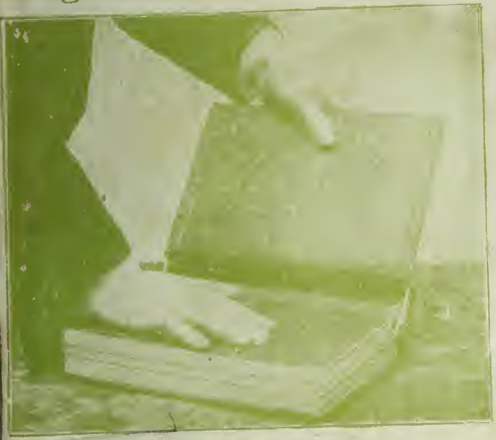
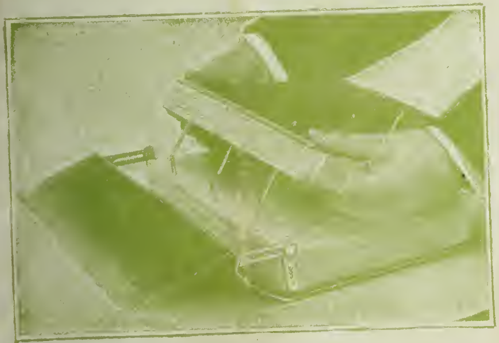
THE UNIVERSITY
OF ILLINOIS
LIBRARY
030
N338
V. 3

Directions are on the inside of the back cover

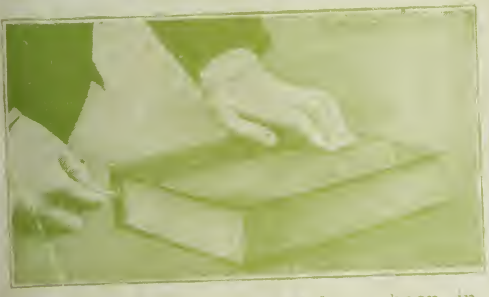
How to take out the Old Pages and put in the New



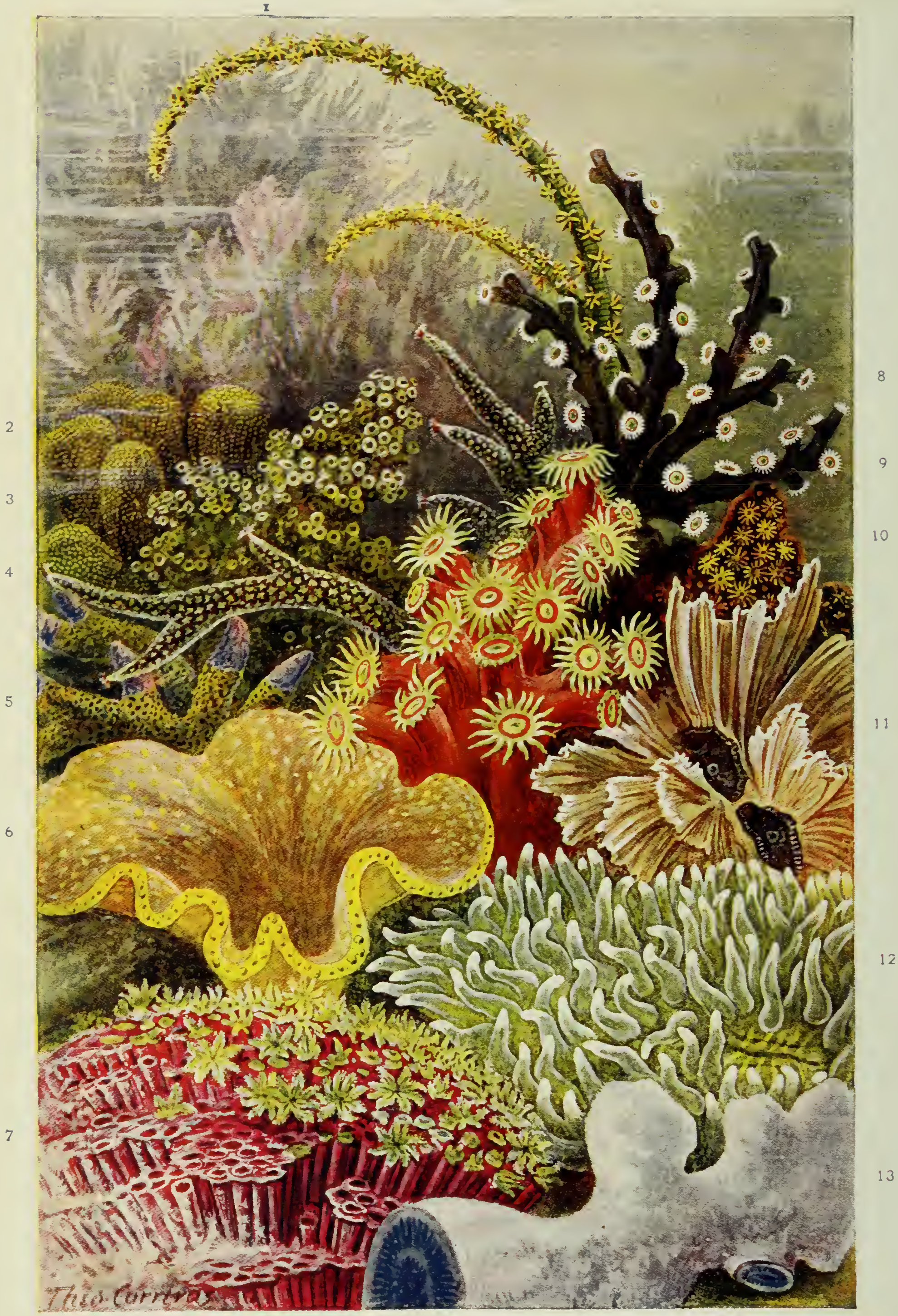
1st—With your key you loosen the nut at the top and bottom of the Volume and lift the front cover.



2nd—Take your metal transfer frame and insert the prongs into the post of the Volume; slide the pages from the Volume on to the transfer frame; remove the old pages and substitute the new.



3rd—After the new pages have been inserted, the old pages can be thrown away and the Volume locked. To lock the Volume fit the pins of the upper cover into the posts as shown in first illustration, close the Volume, press it down tight with your left hand and tighten the nut at the top and bottom. THAT'S ALL.



VARIOUS TYPES OF CORALS.

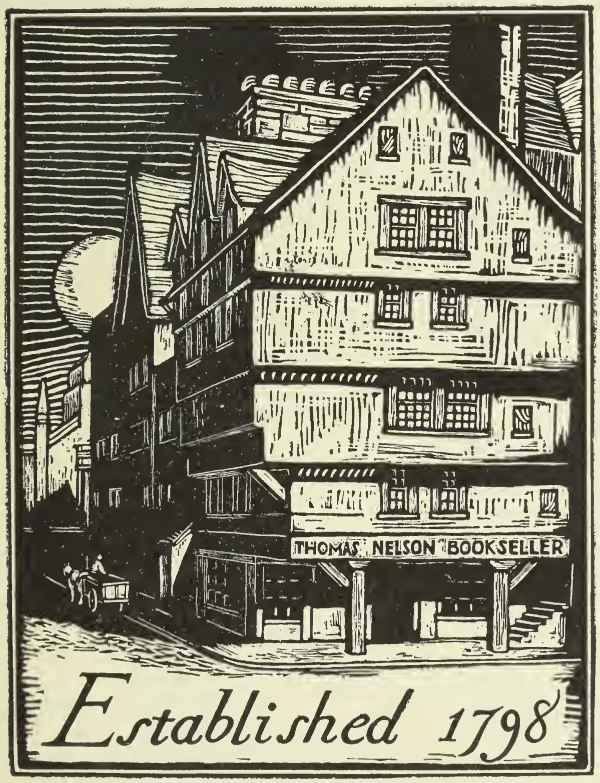
1. Antipathes anguina.
2. Sideropora morax.
3. Madrepora ornata.
4. Madrepora cribripora.
5. Madrepora hebes.
6. Turbinaria patula.
7. Tubipora musica (organ-pipe coral).
8. Dendrophyllia nigrescens.
9. Dendrophyllia coccinea.
10. Turbinaria cinerasceris.
11. Tridacophyllia pæonia.
12. Fungia crassitentacula (mushroom coral).
13. Heliopora cerulea (blue coral).

NELSON

New Loose-Leaf ENCYCLOPEDIA

EDITOR

WILLIAM M. SCHUYLER



THOMAS NELSON AND SONS
LONDON EDINBURGH NEW YORK PARIS TORONTO MELBOURNE

FIRST PUBLISHED AND COPYRIGHTED 1905
BY THOMAS NELSON & SONS, NEW YORK
THIS EDITION REVISED AND COPYRIGHTED 1932
COPYRIGHTED RENEWAL PAGES ISSUED
SEMI-ANNUALLY FOR SUBSEQUENT YEARS

PRINTED IN THE UNITED STATES OF AMERICA

LIST OF CONTRACTIONS USED IN THIS WORK.

ac., acres.
agric., agricultural.
Ala., Alabama.
alt., altitude.
Alta., Alberta.
Amer., America or American.
anc., ancient.
ann., annual.
Ar., Arabic.
Aram., Aramaic.
Ariz., Arizona.
Ark., Arkansas.
arr., arrondissement.
A. S., Anglo-Saxon.
A. V., Authorized Version.
aver., average.
b. p., boiling point.
bor., borough.
Brit., Britain or British.
B. C., British Columbia.
bur., burgh.
c. (circa), about.
C., centigrade.
Cal., California.
cap., capital.
cf., compare.
co., county.
Colo., Colorado.
Com., Commission.
comm., commune.
Conn., Connecticut.
cub. ft., cubic feet.
Dan., Danish.
D. C., District of Columbia.
Del., Delaware.
dep., department.
dist., district.
div., division.
Du., Dutch.
E., east.
eccles., ecclesiastical.
ed., edition; edited.
e. g., for example.
Eng., England or English.
episc., episcopal.
et. seq., and the following.
F., Fahrenheit.
Fla., Florida.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ga., Georgia.
Ger., German.
gov., government.
Gr., Greek.
Heb., Hebrew.
I., **isl.**, island.
Ia., Iowa.
ibid., the same.
i. e., that is.
Ill., Illinois.
in., inches.
Ind. T., Indian Territory.
Ind., Indiana.
Ire., Ireland or Irish.
Ital., Italian.
Kan., Kansas.
Ky., Kentucky.
l., lake.
La., Louisiana.
Lat., Latin.
lat., latitude.
l. bk., left bank.
lit., literally.
long., longitude.
m., miles.
Man., Manitoba.
Mass., Massachusetts.
Md., Maryland.
Me., Maine.
M. E., Methodist Episcopal.
Meth., Methodist.
Mich., Michigan.
Minn., Minnesota.
Miss., Mississippi.
Mo., Missouri.
Mont., Montana.
m. p., melting point.
mrkt. tn., market-town.
Mt., **mts.**, mount, mountain, -s.
munic., municipal.
N., north.
Neb., Nebraska.
N. B., New Brunswick.
N. C., North Carolina.
N. Dak., North Dakota.
Nev., Nevada.
N. H., New Hampshire.
N. J., New Jersey.
N. Mex., New Mexico.
N. S., Nova Scotia.
N. T., New Testament.
N. W. T., Northwest Territories.
N. Y., New York.
O., Ohio.
Okla., Oklahoma.
Ont., Ontario.
Ore., Oregon
O. T., Old Testament.
par., parish.
parl., parliamentary.
Pa., Pennsylvania.
P. E., Protestant Episcopal.
P. E. I., Prince Edward Island
Per., Persian.
P. I., Philippine Islands.
pop., population.
Port., Portuguese.
P. R., Puerto Rico.
Presb., Presbyterian.
prom., promontory.
prov., province.
pueb., pueblo.
Que., Quebec.
q. v., which see.
R., **riv.**, river.
r. bk., right bank.
R. C., Roman Catholic.
R. R., or **ry.**, railroad or railway.
R. I., Rhode Island.
R. V., Revised Version.
R. R. jn., railroad junction.
S., south.
Sans., Sanskrit.
Sask., Saskatchewan.
S. C., South Carolina.
Scot., Scotland or Scottish.
S. Dak., South Dakota.
seapt., seaport.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square miles.
stn., station.
s. v., under the word.
Syr., Syriac.
temp., temperature.
Tenn., Tennessee.
terr., territory.
Tex., Texas.
tn., town.
trans., translated.
trib., tributary.
U. S., United States of America
Va., Virginia.
vil., village.
vol., volume.
Vt., Vermont.
W., west.
Wash., Washington.
wat.-pl., watering-place.
W. Va., West Virginia.
Wis., Wisconsin.
Wyo., Wyoming.
yds., yards.

392479

Digitized by the Internet Archive
in 2016

https://archive.org/details/nelsonsperpetual03finl

Nelson New Loose-Leaf Encyclopedia

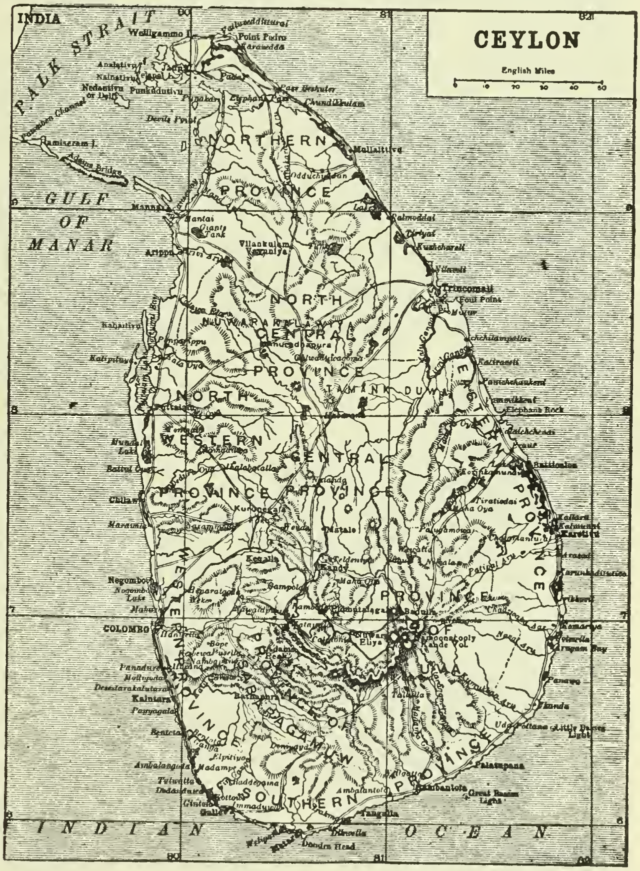
Vol. III.

Cévennes, sā-ven′ (ancient *Cebenna*), a range of mountains in the southeast of France, forming the southern and eastern borders of the central plateau. The Cévennes stretch in a general direction from north to southwest over a length of 330 miles. The principal peak of the system is Mézenc (5,753 feet). To the east of the Cévennes proper lie the plateaus of the Causses. The Cévennes form the watershed between the rivers that flow into the Mediterranean and those that flow into the Atlantic. They are rich in coal, which is extracted in the basin of the Loire and around Alais and St. Etienne; and there is also an abundance of iron ore, zinc, and manganese. There are also rich quarries of granite, marble, and slate; and mineral waters abound, as at Vals, Bagnols, and Silvanez. In the southern part there are big forests, especially the chestnut groves of Ardèche, and extensive grazing grounds. In the northern part cattle raising is the principal occupation, and on the lower slopes vines are grown. Consult E. A. Martel, *Les Cévennes;* R. L. Stevenson, *Travels with a Donkey in the Cévennes;* S. Baring-Gould, *A Book of the Cévennes.*

Ceylon, sē-lon′ *or* -lōn′, an island and British Crown colony in the Indian Ocean, at the southeastern extremity of India, with which it is closely connected by a chain of sand banks and reefs known as Adam's Bridge (q.v.). Ceylon lies between lat. 5° 55′ and 9° 51′ N., and long. 79° 41′ and 81° 54′ E.; it is 270 miles long and 140 miles wide; and it has an area of 25,332 square miles, exclusive of the dependent islands of the Maldives.

Physical Features.—A broad strip of lowland borders the coast, widening out in an undulating plain to the north; and mountains cover about one-sixth of the island in the central south. The highest summits are Pedrotallagalla (8,296 feet) and Adam's Peak (7,353 feet). The longest river is the Mahavili Ganga, which rises at an elevation of 7,000 feet, and reaches the sea near Trincomali, after a course of 150 miles.

The *climate* of Ceylon, though tropical, is modified by the surrounding sea, and by monsoons, prevailing from June to September and from February to May. The average temperature at Colombo is 80° F., while that at Nuwara Eliya, at an elevation of more than 6,000 feet, is but 58° F. The rainfall is less than 50 inches in the northwest and southeast; from 50 to 75 inches in the northeast; from 75 to 100 inches in a twenty-mile belt surrounding the mountain district; and from 100 to 200 inches in the highlands.



The soil is exceedingly fertile, and palms, tree ferns, orchids, flowering trees, and other tropical plants grow in profusion. Forests formerly covered much of the island, but destructive methods of cultivation have laid waste vast areas. Remaining forests produce ebony, satinwood, and other valuable cabinet woods. The native fauna includes the bear, buffalo, elephant, jackal, leopard, bat, several species of deer and monkeys, the peacock, parrot, and numerous reptiles.

The *mineral wealth* of Ceylon consists chiefly of plumbago and of precious stones. The plumbago mines are worked almost wholly by the natives. With the exception of opals, diamonds, emeralds, and turquoises, practically every variety of gem is found, the most important being rubies, sapphires, garnets, and moonstones. The famous pearl fisheries in the Gulf of Manaar have been much less productive since 1905, when a record catch of 80,000,000 oysters was made.

Industry and Trade.—Ceylon is essentially an agricultural country. Among the older products are rice, which is the staple food of the people, cocoanut and other palms, and cinnamon. Coffee planting was introduced about 1835, and increased steadily until 1870, when an insidious fungus (*Hemileia vastatrix*) attacked the plants, and their cultivation was practically abandoned and eventually tea became a substitute. Tea is the staple product today, and rubber growing is also of great importance. Cinchona, cardamoms, cocoa, pepper, and tobacco are also raised.

Manufactures are chiefly related to the products of agriculture. Of some 4,300 factories on the island, about half are devoted to tea, rubber and cacao; cocoanut oil, copra, arrack, cinnamon, citronella and coir fiber and yard were manufactured in about 1,500 establishments. The making of lace, furniture, jewelry, and brassware is carried on by the villagers in their homes.

The foreign trade of Ceylon comprises exports of rubber, cocoanuts, desiccated cocoanut, cocoanut oil, copra, coir fiber and yarn, plumbago, cocoa, citronella oil, cinnamon (chips and quills); and imports of cotton manufactures, rice, coal and coke, spirits, sugar, and manures.

Railroads are owned and operated by the government, 950 miles being open at the end of 1942.

Peoples.—The population of Ceylon in 1942 (est.) was 6,083,000, exclusive of the military and shipping population and the population on estates, which was 692,540. Of these 3,500,000 were Sinhalese; 325,000 Moormen;35,000 Burghers; and 10,000 Europeans.

The Sinhalese (q. v.) are found chiefly in the southern and central parts of the island. They are descendants of those colonists from the valley of the Ganges who first settled in the island (543 B.C.), and speak an Aryan language closely allied to the Pali. The Tamils, or Malabars, have sprung from early invaders of Ceylon who from time to time swept across from southern Hindustan. The Moormen met with in every province are enterprising traders, and are generally believed to be of Arab descent. The Burghers are the naturalized descendants of early European settlers. There is, besides, a remarkable tribe of outcasts—the Veddahs (q. v.)—believed to be descended from the Yakkos, the aboriginal inhabitants of the country. The Sinhalese are devoted to Buddhism, which is the prevailing religion of the island. Brahmanism or Hinduism is the faith of the Tamils or Malabars, and the Moormen are Mohammedans.

The principal towns, with their population in 1931 (exclusive of military, shipping, and estates), are: Colombo, the capital, 284,155; Galle, 38,424; Jaffna, 45,708; Kandy, 36,541.

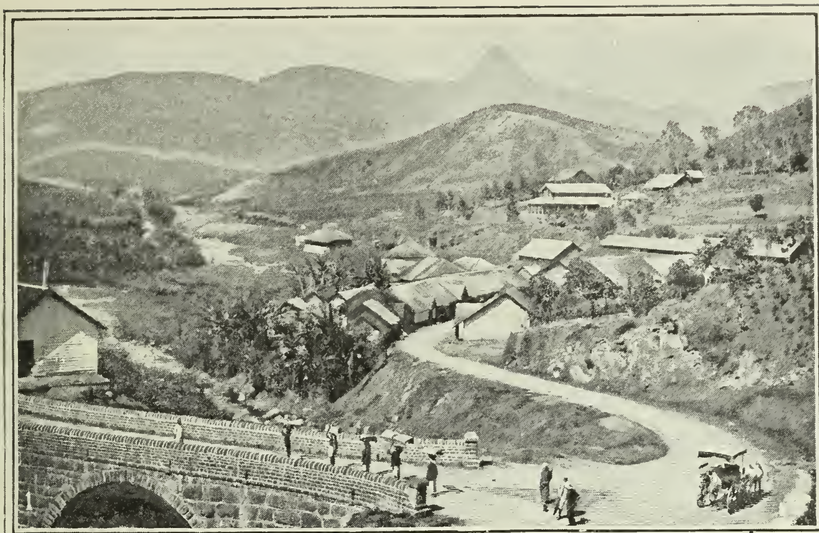
Government.—A Crown colony, Ceylon is administered by a governor, aided by a state council of 50 members. For administrative purposes the island is divided into nine provinces, each under a government agent. The judicial system includes a supreme court, police courts, district courts, and courts of request. Local boards and village tribunals give a measure of self-government to the people.

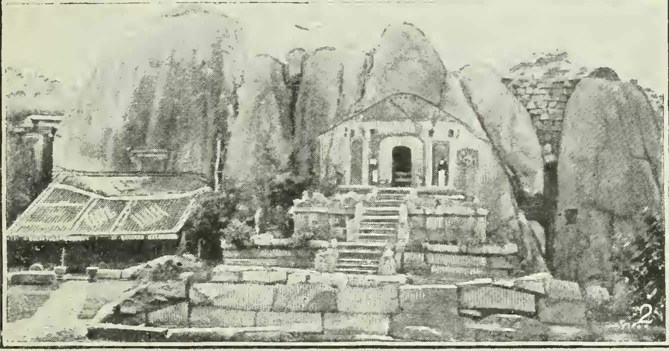
Education is provided for by vernacular schools, in which tuition is free, and in English schools in which fees are charged. The total enrolment in 1942 was about 575,000. There are also a Royal College and a Government Training College, and technical and industrial schools. The University of Ceylon was established July 1, 1942 by the incorporation of the Ceylon Medical College (1870) and the Ceylon University College (1921), with 904 students.

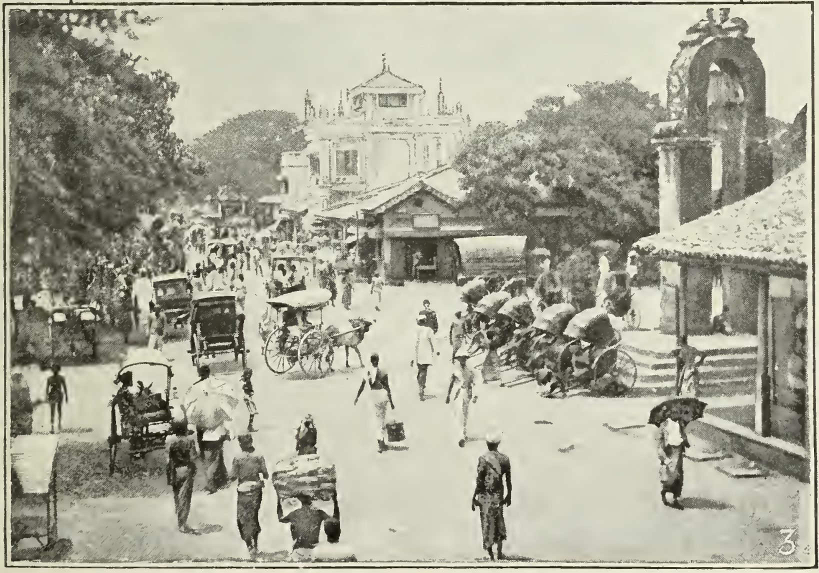
History.—The authentic history of Ceylon begins in 543 B.C., with the invasion of the island by Wijayo, who subdued the Yakkos, and bestowed on the kingdom his patrimonial name of Sihala. Buddhism was established about 300 B.C., and then was begun the erection of the numerous Buddhistic shrines, temples, and monasteries whose ruins are one of the most interesting features of Ceylon. In 237 B.C. occurred the first of a series of Malabar or Tamil invasions and usurpations that marked the history of the Sinhalese until the arrival of the Portuguese in 1505. The latter established their first colony at Colombo in 1517, and eventually gained control of the entire coast. They were driven from the island in 1658 by the Dutch, who, after over a century of possession, surrendered to the English in 1796. Ceylon was formally ceded to Great Britain in 1803, and in 1815, by a convention with the Kandyan chiefs, the entire sovereignty of the island passed into British hands. Since that time there have been some few disturbances, but on the whole the island has been peaceful and prosperous. Many reforms have been instituted, railways established, the legislative council was reformed in 1910 by the introduction of the elective principle, and in the First World War Ceylon furnished a contingent for service.

Bibliography.—Consult Sir J. E. Tennent, *Ceylon* (2 vols.); E. Gordon Cumming, *Two Happy Years in Ceylon* (2 vols.); Major Skinner, *Fifty Years in Ceylon;* S. M. Burrows, *Buried Cities of Ceylon; Twentieth Century Impressions of Ceylon* (ed. by A. Wright); J. C. Willis, *Ceylon;* R. Farrer, *In Old Ceylon;* H. W. Cave, *Ruined Cities of Ceylon* and *Book of Ceylon;* H. Parker, *Ancient Ceylon;* H. D. Baker, *British India, with Notes on Ceylon* (U. S. Special Consular Report, No. 72, 1915); *Blue Book of Ceylon* (annual); J. Ferguson, *Ceylon Handbook and Directory* (annual); G. E. Mitton, *The Lost Cities of Ceylon;* Codrington, *A Short History of Ceylon* (1926); Mills, *Ceylon Under British Rule* (1933); Dulling, *Sketches from Ceylon History* (1934); Elliott, *The Real Ceylon* (1939); Holden, *Ceylon* (1939).

Cézanne, sā'zan', PAUL (1839–1906), French artist, was born in Aix-en-Provence. He was graduated from the college at Aix, where he formed a close friendship with Emile Zola. He studied at the Académie Suisse, coming successively under the influence of Delacroix, Courbet, and Manet. He joined the Impressionists at their first exhibit in 1874, and again in 1877; but his pictures were ridiculed by the critics, and he gained little recognition during his lifetime. By the more radical of the younger French painters, however, he is looked upon as a leader and a prophet. His work is characterized by strength and harmony of color, and by an attempt to express the depth and modeling that was absent from the work of the Impressionist school. His paintings include still life, landscapes, and portraits. Consult T. Vollard, *Paul Cézanne* (trans.

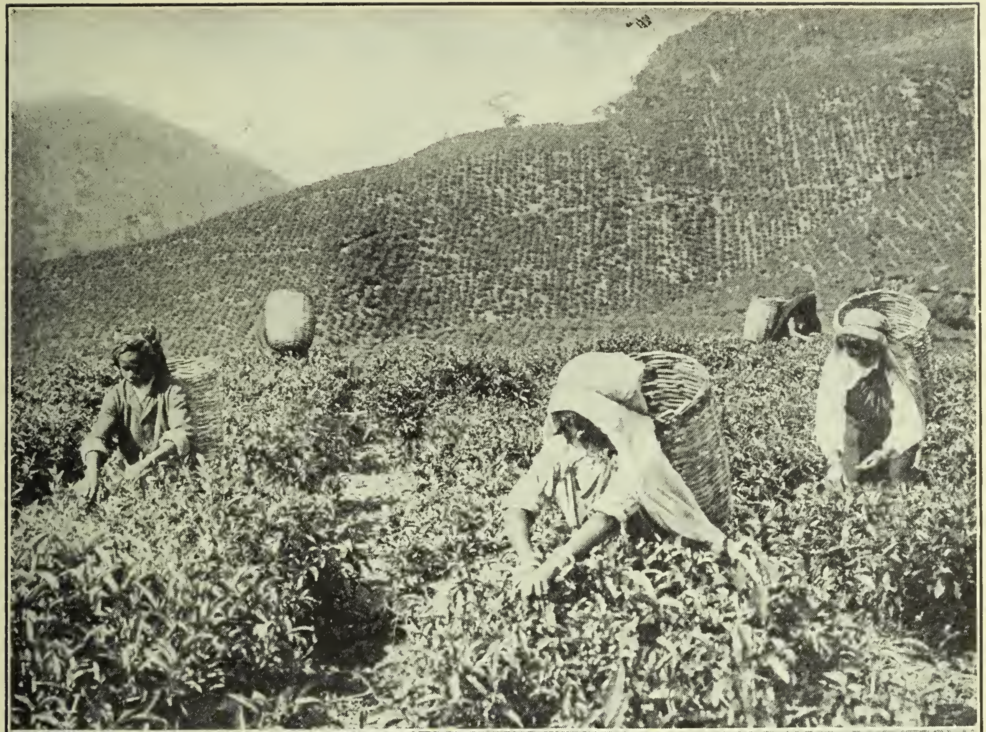


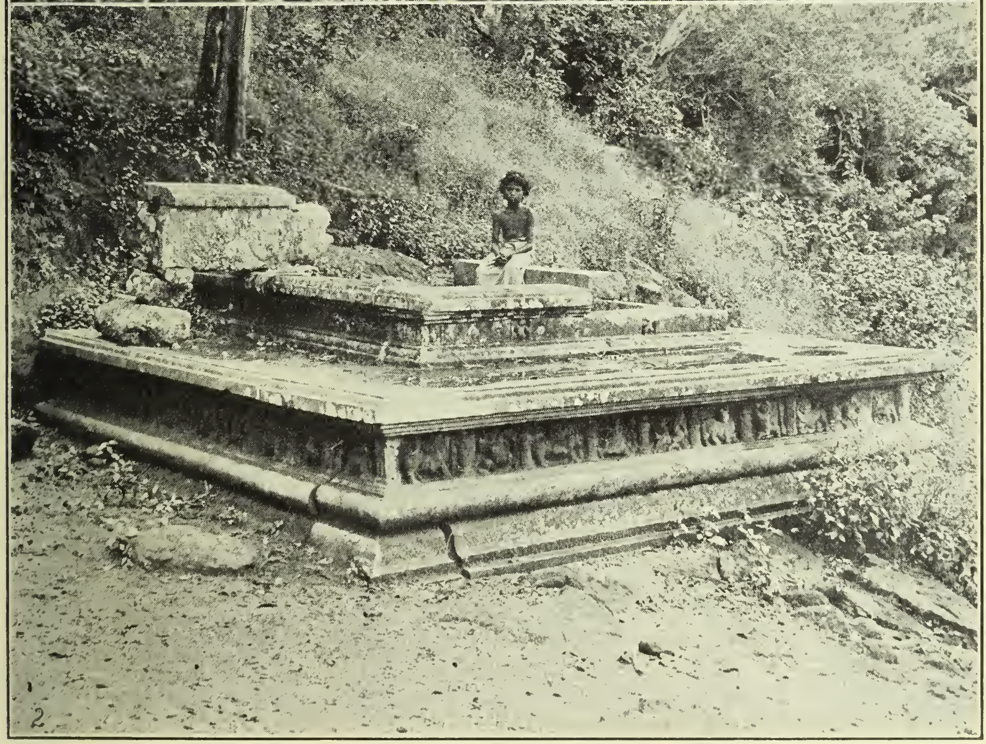




VIEWS IN CEYLON.

1. Adam's Peak, from Maskeliya. 2. Anuradhapura: Issurumuniya Temple. 3. Street scene, native town, Colombo.





Photos by Ewing Galloway, N. Y.

Ceylon

1. Tea Pickers at Work. 2. The King's Bath at Mahintale, a Relic of the Ancient Ceylon Civilization.

1924) and Meier-Graefe, *Cézanne* (trans. 1927).

Cezimbra, se-zēm'brȧ, coast town, Portugal; 20 miles south of Lisbon. Fishing is the chief industry. Pop. 9,000.

C.G.S., or Centimeter-Gram Second System, the system used by all scientists, and in daily commercial use by most nations, except the United States, Great Britain, and Russia, for the measurement of physical quantities. Its unit of length is the *centimeter,* that of mass, the *gram,* and that of time, the *second.* The last is the mean solar second, and the other two arose during the French Revolution. See Metric System; Units.

Chabas, shȧ-bȧ', François Joseph (1817–82), French Egyptologist, was born near Briançon. In 1873 he was offered, but declined, the chair of Egyptian language and archaeology at the Collège de France. His works are elucidative chiefly of two important periods of ancient Egyptian history, the conquest of the country by the Hyksos, and the time of their expulsion; they include *Les pasteurs en Egypte* (1868); *Histoire de la XIX dynastie* (1873); *Etudes sur l'antiquité historique d'après les sources Egyptiennes* (1874).

Chabazite, kab'ȧ-zīt, or Chabasite, a hydrous silicate belonging to the zeolite (q. v.) group. Its crystals are white or flesh red in color, and it is found in basaltic rocks principally in Nova Scotia.

Chabot, shȧ-bō', Philippe de (1480–1543), Count of Charny and Buzançois (known as L'Amiral de Brion), French soldier, member of an influential family in Poitu. He saved Marseilles from the imperialists (1524); was taken prisoner at Pavia (1525); appointed governor of Burgundy and admiral of France (1526), and thereafter conquered nearly the whole of Piedmont (1535). Through court intrigues he fell into disgrace, and was imprisoned for two years (1539–41). He was the patron of Jacques Cartier.

Chabrias, kā'bri-as (?–357 b.c.), one of the leading military commanders at Athens in the fourth century b.c. His chief exploits were a victory in Aegina over a Spartan force in 388; his great victory at Naxos in 376 over the Spartan fleet, which reestablished the empire of Athens; his successful expedition with Iphicrates to Corcyra in 373; his repulse of a Theban attack on Corinth in 368; and finally, his gallant attack on the occasion of the siege of Chios in 357 b.c., which cost him his life. Cornelius Nepos wrote his life, and Demosthenes a special eulogy of him.

Chabrier, shȧ-brē-ā', Alexis Emmanuel (1841–94), French musical composer, was born in Ambert. His first successful production was *L'etoile* (1877), followed by *L'education manquée* (1879), *Dix pièces pittoresques,* for piano (1883), and *España.* He played at concerts of Château d'Eau, where he was chorus master (1884–5), helped Lamoureux to produce two acts of *Tristan et Isolde,* and produced *La Sulamite* (1885), also selections from his opera *Guendoline,* the whole of which was played afterward in Brussels (1886). *Le roi malgré lui* was produced at the Opéra Comique in Paris (1887) and he left an opera, *Briseis,* unfinished when he died.

Chacma, chȧk'mȧ (*Cynocephalus porcarius,* 'dog-headed, piglike' monkey), a South African baboon (q. v.), a near ally of the mandrill (q. v.). It lives among rocks and enjoys a varied diet, consuming insects, scorpions, reptiles, and so on, as well as vegetable substances. It is frequently tamed, and occasionally taught to do serviceable things.

Chaco, El, chä'kō, territory of the Argentine Republic, consisting of part of the Gran Chaco (q. v.), lying south of the Bermejo River; area, 52,741 square miles. Agriculture and cattle grazing are pursued to some extent, but timber felling is the most widely spread industry. The administrative center is Resistencia, 400 miles north of Buenos Ayres. Pop. 83,000.

Chaco, El Gran. See Gran Chaco.

Chaconne, shȧ-kon', a dance probably of Spanish origin, formerly popular, but now obsolete. It had slow and stately movements. The music for it was usually a series of variations on a ground bass of eight bars. The Italian *maestro* Porpora (1686–1766) wrote some music for it, as did also J. S. Bach and Handel.

Chad, St., or Ceadda (d. 672), a native of Northumbria, was a disciple of St. Aidan, and became successively bishop of the East Saxons (664), of York (666), and of Mercia (669). His holiness and austerities were long proverbial in the north of England.

Chadbourne, chad'burn, Paul Ansel (1823–83), American educator, was born in North Berwick, Maine. He was graduated from Williams College (1848), and studied for the ministry. In 1853 he became professor of chemistry and physics at Williams, and after 1858 undertook similar duties at Bowdoin and the Berkshire Medical College. He was professor of natural history at Williams (1859–67), and was appointed successively to the presidency of the Massachusetts Agricultural College (1866), the University of Wisconson (1867), Williams College (1872), and again of the Massachusetts Agricultural College (1881). He was twice a member of the Massachusetts senate. His works include *Relation of the Natural Sciences to the Intellect* (1860); *Instinct in Animals and Men* (1872); *Strength of Men and Stability of Nations* (1873–7). He edited *Public Service of the State of New York* (3 vols., 1881).

Chadderton, town, England, in Lancashire, adjoining Oldham (q. v.). It has cotton and chemical manufactures. Pop. (1938) 30,270.

Chad, Lake, Tchȧd, or Tsad, large lake, Africa, between Bornu on the west, Kanem on the northeast, and Bagirmi and Wadai on the southeast and east. Its extreme length from north to south is said to be 120 to 150 miles, while from east to west it has been variously estimated at from 60 to 130 miles. The depth is calculated at from 8 to 15 feet, and the lake is studded with islands on the east and southeast side. In the dry season the area is about 10,000 square miles, but in the wet season it increases to 20,000. Its waters are sweet, though the wells in the vicinity are salt. Lake Chad receives the waters of the Yobe or Yeou, but its chief feeder is the Shari. Its surplus waters once drained to the northeast by the Bahr-el-Ghazal; but, according to later accounts, they no longer reach the Bodele depression to the northeast. The lake abounds with fish, and is frequented by wild fowl, hippopotami, and alligators. Nachtigal explored it in 1870. The convention of 1898 gave France the right to its eastern shore. On the islands live the piratical Baduma and Kuri tribes. Consult Boyd Alexander, *From the Niger to the Nile* (1907).

Chad'ron, city, Nebraska, county seat of Dawes County, on the Chicago and North Western Railroad; 350 miles north of Denver. It is an important trade and live stock center, and is the seat of the state normal school. Pop. (1930) 4,606; (1940) 4,262.

Chad'wick, Sir Edwin (1800–90), English social reformer, was born in Longsight, near Manchester. The eradication of disease and the promotion of health and well-being were his chief interests. His report on the poor laws, in 1833, laid the foundation of the later systems of government inspection; and his report on interments in towns (1843) led to subsequent legislation. He was secretary of the Board of Health (1848–54), and helped form (1878) the Social Science Association. Consult *Life* by Richardson.

Chadwick, French Ensor (1844–1919), American naval officer, was born in Morgantown, W. Va. He was graduated from the U. S. Naval Academy (1864), and rose to the rank of lieutenant commander (1869), commander (1884), captain (1897), and rear admiral (1903), retiring in 1906. He was naval attaché at the American embassy, London (1882–9), chief of the Intelligence Office (1892–3), and chief of the Bureau of Equipment (1893–7). During the Spanish-American War he commanded U.S.S. *New York,* was chief of staff to Admiral Sampson, and was advanced for conspicuous conduct in battle. Later he was president of the Naval War College (1900–3), and commander in chief of the South Atlantic squadron (1904). He was a member of the National Institute of Arts and Letters. His published works include *Temperament, Disease and Health* (1892); *An Unsolved Problem* (1896); *Causes of the Civil War* ('American Nation' series, 1906); *Relations of the United States and Spain, 1776–1898* (3 vols., 1909–11); *The American Navy* (1915).

Chadwick, George Whitefield (1854–1931), American composer and conductor, was born in Lowell, Mass. He studied under Eugene Thayer in America, and under Jadassohn, Reinecke, and Rheinberger in Germany. Returning to Boston in 1880, he became instructor in harmony and composition in the New England Conservatory of Music, of which institution he was appointed director in 1897. He acted as organist for prominent Boston churches, and for several seasons conducted the Springfield and Worcester festivals. He conducted all the leading symphony orchestras of America in his own works, and organized a symphony orchestra in the New England Conservatory of Music, which gave an annual series of concerts under his direction. His compositions include overtures—*Rip Van Winkle, Thalia, Anniversary, Melpomene, Adonais,* and *Euterpe;* three symphonies; an opera—*Judith;* a lyric drama; three symphonic poems—*Cleopatra, Aphrodite,* and *Tam O'-Shanter;* and various choral works, smaller orchestral compositions, songs, and pieces for the piano and organ. In 1893 he set to music the Columbian Ode, written for the Chicago Exposition. He was a member of the American Academy of Arts and Letters.

Chadwick, James Read (1844–1905), American surgeon, was born in Boston. He was graduated from Harvard University (1865) and from the Harvard Medical School (1871), and became a specialist in gynecology. He was founder, secretary (1876–82), and president (1897) of the American Gynecological Society; librarian of the Boston Medical Library (1875); and president of the Massachusetts Cremation Society (1894). His works include *The Boston Medical Library* (1876, 1903); *The Study and Practice of Medicine by Women* (1879); *Obstetric and Gynæcological Literature 1876–1880* (1881).

Chadwick, John White (1840–1904), American clergyman and author, was born in Marblehead, Mass. He was graduated from the Harvard Divinity School (1864), and was called to the Second Unitarian Church of Brooklyn, N. Y., with which he was associated for the remainder of his life. He was a contributor to numerous periodicals. Among his works are several books of verse—*A Book of Poems* (1876), *In Nazareth Town* (1883), *A Few Verses* (1900), and *Later Poems* (1905); a number of biographies, including *Theodore Parker, Preacher, Reformer* (1900), and *William Ellery Channing, Minister of Religion* (1903); and numerous popular religious treatises, such as *The Bible of To-day* (1875), *The Faith of Reason* (1879), *Some Aspects of Religion* (1879), *The Man Jesus* (1881), *A Daring Faith* (1885), and *Old and New Unitarian Belief* (1894).

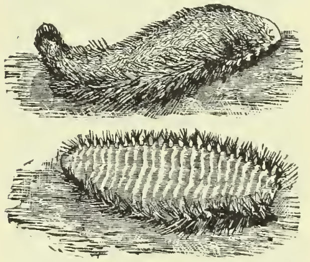
Chaerea, kē′rē-*a,* Caius Cassius, a tribune of the praetorian guards of Rome under Caligula, who formed the conspiracy which ended that Emperor's life (Jan. 24, 41 A.D.).

Chaeronea, ker-ō-nē′*a* (now Kaprena), ancient Greek town in Boeotia, famous for the victory gained by Philip of Macedon in 338 B.C. over the Boeotian and Athenian forces. Here also Sulla defeated the generals of Mithridates in 86 B.C. It was the birthplace of Plutarch. The ruins of a temple, an aqueduct, and the fragments of the marble lion (removed to Athens in 1880) which marked the tomb of Boeotians of the Sacred Band in the great battle, still remain.

Chaetodon, kē′tō-don ('bristle teeth'), a genus of bony fishes, comprising some seventy species from the tropical parts of the Atlantic and Indo-Pacific, where they are especially abundant in the vicinity of coral reefs. The fish, which are carnivorous, are remarkable for the beauty and variety of their coloring. The lower rays of the pectoral fins are branched, and the hind fins are situated far forward on the thorax. The dorsal and anal fins are so thickly covered with scales that the boundary between body and fins is obliterated, a peculiarity which gives the name of Squamipennes to the family to which the Chaetodon belong. They are but little used for food.

Chaetodon

Chaetopoda, kē-top′ō-d*a* *or* kē-tō-pō′d*a* (Greek 'bristle footed'), a class of worms including familiar types like the Earthworm, the fisherman's Lobworm or Lugworm, and the Sea-Mouse. They are often included under the title of Annelids or Ringed Worms. The body consists of numerous more or less similar joints; and the locomotor organs are furnished with or represented by bristles. The class is divided into two main orders of Oligochaeta and Polychaeta, of which the latter is much the larger. The *Oligochaeta* have rudimentary locomotor structures, which are in fact reduced to bristles; they are fresh water or subterranean in habit; the familiar earthworm (Lumbricus) and certain river



Chaetopoda: upper and under aspects

and pond worms (*e.g.*, Tubiflex and Nais) are common representatives. The *Polychaeta* are marine, with three or four exceptions; the bristles, which are numerous, are fixed in special locomotor outgrowths; and many other characters, such as the possession of antennae, gills, etc., distinguish them from the earthworm order, and are in obvious association with their very different habits. Many of them, described as errant, lead a free life, and are carnivorous in their diet. The common nereis, or alitta, and the sea-mouse (Aphrodite) are good examples. A large number, however, are sedentary in habit, vegetarian in diet, and often inhabit tubes. The lugworm (*Arenicola*), the common serpula, and terebella are characteristic types. See EARTHWORM; LUGWORM; SEA-MOUSE.

Chaetopterus, kē-top't*e*r-us ('winged bristle worm'), a much-modified annelid, remarkable for its peculiar violet color and lateral fans or wings. It inhabits a parchment-like tube, and occurs in the Mediterranean.

Cha'fer, a common name for beetles or coleopterous insects, especially for those which are destructive of plants, particularly of the wood, bark, or roots of trees. The word is seldom used alone, but generally as part of a name, with some prefix; as *cock chafer*, *rose chafer*, *bark chafer*, etc.

Chaffarinas. See ZAFFARINES.

Chaffee, chaf'i, ADNA ROMANZA (1842–1914), American soldier was born in Orwell, O., and entered the U. S. Army as a private in 1861. He was commissioned second lieutenant in 1863, and was brevetted first lieutenant and captain for gallant and meritorious service during the Civil War. In 1867 he became a captain in the regular army, and for the next twenty-one years was largely occupied in Indian warfare. In 1888 he became major, and in 1897 lieutenant colonel. He served in Cuba during the Spanish War as brigadier general and major general of volunteers, especially distinguishing himself at El Caney. In 1900 he was assigned to the command of the U. S. troops sent to the relief of the U. S. legation at Peking. He was promoted major general in the U. S. Army (1901); was in command of the division of the Philippines, and military governor (1901–2), and was commander of the Department of the East (1902–03). In 1904 he became lieutenant general and chief of staff. He retired in February, 1906.

Chaffinch (*Fringilla coelebs*), a species of finch, and probably that to which the name finch, now so extended in its signification, originally belonged. The whole length of the bird is about 6 inches. The tail is slightly forked; the beak is almost equal in breadth and height. In the male, in summer, the top of the head and nape of the neck is bluish gray; the back, chestnut; the wings almost black, with two conspicuous white bars; the tail nearly black; the lower surface reddish. In winter its colors and those of the female are much duller. The chaffinch is found in almost all parts of Europe, in some parts of Asia, in the north of Africa, and as far west as the Azores. In the colder northern countries it is migratory; but in more southern regions it is stationary. The eggs are usually four or five in number, of pale purplish buff color, sparingly streaked and spotted with reddish brown. The chaffinch feeds in great part on insects, and is useful in destroying aphids and caterpillars, although it also eats seeds. Because of its loud, clear, and thrilling voice it is much sought as a cage bird.

Cha'fin, EUGENE WILDER (1852–1920), American temperance advocate, was born in East Troy, Wis. He was graduated in law from the University of Wisconsin (1875); practised in Waukesha, Wis. (1876–1900); and was superintendent of the Washingtonian Home, Chicago (1901–04). He was admitted to the bar of the Supreme Court of the United States in 1909. One of the leaders in the temperance cause in the United States, he was Prohibition candidate for Congress in Wisconsin (1882) and Illinois (1902), for attorney-general of Wisconsin (1886, 1900) and Illinois (1904), for governor of Wisconsin (1898), for President of the United States (1908, 1912) and for U. S. Senator from Arizona (1914). He wrote *Voter's Handbook* (1876); *Lives of the Presidents* (1896); *Lincoln, the Man of Sorrow* (1908); *Washington as a Statesman* (1909).

Chagny, fortified town, France, in the department of Saône-et-Loire, on the Canal du Centre; 32 miles from Dijon. It has railway workshops and quarries. Pop. 4,556.

Chagos Archipelago, chä'-gōs, a group of low coral islands in the Indian Ocean, south of the Maldive Islands; area, 76 square miles. The largest is *Diego Garcia*, or Grand Chagos. It exports cocoanut oil. The group belongs to Great Britain, and forms a dependency of Mauritius. Pop. 1,000.

Chagres, chä'gres, town, Republic of Panama, on the Atlantic Coast of the Isthmus of Panama, at the mouth of the Chagres River. Pop. 1,000.

Chagres River, a river of Panama, rises about 30 miles northeast of the city of Panama, flows for 100 miles across the Isthmus, and enters the Caribbean Sea at Chagres. Its waters are used in connection with the Panama Canal, but the control of its tropical floods proves one of great difficulty. The river flows through the Gatun dam, which constitutes a reservoir for receiving the floods of the Chagres and other rivers. See PANAMA CANAL.

Chaillé-Long, shȧ-yā' lông', CHARLES (1842–1917), American soldier, explorer, and diplomat, was born in Princess Anne, Somerset County, Md. He was graduated from Washington Academy (1860), and served in the Union Army during the Civil War, rising to the rank of captain (1864). In 1869 he was appointed lieutenant colonel in the army of the khedive of Egypt, where he served as chief of staff to the commanding general (1870–73), and to Gen. C. G. Gordon, the governor general of the Egyptian Sudan (1874–7). In 1874 he executed a treaty with the king of Uganda annexing that country to Egypt. He navigated the unknown Victoria Nile, discovered Lake Ibrahim, and solved the problem of the Nile sources, thus completing the discoveries of Speke and Baker. By order of Gordon he led an Egyptian expedition west of the Nile, and occupied the Niam-Niam country, and the east coast of Africa at Juba, Kismayu, Mombas. For these services he was decorated with the Medjidieh cross, and was promoted colonel and bey. He retired in 1877 on account of disease contracted in service.

Returning to America, Chaillé-Long was graduated from the Columbia Law School in 1880. He was admitted to the practice of international law in Egypt in 1882; and at the request of the U. S. Government assumed temporary direction of the U. S. consulate at Alexandria after the massacre of June 11, 1882. With the aid of a detachment of American sailors and marines, he saved hundreds of Christian lives, and the city itself from entire destruction, during the bombardment. For this service he was awarded the Egyptian cross of the Osmanieh, and a letter of thanks by the U. S. State Department. In 1887–9 he was U. S. consul-general and secretary of legation to Korea. In 1910 he was awarded the gold medal of the American Geographical Society for the final solution of the Nile source problem. He published *Central Africa: Naked Truths of Naked People* (1876); *The Three Prophets* (1884); *Les sources du*

Nil (1891); *L'Egypt et ses provinces perdues* (1892); *Une page d'histoire de la geographie Africaine* (1900); *Les provinces equatoriales d'Egypte* (1904); *Les combatants Français de la guerre Américaine* (Eng. trans. 1906); *My Life in Four Continents* (1912).

Chaillu, PAUL DU. See DU CHAILLU.

Chain. See CHAINS.

Chain Bridge. See BRIDGE.

Chain Cable. See CABLE.

Chain Coral. See HALYSITES.

Chained Books. In the fifteenth and sixteenth centuries books were of such high value that drastic means were necessary to secure them from theft. As a rule, they were arranged on long reading desks, and were chained to an iron rod running along the top of each desk. A library of this kind, founded in 1561, is still to be seen at Zutphen. The increase in the number of books led to standing bookshelves in which the books were placed in modern manner, but still chained in such a way that they could be taken out and perused on the desks. At All Saints' Church, Hereford, England, and in the Cathedral Library at the same place, chained books may be seen arranged in this way. In the reigns of Henry VIII. and Edward VI. the Bible and the Paraphrases of Erasmus were ordered to be placed in all parish churches and were chained. In some English churches they may still be seen, along with such other works as Foxe's *Book of Martyrs* and Bishop Jewell's books. Chaining of books was discontinued in the early years of the eighteenth century. For a list of English churches with chained books, consult William Blades' *Books in Chains;* for further information, J. W. Clark's *The Care of Books.*

Chain Mail, or CHAIN ARMOR, a coat of armor much used in Europe in the twelfth and thirteenth centuries, consisting of hammered iron links, connected together by rivetted links so that each link embraces four others, and worked into the form of a garment. Such armor was much more flexible and convenient to the weaver than steel or brass plates, but was less fitted to bear the thrust of a lance. See ARMOR.

Chain Plates, on board wooden ships, are iron plates bolted below the channels to serve as attachments for the dead-eyes, through which the standing rigging or shrouds and back-stays are rove and secured. In most of the modern iron-steel vessels *rigging screws* take the place of the older *dead-eyes,* the chain plates to which they are attached consisting simply of flat palms, having an eye projection, rivetted to the inside of the *sheer* or top strake of shell plating.

Chains, series of rings or links of metal joined together so as to move more or less freely, and forming a strong but flexible band. The term is applied to a great number of forms, ranging from the finest ornamental chains of gold or silver, weighing but a few grains, to massive cables of wrought iron, each link of which weighs a hundred pounds or more. Chains are variously classified: according to use, as anchor chains, hoisting chains, surveyors' chains, etc.; according to material, as gold, silver, iron, or steel; according to the form of link, as open, stud, twisted, flat, and rolled link. The size is specified by the thickness of the bar metal from which the links are formed.

Crane, hoisting, and *anchor chains* are usually of wrought iron, which combines a high tensile strength with sufficient malleability to allow it to be bent or twisted into the desired form, and a high degree of ductility, enabling the chain to endure severe and sudden strains, as those due to the slipping or falling of heavy loads or to the tug of a vessel riding at anchor. Soft steel is sometimes used, especially for smaller chains, but is less resistant to climatic conditions, and more apt to break abruptly and without warning.

Most wrought iron chains of more then one and one-quarter inches are hand forged and welded, but the use of the steam hammer has been introduced for chains above two and one-half inches. In either case, iron bars of the desired thickness are cut into straight lengths and heated. The ends are then hammered to form scarves or levels, the bar is swaged into link form, threaded onto the link previously made, and welded. In stud link chains a stud or bar of cast iron, with the ends shaped to fit the inner surface of the link, is inserted across the link midway of its length before welding. This prevents kinking of the chain, keeps it from becoming rigid under heavy weights, and enables it to bear from twenty to twenty-five per cent. more load than an open link chain, though its ultimate strength is probably less.

Smaller chains of inferior quality are made by machinery, the bar of metal being coiled into a spiral form and then cut into individual links. The links are sprung open, assembled to form the complete chain, and welded or brazed. Twisted link chains, which are especially adapted to winding on drums, have the links twisted just previous to the final welding. Steel chains up to a size of one inch diameter metal are sometimes of the weldless type. These are made by passing a red hot steel bar of cruciform section through a stamping machine, the dies of which impress on the metal, by a series of strokes, the outer form of a short-link chain. A second operation cuts away the web from inside the links, and a third breaks them apart and polishes their surface.

The breaking strain of any chain may be calculated from its cross section, to the area of which it bears a fixed proportion. Test loads to detect poor workmanship or defective material are usually about one-half the ultimate strength of the chain; but the working load should never exceed one-third of the ultimate strength, as more than that stresses the material beyond its elastic limit, and soon causes the chain to break. Chains for use in the U. S. Navy and for ship's cables must pass certain standard tests.

Chains for suspension bridges differ from other chains in that the links are formed of flat plates of iron joined together by transverse pins. *Surveying chains* also have a peculiar construction, being made up of long single-bar links, looped at each end, but not welded, and connected by small circular links. They contain a hundred long links, including a handle at either end, and every tenth connecting link is marked by a distinctive tag of brass, for convenience in reading the measurement (see SURVEYING).

Specially constructed chains designed to engage on suitably formed sprocket wheels are used extensively for *power transmission,* as in the various types of motor vehicles, paper and textile machinery, turbines, ventilating apparatus, hydro-extractors, engine governors, refrigerating machinery, ignition apparatus, and locomotives. Power transmission chains are of two main types, non-silent and silent. Non-silent chains, in which the links are made up of a single roller or block held by side pieces and rivets, are used chiefly for mechanical drives as in motor cars, motor-cycles, and bicycles. Silent chains, sometimes known as flexible gearing, differ in having the links made up of several comparatively thin plates. They find a wide application in electrical machinery. (See GEARING.)

Consult T. W. Trail's *Chain Cables and Chains.* For test requirements, consult Kent's *Mechanical Engineer's Pocket Book.*

Chain Shot, an obsolete artillery projectile, consisting of two balls connected by a short chain.

Chain Snake (*Ophiobolus getulus*), a harmless snake of the United States, so called because of the chain-like markings on its skin. It is 4 to 5 feet in length, and the color and markings vary in different localities. In the East and South it is black, crossed by yellow lines. Its habits are nocturnal, and it feeds on smaller animals, including snakes.

Chain Stores, a system of retail selling which comprises a number of stores under a common ownership and management and having common policies and methods of operation. Chain stores existed in the days of the Roman Empire and possibly much earlier. In the excavations at Pompeii evidence was found that one trader had branch stores. It is claimed that the oldest chain now operating is that of the Hudson's Bay Company (1670) with 250 trading posts in sub-arctic America and 10 large modern stores in western Canada. Probably the second oldest chain in the Americas is that of Companhia Calcado Clarke Company (30 stores) in Brazil, dating from the early 19th century. There are chains in England which are over 100 years old. In the United States the chain store pioneer was George Hartford, who, in 1859, founded the Great Atlantic and Pacific Tea Company, the largest chain of retail stores in the world. Perhaps the most widely distributed in the world is that of the Singer Sewing Machine Company, founded in America, with associate companies in Great Britain, France and Germany. In India there are chains of railway buffets, bookstalls, hotels, general stores, and department stores operated by an English firm. Chain stores thrive in Japan, Denmark, Germany, Italy, Switzerland, Holland, Norway, Sweden, Egypt and elsewhere.

The chain store system includes almost every field of retail buying. Voluntary chains, which are really groups of independently-owned stores combined to combat the chain stores proper, are different from the systems considered above, as are also the chains of consumer-owned stores, managed by the coöperative societies in Europe. It is estimated that exclusive of chains of gasoline stations, banks, coal depots, farms and hotels, there are between 270,000 and 300,000 chain stores throughout the world, of which approximately 100.000 are chain grocery stores. In the United States the chain stores do an annual trade of about $15.000.000,000 or about 30 per cent of total sales in all retail stores, which represents close to one-sixth of the total annual income.

The chief source of chain store superiority lies in greater merchandising efficiency with a curtailment of services. In principle, chain store operation depends on mass buying and mass selling. The executive of a chain system must have exceptional skill in knowledge of the market—ability to foresee trends in public taste, and knowledge of sources of supply here and abroad. Every foot of space in the chain store must be made to produce, sales and inventory records must be refined to a high degree and costs must be ascertained to the fraction of a penny. What a store should produce and the rate of normal growth must be known. The introduction of the chain idea is perhaps the most important single factor of the 20th century in the distributing and marketing fields. Manufacturers, jobbers, retailers, sales managers, and purchasing agents have had to reckon with the new force. Every agency involved has had to cut costs and improve marketing methods.

Chain store growth engendered a feeling of animus. Heavy discriminatory taxes have been laid upon them. The most common argument against them contends that they drain the communities of money which would otherwise remain in the locality. But this argument confuses money with wealth and purchasing power and overlooks the fact that a community's wealth is derived from what is produced by the community and not from the amount of money which circulates there.

A report of the Federal Trade Commission in 1932 showed that the average gross profit of all classes of chain stores is 26.7 per cent. About 70 per cent of the aggregate supply of all chains is purchased from manufacturers.

Consult Baxter, *Chain Store Distribution and Management* (1931); D. Bloomfield, *Chain Stores* (1931); R. F. Daly, *Multiple Shop Accounts* (1933); Lebhar, *Chain Store—Boon or Bane?* (1932); Nichols, *Chain Store Manual* (1932); F. F. Witte, *Purchasing Policies and Practices of Chain Drug Companies* (1933).

Chairman, the president of a meeting, whether convened for the consideration of public affairs, or for the despatch of business connected with some association, company, or committee. In the case of public bodies and companies, the chairman is usually elected for a definite period, according to statute or to the bylaws governing his appointment. In the case of a public meeting, the chairman is usually selected by the promoters of the meeting.

The essential duty of the chairman is the maintenance of order. In the case of rude or violent interruption he may direct the expulsion of the wilful offender without unnecessary violence. In extreme cases he may adjourn the meeting. Speakers must address the chair, and they are entitled to the chairman's protection against interruption, except on a question of order. The chairman regulates the order of business; he calls upon the speakers previously selected; or, if the meeting is an open one, decides which of the members rising to speak shall be heard.

The chairman must permit no discussion unless on a motion or amendment duly proposed and seconded. He should call to order speakers who indulge in purposeless talk, or do not confine themselves to the matter under debate. He is the judge as to whether a motion or amendment is in order, and he decides questions of adjournment or any other incidental matter needing immediate decision. He has no option but to put to the meeting all duly proposed and seconded amendments in proper order, and he must take a vote, which may be by voices, or, if demand is made, by show of hands. In the case of equality of votes he is entitled to a casting vote. See Parliamentary Law; Speaker.

Chaise, shāz (French), a light, hooded two- or three-wheeled vehicle. The *post-chaise* of the eighteenth and nineteenth centuries was a closed four-wheeled carriage with two or four horses, and driver as postilion.

Chaka. See Zulus.

Chalaza, kȧ-lā'zȧ, the first layer of albumin deposited upon the yolk of an egg as it descends the bird's oviduct. It is peculiarly viscous, and thus becomes twisted into two strands which keep the yolk in the middle of the more fluid albumen. These cords are also called *chalazæ*.

In botany the chalaza is the point of union of the nucellus and the integuments of an ovule.

Chalazogamy, kal'ȧ-zog'ȧ-mi, in botany, is fertilization through the chalaza (q. v.), instead of through the micropyle, as is usually the case (see Ovule). True chalazogamy occurs in the birch, alder, hornbeam, hazel, walnut, and Casuarina. A modified form is met with in the elm.

Chalcedon, kal'si-don (more correctly Calchedon), now *Kadikoi* (pop. 30,000), a Greek city on the shores of the Propontis or Sea of Marmora, at the entrance of the Bosporus, nearly opposite Byzantium. It was a colony from Megara, founded in 685 B.C. When Nicomedia was founded in 140 B.C., most of its inhabitants were transferred thither. With the formation of the province of Bithynia it became (74 B.C.) part of the Roman empire. It was captured by Gothic invaders in A.D. 156, and by Chosroes of Persia in A.D. 616, after which it declined, until it was demolished by the Turks.

The *Council of Chalcedon* was the fourth ecumenical council, and was assembled (A.D. 451) by the Emperor Marcian for the purpose of drawing up a form of doctrine in regard to the nature of Christ which should equally avoid the errors of the Nestorians and the Monophysites.

Chalcedony, kal-se′dō-ni *or* kal′si-dō-ni, a mineral consisting of silica, and occurring in fibrous or minutely crystalline condition, never in well developed crystals. It derives its name from Chalcedon in Bithynia, near which it is found in abundance. It occurs usually in crevices and cavities in rocks, where it has been deposited from solution in water. It is harder than steel, and assumes many varieties of form and color, as Agate, Carnelian, Chrysoprase, Bloodstone, Jasper, Plasma, Onyx, and Sard (qq.v.). The name 'chalcedony' is usually reserved for specimens which are white, gray, or bluish gray in color and translucent. In the United States, chalcedony is obtained from a number of localities in Colorado and California.

Chalcedonyx, kal-sed′ō-niks, name given to agates formed of a white opaque chalcedony, alternating with a grayish translucent chalcedony.

Chalchicomula, chal-chi-cō-mo͞o′la, town, Puebla state, Mexico; 30 miles northwest of Orizaba. Pop. 7,000.

Chalchihuitl, chal-chi-wē′t′l, a mineral much prized by the ancient Mexicans, considered by some to be a variety of jadeite (q.v.), and by others a kind of turquoise. It is a green-colored, fine-grained stone, and was obtained near Santa Fé. The elaborate brooch fastening Montezuma's robe was of chalchihuitl, and rude figures carved from it, and skilfully polished, have been found in tombs.

Chalcidice, kal-sid′i-sē, peninsula in Macedonia, between the Thermaic (Salonica) and Strymonic (Rendina) Gulfs, which runs out into the sea in three projecting promontories. It contained several Greek colonies, as Chalcis, Olynthus, and Potidæa.

Chalcis, kal′sis, or EGRIPO, chief town of the island of Eubœa, Egripos, or Negropont, Greece, on the Strait of Euripus, here only 120 feet wide. In the seventh and sixth centuries B.C. it enjoyed much prosperity, as is proved by the number of colonies sent out from it—as, for example, Cumæ in Campania, Naxos in Sicily, and the towns in Chalcidice. About the end of the seventh century B.C. Chalcis was engaged in a prolonged war with its neighboring city Eretria, which weakened its power. During the fifth and fourth centuries B.C., with the rest of Eubœa, it was subject to Athens. In the Middle Ages it was prosperous under the Venetians, who held it for nearly three centuries, until its conquest by the Turks in 1470. Pop. 20,000.

Chalcis, a typical genus of a large family of hymenopterous insects, not unlike small wasps. The family numbers many thousand species, and has this great importance that the larvæ of its members are parasitic in the eggs, larvæ, or pupæ of other insects. As some of the latter are very destructive to plants, these parasites perform a valuable service in helping to destroy them. Thus, forms as different as the Cabbage Butterfly and the destructive Hessian Fly have their attendant Chalcididæ. Many of the so-called Gall Wasps, as well as the ruinous Cotton Worm (q.v.), are also preyed upon by Chalcididæ.

Chalcocite, kal′kō-sīt, a mineral belonging to the copper ores, Cu_2S, carrying about 80 per cent. of that metal. It is a black, metallic, brittle mineral of high specific gravity (G. 5.5–5.8); is characteristic of the secondary enrichment zone in copper deposits; and is an important source of copper in such mines as those at Butte, Mont. See COPPER.

Chalcondylas, kal-kon′di-las, or CHALCHONDYLAS, DEMETRIUS (1428–1511), Hellenic grammarian, was born at Athens, but took refuge in Italy in 1447, and became teacher of Greek at Perugia, Florence (1479–92), and Milan. Grocyn, Linacre, Latimer, and Lorenzo de' Medici's sons were among his students. He published his *Erotemata* in 1493, and produced the first editions of Homer (1488), Isocrates (1493), and Suidas (1499).

Chalcopyrite, kal-kō-pī′rīt, $CuFeS_2$, is an important copper ore, in which the amount of the metal is extremely variable. It is a yellow, metallic mineral, very brittle, resembling common iron pyrite, and is widely distributed. In many mines it is thought to have been the original ore from which the other richer varieties have been produced by secondary enrichment. It is of great importance at Ducktown, Tenn., Butte, Mont., and in the deeper workings in Arizona. See COPPER.

Chaldæa, kal-dē′*a*, a province of Babylon, bounded by the lower course of the Euphrates, the head of the Persian Gulf, and the Arabian Desert. In a wider sense the term is applied to the empire of Babylon generally. The *Chaldæans* were the ruling class at Babylon. They were either from Northeast Arabia or from the Kurdish uplands. Their priests were famous for their knowledge of astronomy and mathematics. See BABYLONIA; ARAM.

Chaldir-gol, kal-dēr′gûl′, the second largest lake in Transcaucasia, 35 miles north of Kars, 12 miles long, with a maximum breadth of 10 miles, and an area of 33 square miles. Its bottom nowhere sinks to more than 140 feet below the surface, which lies at an altitude of 6,522 feet. The lake swarms with fish, chiefly trout and carp, and it is a favorite haunt of water fowl.

Chaldron, an old measure used in selling coal, containing 36 heaped bushels (= 25½ cwt.).

Chalet, sha′lā, the wooden hut of the Swiss herdsmen on the mountains. The term is also extended to Swiss dwelling houses generally, and to picturesque villas built in imitation thereof. (See illustration on page 7A.).

Chaleur Bay, shâ-lûr′, an inlet of the Gulf of St. Lawrence, between the Gaspé district of Quebec and New Brunswick, Canada. It is 90 miles from east to west, and from 12 to 20 miles wide, is deep and well sheltered, and much frequented for its mackerel fisheries. It was visited by Jacques Cartier in 1535.

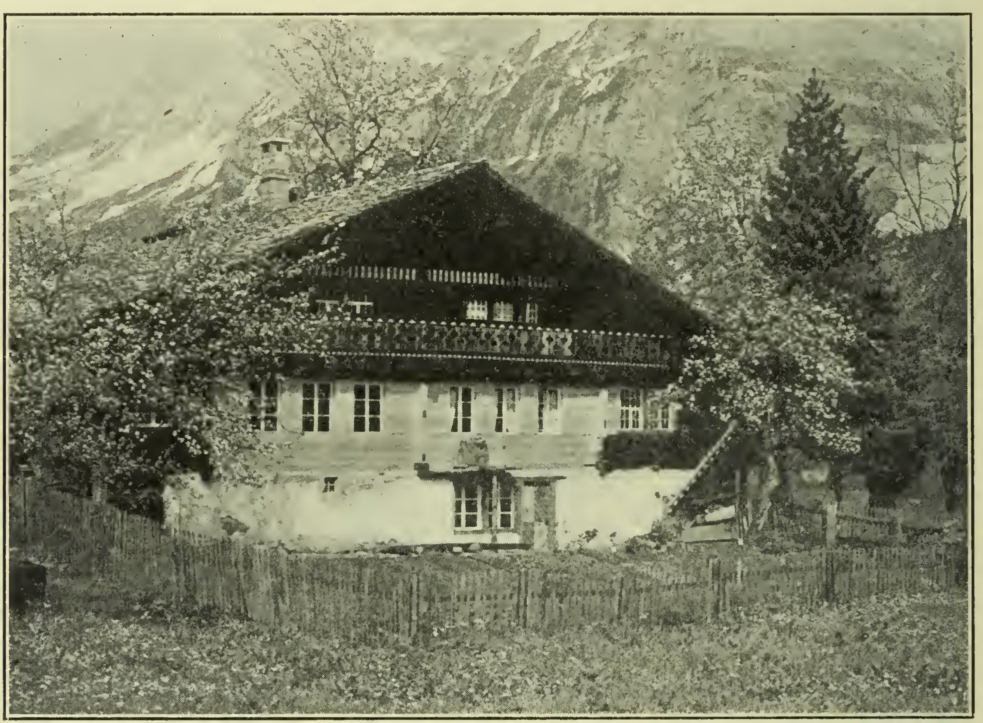
Chalfont St. Giles, chăl′funt sent jīlz′, village, England, in Buckinghamshire; 16 miles southeast of Aylesbury. Here Milton fled to escape the great plague, and here (1665) he finished his *Paradise Lost* and wrote part of *Paradise Regained.* Pop. 1,700.

Chalford, village, England, in Gloucestershire; 4 miles southeast of Stroud. It has dyeworks and manufactures broadcloth. Pop. 3,000.

Chal′grove, village, England, in Oxfordshire; 10 miles southeast of Oxford. Here, on June 18, 1643, in a battle between the Royalists and the Parliamentary forces, John Hampden was mortally wounded.

Chaliapin, shä-li-ä′pin, FEODOR IVANOVITCH (1873–1938), Russian operatic basso, was born in Kazan. He sang as a choir boy and when seventeen years old joined a provincial opera company, on the dissolution of which he became a porter. At length, after studying under Usatof, he secured an engagement in the Tiflis Opera House and in 1894 sang in the Summer Theatre, Leningrad. He was in Milan for a time, and in 1899 appeared as guest-artist at the Imperial Opera, Moscow, and at the Maryinsky, Leningrad. He was in England first in 1913. His first appearance in New York was in 1907–8, and after 1921 he became an annual visitor to that city and Chicago. He excels in the interpretation of Russian types, his most famous rôle being Boris Godounoff. For portrait, see OPERA. Died april 12, 1938

Chal'ice (Latin *calix*, 'a cup'), the vessel containing the wine used in the eucharist. In early Christian times chalices were made of wood, clay, glass, agate, silver, and gold, but owing to the fragility of glass and similar materials, and also to a desire to exclude the baser materials as unworthy, gold and silver came at length to be almost exclusively used. The earlier chalices had a short stem supporting a hemispherical bowl, richly adorned with filigree work; this was succeeded by the Gothic chalice with a coniform cup and less ornamentation, and this in turn by the chalice of the Renaissance, higher, with a wider bowl and lavish decoration. Chalices were a favorite subject for the goldsmith's art, and many exquisite examples have been preserved.



© *Ewing Galloway, N. Y.*

A Picturesque Chalet in Grindelwald, Bernese Oberland, Switzerland

Chalk, a soft, earthy, finely granular variety of limestone, white, grayish white, or yellowish in color. It is an exceedingly pure carbonate of lime, in some cases containing less than one per cent. impurities. A small amount of silica is always present, and there are sometimes minute quantities of magnesium carbonate, ferric oxide, and alumina. Chalk is formed chiefly by sea-bottom accumulations of the shells of small Foraminifera (q.v.), combined with numerous minute organisms known as coccoliths and rhabdoliths, fragments of molluscan shells, the siliceous spicules of sponges, and shells of Radiolaria. In many respects it presents a close similarity to the Globigerina ooze of the Atlantic Ocean (see GLOBIGERINA). Enclosed within the chalk are to be found numerous fossils, including echinoderms, sponges, corals, molluscs, and the teeth of sharks.

Chalk is soluble in water containing carbon dioxide, and water drawn from chalk areas is therefore very hard. This solubility occasions also the frequent sinks and 'swallow holes' which may be observed in chalk countries. The soil produced by the weathering of the chalk is fine and thin, often filled with flints left after the removal of the limestone in solution.

Chalk occurs extensively in England, where it forms the Lincolnshire and Yorkshire Wolds, the North and South Downs, the Chiltern Hills, and Salisbury Plain. At Flamborough Head, Beachy Head, and Shakespeare's Cliff at Dover it fronts the sea in noble headlands, which from their white color gave England the ancient name of Albion (q.v.). It occurs also at Maestricht, at Fanö in Denmark, in Northern France, and elsewhere in Western Europe. In the United States, chalk formations are found in Iowa, Texas, Arkansas, Nebraska, and South Dakota.

In geology, the chalk is the most familiar member of the Upper Cretaceous formation. Some geologists have divided it into three groups—the Lower, Middle, and Upper Chalk. (See CRETACEOUS SYSTEM.)

The uses of chalk are many. When mixed with a bonding substance it finds wide application as a writing material. When burned it furnishes quicklime, and when mixed with clay, Portland cement. It is used as a dressing on clayey ground, and the harder, less pure varieties are employed as building stone. *Whiting*, prepared by grinding chalk and washing it free of grit, is used for polishing glass and silver and for making putty. Purified chalk is used in the manufacture of tooth powder, and medicinally as a mild astringent.

Black chalk, a mineral quite different from common chalk, is essentially a kind of slaty clay, of a grayish-black color, derived from the carbon that it contains. It is used for drawing and as a black color in painting. (See Crayon.) *French chalk* is a powdered form of steatite or soapstone (see Talc). *Red chalk* is a soft, red, ochreous clay.

See Lime; Limestone.

Challemel-Lacour, shȧ-l'-mel'-lȧ-ko͞or', Paul Amand (1827–96), French statesman and writer, was born in Avranches. He became professor of philosophy at Pau and Limoges successively. After the *coup d'état* (1851) his republican opinions drove him to Belgium, and then to Zürich. Returning after the amnesty (1859), he, with Brisson and Gambetta, established the *Rêvue Politique* (1868). On the fall of Napoleon III. (1870) he became prefect of the Rhône, but resigned in 1871. With Gambetta he established the *République Française*, becoming editor-in-chief. Then he became Ambassador at Bern (1879) and London (1880), and later Minister of Foreign Affairs (1883), and a member of the French Academy (1893). He published a translation of Ritter's *Geschichte der Philosophie* (1861), *La Philosophie Individualiste* (1864), and an edition of the works of Madame d'Epinay (1869). His *Œuvres Oratoires* were published in 1897.

Challener, Frederick Sproston (1869), Canadian artist, was born in Whetstone, England, and migrated to Canada in 1883. He studied at the Ontario School of Art, with G. A. Reid in Toronto, and in England, Italy, Egypt, and Syria. His works include: *Workers of the Fields* and *A Song at Twilight*, in the National Gallery, Ottawa; *The Milkmaid*, *When the Lights are Low*, and *A Quiet Old Road*, in the Provincial Art Gallery, Toronto; and the eight large historical panels in the Hotel Alexandra, Winnipeg. He is a member of the Royal Canadian Academy of Arts. He was awarded medals at the Pan-American Exposition, Buffalo (1901), and the Louisiana Purchase Exposition (1904).

Challenge, an oral or written request, addressed by one person to another, to fight a duel. Such a challenge is now considered a crime in almost every civilized country. It is a high offence at common law, and is punishable by special laws in most of the States. (See Duel.)

In legal practice, a challenge is an objection made to the jurors who have been arrayed to pass upon a cause on trial. It may apply to all the jurors (*challenge to the array* or *to the panel*), or to any particular juror (*challenge to the poll*); and may be *for cause*, in which case the reason is assigned, or *peremptory*, when it must be allowed by the court without the assignment of a reason. A challenge may be made by either party to a suit, but it must be made before the jurors are sworn. See Jury.

Challenger Expedition, a circumnavigating scientific exploration of the open sea sent out by the British government in 1872–6—earlier expeditions being those of the *Lightning* (1868) and *Porcupine* (1870). In 1872 the *Challenger*, a corvette of 2,306 tons, was fitted out with every scientific appliance for examining the sea from surface to bottom—natural history, work room, chemical laboratory, aquarium, etc. The ship was given in charge to a naval surveying staff under Captain Nares; and to a scientific staff, with Sir C. Wyville Thomson at the head, for the purpose of sounding the depths, mapping the basins, and determining the physical and biological conditions of the Atlantic, Southern, and Pacific Oceans. The *Challenger* weighed anchor at Sheerness on Dec. 7, 1872, and on May 24, 1876, dropped anchor at Spithead, having in those three and a half years cruised over 68,900 nautical miles. The route was by Madeira, the Canaries, the West Indies, Nova Scotia, Bermudas, Azores, Cape Verde, Fernando Noronha, Bahia, Tristan d'Acunha, Cape of Good Hope, Kerguelen, Melbourne, the China Sea, Hong-kong, Japan, Valparaiso, Magellan's Strait, Montevideo, Vigo, and Portsmouth. Between the Admiralty Isles and Japan the *Challenger* made her deepest sounding, 4,575 fathoms. In addition to the official *Reports* (50 vols., 1880–95) of the Expedition, works were issued by Sir C. Wyville Thomson, H. M. Moseley, Lord George Campbell, and others.

Challis, James (1803–82), English astronomer, was born in Braintree, Essex. He was graduated from Cambridge (1826), where he was appointed professor of astronomy (1836) and director of the observatory. In 1846 he twice unknowingly 'noted' the planet Neptune before its discovery at Berlin on Sept. 23 of that year. He published: *Lectures on Practical Astronomy and Astronomical Instruments* (1879); *Astronomical Observations Made at the Observatory of Cambridge* (1832–64); *Mathematical Principles of Physics* (1873).

Chal'loner, Richard (1691–1781), English Roman Catholic prelate, was born in Lewes. He was sent to the College at Douai (1704), where he taught poetry in 1712. He remained as professor until 1730, when he was created bishop of Debra, in Libya, and vicar apostolic of the London district (1758). During the Gordon riots of 1780 he had to secrete himself in Highgate. He wrote *The Garden of the Soul* (1740), and a translation of *The Imitation of Jesus Christ* (1706).

Chalmers, chä'merz, Alexander (1759–1834), Scottish biographer and miscellaneous writer, was born in Aberdeen. He edited Burns, Fielding, Gibbon, Shakespeare, and others, and issued *The British Essayists* (45 vols., 1817). His more permanent place in literature depends on his *General Biographical Dictionary* (32 vols., 1812–17).

Chalmers, George (1742–1825), Scottish antiquary, was born in Aberdeen. In 1763 he went to North America, and practised as a lawyer at Baltimore till the American Revolution. Then returning to Great Britain, he settled in London (1775), and was clerk to the Board of Trade (1786). Of his thirty-three works the chief are *Caledonia, an Account, Historical and Topographical, of North Britain;* Lives of Defoe, Paine, Ruddiman, and Mary Queen of Scots; and editions of Allan Ramsay and Sir David Lindsay.

Chalmers, George Paul (1833–78), Scottish painter, was born in Montrose, and studied in Edinburgh under Robert Scott Lauder. He was an exponent of the Scottish feeling for romance and dreamy mysticism, which he expressed with Titian-like coloring. His landscapes exhibit striking freshness, power, and decision—*e.g.*, *Running Water*, *The End of the Harvest*, *Rain in Slichagen*. His portraits have fine qualities of light and shade, color and technique. His *Legend*, in the Edinburgh National Gallery, is a fine example.

Chalmers, Thomas (1780–1847), Scottish divine, was born in Anstruther, Fifeshire. He was educated at St. Andrews University, where he became assistant professor (1802), and where he continued to hold classes after his ordination as parish minister at Kilmany, Fifeshire (1803). In 1815 he was translated to the

Tron Church, Glasgow, and took the city by storm with his eloquent preaching. In 1817 he visited London, where his sermons won him as great a triumph as in Glasgow. In 1823 he became professor of moral philosophy at St. Andrews, and in 1828 assumed the chair of theology in Edinburgh University. In 1830 he was appointed a royal Scottish chaplain, and in 1832 became moderator of the General Assembly of the church.

In 1834 Chalmers was made convener of the Church Extension Committee; and after seven years' labor he announced that upward of $1,500,000 had been collected, and 220 new churches built. Meanwhile, the Evangelical party had become predominant in the General Assembly; the struggles in regard to patronage between them and the 'Moderate' or 'Erastian' party became keener, until the decision of the civil courts in the Auchterarder and Strathbogie cases brought matters to a crisis; and on May 18, 1843, Chalmers, followed by 470 clergymen, left the Established Church, and entered upon the organization of the Free Church of Scotland (see Presbyterianism). He resigned his professorship, and became principal of the New College of the Free Church.

A fine orator, and one of the most potent Scottish forces in the nineteenth century, Chalmers was greater than his books, though he made important contributions to economics and theology. His publications include: *Evidence and Authority of the Christian Revelation* (1814); *Astronomical Discourses* (1817), deservedly popular, and frequently reprinted; *Commercial Discourses* (1820); *Christian and Civic Economy* (1821–26; edited by Prof. C. R. Henderson, 1900); the Bridgewater treatise, *Adaptation of External Nature to the Moral and Intellectual Constitution of Man* (2 vols., 1833; reprinted, 1 vol., 1853); *Defence of Church Establishments* (1838). The original works appeared in 25 volumes (1836–40), and the posthumous works in 9 volumes (1848). Consult W. Hanna's *Memoirs of the Life and Writings of Dr. Chalmers;* Buchanan's *Ten Years' Conflict;* D. Fraser's *Thomas Chalmers;* Mrs. Oliphant's *Thomas Chalmers; Preacher, Philosopher, and Statesman;* Blaikie's *Thomas Chalmers.*

Chaloner, Sir Thomas (1521–1565), the Elder, English diplomat and author, was born in London, was educated at Oxford, and entered the service of Henry viii. Sent by the King as ambassador to the Emperor Charles v., he went to Algiers with the latter in his expedition (1540) against the corsairs. His Protestant sympathies, which stood him in good stead during the reign of Edward vi., drove him from office during that of Mary; but on the accession of Elizabeth he was appointed ambassador, first to the Emperor Ferdinand, and then to the court of Spain. His chief works are several volumes of *Miscellaneous Poems* (1559); *De Republica Anglorum Instauranda* (1544); a translation of Erasmus' *Praise of Folly.*

Châlons-sur-Marne, shä-lôṅ′ sür-märn′, capital of the department Marne, France, on the River Marne; 92 miles east of Paris. It is the see of a bishop, and contains a fine library, museums, schools of *arts et métiers*, and a cathedral (St. Etienne) of the thirteenth–seventeenth centuries. It manufactures chiefly champagne, but there are foundries and glass works. The Huns were defeated and the power of Attila broken by a battle fought near the town in 451. In 1430, and again in 1434, the English unsuccessfully besieged it. Twelve miles north is the Camp de Châlons (45 square miles), devoted to French army manœuvres. In the European War, the town was occupied by the Germans on Aug. 28, 1914, but they were driven out a few days later in the Battle of the Marne (q. v.). Pop. (1901) 26,737; (1911) 31,367.

Chalon-sur-Saône, sōn′, town, department Saône-et-Loire, on the Saône, where the Canal du Centre joins that river; 35 miles north of Macon. Its Library, Museum, bridge of 1415, and the Church of St. Vincent (1386) are of interest. It has manufactures of wine, hats, gloves, iron and structural steel, tiles, and glass; and trade in corn, iron, wood, and leather. It was the second city of the Ædui (*Cabillonum Æduorum*) in the time of Cæsar, and was destroyed successively by the Vandals, Huns, and Burgundians. Several church councils were held here. Pop. (1901) 29,058; (1911) 31,550.

Chalybäus, Heinrich Moritz (1796–1862), German philosopher, born at Pfaffroda in Saxony. He was made (1839) professor of philosophy at Kiel University, but later lost this post on political grounds. Chief works: *System der Speculativen Ethik* (1850); *Historische Entwickelung der Speculativen Philosophie* (1837).

Chalybeate Waters, kal-ib′i-et, or Iron Waters, are mineral or medicinal waters which naturally contain iron compounds in solution, either alone or with other salts, the proportion of iron ranging from .003 to .012 per cent. They have an astringent or styptic taste, and a sparkling appearance when excess of carbonic acid is present. They are of therapeutic value as a tonic in cases of general debility and anæmia, but should be avoided in febrile, inflammatory, and plethoric conditions.

Among the best known carbonated chalybeate waters are those of Tunbridge Wells, Buxton, Pyrmont (Waldeck), Spa, Homburg, Marienbad, Schwalbach, Nauheim, and St. Moritz in Europe; and Bailey Springs, Ala., and Rawley Springs, Va., in the United States. Sulphated or aluminated chalybeate waters contain ferrous sulphate, and are often so strong as to require dilution. Springs of this character are found at Moffat and Vicarsbridge, England, Rockbridge Alum Springs, Va., and the Texas Sour Springs. See Mineral Waters.

Chalybes, kal′i-bēz, an Asiatic people who dwelt in Pontus, on the north coast of Asia Minor. They were famous as iron workers; hence the word 'chalybeate.'

Cham, shäṅ, the pseudonym of Amédée de Noé (1819–79), French caricaturist. He was born in Paris, his father being the Comte de Noé (whence the nickname, 'Cham' being French for Ham, son of Noah). He excelled in humorous drawings of contemporary Paris life, and from the age of twenty-four until almost the close of life he was connected with the *Charivari* and the *Journal des Pélerinages. Douze Annèes Comiques* (1880) and *Les Folies Parisiennes* (1883) are collections of his comic sketches.

Chamæleon, k*a*-mē′lē-on. See Chameleon.

Chamæleon, a small southern constellation between Hydrus and Argo, announced by Bayer in 1603.

Chamærops, k*a*-mē′rops, a genus of palms, remarkable for its wide range into northern climates throughout the world, and of which one species, *C. humilis*, is the only palm truly indigenous to Europe. It forms dense furze-like thickets from the suckers which arise from its creeping roots; but when these are not allowed to grow, its stem may reach a height of 20 feet or more. It has fern-shaped leaf blades, the margins of the petioles being armed with prickles; the leaves are deeply divided. The black drupes are three-sided, spongy, and edible; the young shoots also are eaten. Propagation is most easily effected by means of suckers. The fibre is valuable for weaving with camel's hair, and for making

NOV 19 1940

into paper, sailcloth, and coarse canvas; the leaves also are used for paper and as thatch.

Chamalhari, chum-*a*-lä'rē, a peak in the Himalayas (27° 49' N.), on the northwest frontier of Bhutan; 140 miles east of Mount Everest. It rises to an altitude of 23,944 feet just above the main route from India to Gyangtse.

Chamba, chum'b*a*, or CHUMBA, native state Punjab, India, lying to the S. E. of Kashmir, and north of Kangra district; area, 3,127 square miles. It is enclosed by hills, and is traversed by the Ravi and Chandra (Chenab), whose banks are covered with forests which abound with game. Pop. (1931) 146,870.

Chambal, chum'bul, or CHUMBAL river, Central India, a principal tributary of the Jumna, rises in the Vindhya Range, 2,019 feet above sea level. It flows in a northeasterly direction, and after a course of 650 miles falls into the Jumna, 40 miles below the town of Etawah.

Chamber, a term often applied to a legislative or public body, as Chamber of Deputies, Chamber of Commerce (qq. v.). See CHAMBERS.

Chamber of a firearm is the name given to that part of the bore which contains the powder, when its diameter is not the same as the caliber of the gun. See GUNS.

Chambered Nautilus. See NAUTILUS.

Chamberlain, chām'b*e*r-lin, an officer appointed by a king or nobleman to perform domestic and ceremonial duties, or by a corporation or municipality to receive rents and fees.

The ***Lord Chamberlain*** has been one of the principal British officers of State from at least the thirteenth century, and in 1406 Parliament declared that he should be a member of the council *ex officio*. Though he has long ceased to have any share in the responsibilities of government, he is still an officer of high standing in the royal household. All theatres in towns in which a royal palace is situated require to be licensed by him, and no new play can be performed anywhere without his license. All persons desiring to be presented at levees or drawing rooms are required to send their cards to the Lord Chamberlain, and it is his duty to see that the persons thus applying are entitled by station and character to be presented to the sovereign. The Chamberlain also issues invitations to royal balls, parties, and receptions.

The ***Lord Great Chamberlain*** is the sixth great officer of State in Great Britain, to whom belong the government of the Palace of Westminster and the supervision of its officials. He disposes of the sword of State carried before the king when he comes to Parliament, and walks on the right of the sword, next to the king's person. He has 'livery and lodging' in the king's court, receiving fees from bishops and archbishops when they perform homage to the king, and from peers at their creation. His duties, however, chiefly relate to coronations and other public solemnities. The dignity is now held jointly by the Marquis of Cholmondeley and the Earls of Ancaster and Carrington.

Chamberlain, ALEXANDER FRANCIS (1865–1914), British-American ethnologist, was born in Kenninghall, England. He was delegated by the British Association to investigate the Kootenay Indians of British Columbia, concerning whom he published a *Report* (1892). He also published *The Child and Childhood in Folk Thought* (1896), *The Child—A Study in the Evolution of Man* (1900), and *Poems* (1904).

Chamberlain, (ARTHUR) NEVILLE (1869–1940), British statesman, second son of Joseph Chamberlain (q. v.), was born in Birmingham and educated there and at Rugby. During 1890–97 he resided in the Bahamas, B. W. I. He entered municipal politics in his native city, served in various offices and was Lord Mayor 1915–16, as his father had been before him, though then the title was only 'mayor.' In 1918 he was elected to Parliament and was, successively, Director-General of National Service, Postmaster-General, Paymaster-General, Minister of Health, Chancellor of the Exchequer and, finally, Prime Minister in 1937, succeeding Stanley Baldwin.

Chamberlain's tenure of office was an eventful one. Serious international problems faced him, coupled with Cabinet dissensions and national defense questions. During the Czecho-Slovakian crisis of 1938 Chamberlain adopted a policy of 'appeasement' towards Hitler's demands upon the Republic and, supported by Premier Daladier of France, agreed to its dismemberment. The Polish crisis of 1939 exhausted British patience; war was declared on Germany by Britain and France on Sept. 3, 1939. During the war Chamberlain was succeeded as Premier by Winston Churchill on May 10, 1940. He published *The Struggle for Peace* (1939). Consult Sir C. Petrie, *The Chamberlain Tradition.* Died Nov. 9, 1940

Chamberlain, AUSTEN. See CHAMBERLAIN, SIR (JOSEPH) AUSTEN.

Chamberlain, DANIEL HENRY (1835–1907), American lawyer and legislator, was born in West Brookfield, Mass. In 1866 he became a cotton planter in South Carolina; was attorney-general of the State from 1868 to 1872, and governor from 1874 to 1876. He was renominated by the Republicans in 1876, and both he and his Democratic opponent, Wade Hampton, claimed to have won the election.

Chamberlain, JACOB (1835–1908), American missionary, was born in Sharon, Conn. After studying medicine he proceeded to India (1859), as missionary. He did considerable work in the Tamil and Telugu languages. His works include *In the Jungle; The Cobra's Den; The Bible Tested in India; The Religions of the Orient; The Opportunity of the Ages.*

Chamberlain, JOSEPH (1836–1914), British statesman, was born in Camberwell, a suburb of London. He entered his father's firm of Nettlefold & Chamberlain, screw manufacturers, of Birmingham, from which he retired in 1874 with an independent fortune. By that time he had acquired a reputation as a Radical; and had won favor in the municipal life of Birmingham, of which he was thrice mayor, before he entered the larger sphere of imperial politics. After unsuccessfully contesting Sheffield in 1874, he was returned to Parliament for Birmingham without opposition in 1876, as the colleague of John Bright. In 1880 Gladstone made him President of the Board of Trade, and included him in the Cabinet. He came to be regarded as the leader of the extreme Radical Party; and during the general election of 1886 he was severe in his strictures on the moderate Liberals, and produced an 'unauthorized' programme (in opposition to that of Gladstone), which included the readjustment of taxation, free schools, and the creation of allotments by compulsory purchase. When Gladstone formed his first Home Rule Administration, in January, 1886, he became president of the Local Government Board; but resigned on March 26 because of his objections to Gladstone's Home Rule measures for Ireland. After the 'Round Table' conference had failed to reunite the Liberal Party, he assumed an attitude of uncompromising hostility to his old leader's new policy; and became leader of the Liberal-Unionists when the Duke of Devonshire went to the Upper House.

In 1887 Chamberlain went to Washington as one of the British plenipotentiaries to discuss the question of Canadian fisheries with the United States Government, and in 1888 he married a daughter of William C. Endicott, then Secretary of War under President Cleveland.

When, in 1895, the Marquis of Salisbury was returned to power for the third time, Chamberlain chose the Colonial Office. He breathed a new spirit into the administration of that department, and invested it with an interest and importance second only to that of the Foreign Office. Almost his first duty was to disavow and denounce the Jameson Raid (1896). He insisted upon the appointment of the South African Committee, of which he was made a member against his own wish (1897); and the report of the Committee explicitly exonerated him from any preknowledge of Dr. Jameson's intentions. The negotiations with President Kruger, which ensued in the hope of securing reforms in the internal government of the Transvaal, were continued until the Boers invaded Natal (October, 1899), and war was declared. Chamberlain's conduct of these negotiations—which, with certain declarations of his on foreign affairs, notably his strong advocacy of an Anglo-American alliance in 1898, gave rise to the phrase the 'new or American diplomacy'—was made the subject of frequent debates in Parliament. The awakening of a strong imperial spirit among the colonies, which culminated in the despatch of thousands of volunteers from Canada, Australia, and New Zealand to fight in South Africa, was also attributed to his policy and inspiration.

In 1903 Chamberlain startled friends and foes alike by his scheme for preferential treatment of colonial imports, and such protective legislation as might aid native manufactures and prevent 'dumping' of foreign manufactured goods. To secure greater freedom for action he withdrew from the Balfour Cabinet, and began a vigorous campaign in favor of his policy. Though great weight was given to his opinions, his propaganda was usually rejected at general elections. During the last years of his life, ill health prevented him from taking any active part in politics. The Birmingham University owed its foundation (1900) largely to his efforts, and he became the first chancellor. See *Lives* of him by S. H. Jeyes, Miss Murrell Marris, A. Mackintosh, J. L. Garvin, H. W. Lucy, Spender, Creswick, Lord Milner and Sir C. Petrie, *The Chamberlain Tradition.*

Chamberlain, Sir [Joseph] Austen (1863–1937), British statesman, the son of Joseph Chamberlain (q. v.), was born in Birmingham. He (1892–1914) represented East Worcestershire in the House of Commons. On the death of his father he succeeded for West Birmingham. He was Civil Lord of the Admiralty (1895–1900), financial secretary to the treasury (1900–2), Postmaster-General (1902–3), and Chancellor of the Exchequer (1903–6), under the Unionist administration. In the first Coalition government (1915) he entered the Asquith Cabinet as Secretary of State for India but resigned in 1917 because of charges of medical unpreparedness in the Bagdad campaign, although he was in no wise responsible. In 1918 he became a member of the War Cabinet and in 1919 again became Chancellor of the Exchequer. On the resignation of Bonar Law in 1921 he became leader of the House of Commons and Lord Privy Seal, but was superseded by Bonar Law in 1922. He was Foreign Secretary in the second Baldwin Cabinet in 1924–9, a position he filled most acceptably both at home and abroad. In 1925 he received the Garter for distinguished services in connection with the Locarno Treaties. Together with the American, Charles G. Dawes, he shared the Nobel Peace Prize in 1925. He was First Lord of the Admiralty when he retired in 1931.

Chamberlain, Joshua Lawrence (1828–1914), American soldier and legislator, was born in Brewer, Me. He was professor of rhetoric and oratory (1856–62, 1865–6) and instructor (1857) and professor (1861–5) of modern languages at Bowdoin. During the Civil War he served on the Union side; took part in twenty-four engagements, and was awarded a Congressional Medal of Honor for heroism at Gettysburg. After the war he was governor of Maine for four terms (1866–71), and from 1871 to 1883 was president of Bowdoin College, where he was also professor of moral philosophy (1874–9), and lecturer on public law and political economy (1883–5). Among his publications are *Maine, Her Place in History; Ethics and Politics of the Spanish War.*

Chamberlain, Montague (1844–1924), Canadian-American ornithologist, was born in St. John, N. B. In 1889 he became assistant secretary at Harvard University, and in 1893 secretary at Lawrence Scientific School. He served in the Canadian army and retired as captain. His writings include *Canadian Birds* (1870); *Systematic Table of Canadian Birds* (1887); *Birds of Greenland* (1892); *Some Canadian Birds* (1895); *The Church Army* (1897); *The Penobscot Indians* (1899). He edited the revised edition of Nuttall's *Birds of the United States* (1896).

Chamberlain, Neville. See Chamberlain, (Arthur) Neville.

Chamberlain, Sir Neville Bowles (1820–1902), British general, a dashing leader of Indian irregular horse, was born in Brazil. He entered the Indian army, served in the Afghan campaign (1842), being wounded six times, and fought at Maharajpur (Gwalior campaign, 1843), and at Chilianwala and Gujarat (Sikh campaign, 1848). During the mutiny (1857) he was severely wounded at Delhi. He commanded against the Waziris, and in 1863 against the Bunerwals.

Chamberlin, chām′b*e*r-lin, Thomas Crowder)1843–1928), American geologist, was born in Mattoon, Ill. He was professor of natural sciences, Wisconsin State Normal School (1869–73); professor of geology at Beloit (1873–84); chief geologist of Wisconsin (1876–82); and geologist in charge of the glacial division of the U. S. Geological Survey (1882–1908). In 1887–92 he was president of Wisconsin University; head of the department of geology and director of museums (1892–1919), and emeritus professor of geology (1919–28), at the University of Chicago. He was geologist of the Peary Relief Expedition in 1894, and a member of the University of Chicago Oriental Education Investigation Commission in 1909. He was research associate in Carnegie Institution. He published *Geology of Wisconsin* (4 vols., 1877–83), a general treatise on *Geology* (with R. D. Salisbury, 3 vols.), and was editor of *The Journal of Geology.*

Chamber of Deputies, the lower of the two national legislative bodies in certain European and Latin-American countries. It is the popular branch of the legislature, and in general the one originating financial measures.

Chambers are places where legal or judicial business is transacted in private, as distinct from open court. Thus a lawyer's business premises are called his chambers, and in England a chamber counsel is a barrister who devotes his time to giving opinions and doing conveyancing work, but who seldom appears in court. Judicial business is said to be done 'in chambers' when a

NOV 12 1940

judge holds an informal sitting during a court vacation. Likewise a trial with closed doors is said to take place *in camera*, 'in a chamber.'

In England, rooms called chambers are attached to the various courts, in which informal and incidental matters, such as the recovery of documents wanted for a trial, are transacted in the presence of a master of court or chief clerk. An appeal usually lies from the decision of a master or clerk sitting in chambers to the judge likewise sitting in chambers.

Chambers, chām'berz, Charles Haddon (1860–1921), English playwright, born and educated in Sydney, N. S. W. After a varied experience of life as a civil servant, stock rider, and traveller, he settled permanently in England in 1882, becoming a journalist, and later a dramatist. His plays include *Captain Swift, The Idler* (first produced in New York at the Lyceum Theatre), *The Honorable Herbert, The Old Lady, John-a-Dreams, The Tyranny of Tears, Passers-By, The Awakening,* and *The Golden Silence.*

Chambers, Robert (1802–71), Scottish publisher and author, brother of William Chambers (q. v.), was born in Peebles. He entered the publishing business in Edinburgh, and issued *Illustrations of the Author of 'Waverley'* in 1822. Scott and others interested themselves in him, and finding congenial themes in Scottish archæology, history, and biography, he issued *Traditions of Edinburgh* (2 vols., 1825) ; *Edinburgh Fires* (1824) ; *Walks in Edinburgh* (1825) ; *Picture of Scotland* (2 vols., 1826) ; *The Land of Burns* (1840) ; *Domestic Annals of Scotland* (3 vols., 1858–61) ; and a *Life of Scott* (1835). He also produced *Popular Rhymes of Scotland* (1826 ; enlarged, 1847), *Poems* (1835), and other similar works, and the elaborate *Life and Works of Robert Burns* (4 vols., 1851 ; new ed. 1896). In 1844 his anonymous *Vestiges of the Natural History of Creation* anticipated the theories and methods of Darwin. In 1845 he replied to his critics in *Explanation, a Sequel.* A unique work, the fascinating *Book of Days* (1863–4), shows the writer at his best. Consult William Chambers' *Memoirs* of himself and Robert Chambers.

Chambers, Robert William (1865–1933), American author and painter, was born in Brooklyn, N. Y. He studied art at the Art Students' League in New York, and later in Paris, under Lefebvre, Constant, and others (1886–93), exhibiting at the Salon in 1889. He returned to New York in 1894, and devoted himself to illustrating, which he soon gave up for literature. His first book, *In the Quarter,* inspired by his student experiences in Paris, was brought out in 1894, and was followed by a volume of short stories, *The King in Yellow,* which met with immediate success. Among his publications are *The Republic* (1894) ; *Lorraine* (1896) ; *The Haunts of Men* (1898) ; *The Conspirators* (1900) ; *The Maid-at-Arms* (1902) ; *The Maids of Paradise* (1903) ; *The Reckoning* (1905) ; *The Fighting Chance* (1906) ; *The Younger Set* (1907) ; *The Firing Line* (1908) ; *Ailsa Paige* (1910) ; *The Streets of Ascalon* (1912) ; *The Business of Life* (1913) ; *The Hidden Children* (1914) ; *The Dark Star* (1915) ; *Barbarians* (1917) ; *The Moonlit Way* (1918) ; *The Crimson Tide* (1919) ; *Slayer of Souls* (1920) ; *Eris* (1923) ; *The Girl in Golden Rags* (1924) ; *The Man They Hanged* (1925) ; *The Drums of Aulone* (1926) ; *The Sun Hawk* (1927) ; *The Rogue's Moon* (1927).

He was also the author of a play, *The Witch of Ellangowan,* written for Ada Rehan and produced at Daly's Theatre, New York. He wrote many short stories, and a number of charming children's books, including *Outdoor Land* (1902), *Orchard Land* (1903), *Forest Land* (1905), *Mountain Land* (1906), and *Hide and Seek in Forest Land* (1909).

Chambers, Talbot Wilson (1819–96), American theologian, was born in Carlisle, Pa. He studied theology at Princeton. He was a member of the American Bible Revision Committee. He wrote : *Memoirs of Theodore Frelinghuysen* (1863) ; *Exposition of the Book of Zechariah,* in Lange's Commentary (1875) ; *The Psalter a Witness to the Divine Origin of the Bible* (1875) ; *Companion to the Revised Version of the Old Testament* (1885).

Chambers, William (1800–83), Scottish publisher, brother of Robert (q. v.), was born in Peebles. In 1819 he started a bookselling business at Edinburgh in a humble way, afterward adding printing. Between 1825 and 1830 he wrote the *Book of Scotland,* and, in conjunction with his brother Robert, a *Gazetteer of Scotland.* He founded *Chambers' Edinburgh Journal* on Feb. 4, 1832. At the end of the fourteenth number he united with his brother in founding the business of William & Robert Chambers. A pioneer of popular literature, *Chambers' Journal* had continuous prosperity, its circulation soon rising from 30,000 to 80,000. Other works conceived in the same spirit were immediately successful, including *Information for the People* (2 vols.) ; the Educational Course Series ; *Cyclopædia of English Literature* (2 vols.) ; *Chambers' Miscellany* (20 vols.) ; *Papers for the People* (12 vols.) ; and the *Encyclopædia* (10 vols. 1859–68 ; new ed. 1888–1906). He made numerous contributions to literature, including : *Things as They Are in America* (1854), an account of a visit to the United States ; *France, Its History and Revolutions* (1871) ; *Ailie Gilroy, a Scottish Story* (1872) ; *Stories of Old Families and Remarkable Persons* (2 vols. 1878). He was twice elected lord provost of Edinburgh (1865–9) ; and carried out at his own cost a restoration of St. Giles' Cathedral. A statue was erected to his memory in that city.

Chambers, Sir William (1726–96), English architect, was born in Stockholm. Between 1757 and 1762 he erected for Augusta, princess-dowager of Wales, several classical and Oriental buildings in what are now Kew Gardens, London. He was first treasurer of the Royal Academy (1768), and in 1775 designed Somerset House, London. He was the most successful architect of the reign of George III. His *Treatise on Civil Architecture* was long a text book.

Chambersburg, borough, Pennsylvania, county seat of Franklin county, on the West Maryland and Cumberland Valley Railroads ; 50 miles s.w. of Harrisburg. It has manufactures of woolens, hosiery, men's clothing and paper, as well as foundries and machine shops. Wilson College and Penn Hall School for girls are located here. In 1864 the Confederates burned part of the town. Parts of Guilford township were annexed in 1902 and 1903, and of Hamilton township in 1908. Pop. (1930) 13,788 ; (1940) 16,000.

Chambers of Commerce are associations of merchants, manufacturers, financiers, and others formed for the protection and promotion of commercial interests, and civic development. They endeavor to further the interests of trade in their districts by making representations, by petition or deputation, to the government ; by gathering information and collecting and publishing statistics ; by assisting, informally, in the preparation of legislation dealing with mercantile questions ; by discussion intended to influence or to create public opinion ; and, of late, by fostering commercial and technical education. Some chambers have recently taken a prominent part in the establishment of boards for the settlement of labor disputes, and also of chambers of arbitration, to decide questions arising out of commercial transactions which would otherwise come before the courts of law.

About the year 1500 a body was instituted at Marseilles, France, which may be regarded as the earliest chamber of commerce. This body performed important public functions, participating both in the municipal government and in the settlement of commercial and maritime disputes. In 1700 similar bodies were established at Paris and Dunkirk, and a council-general of commerce, to which delegates were sent from the chief commercial centers of France, was formed by the government. In the next few years chambers of commerce were instituted at Lyons, Toulouse, Rouen, Montpellier, Bordeaux, and other French towns.

French chambers of commerce have a quasi-official character which has been copied in most Continental countries. The members are indicated, if not selected, by the central government or its agents, and are obliged to supply the authorities with information regarding commercial conditions, and to assist them whenever required.

The chambers of commerce of the United States, the United Kingdom, and the British colonies are voluntary associations, and have no official status. One of the first chambers of commerce in Great Britain, if not the first, is that of Glasgow, which was founded in 1783. The Edinburgh chamber was formed two years later, but other commercial centers were comparatively late in establishing similar associations. The Manchester Chamber of Commerce, founded in 1820, was for many years the only institution of its kind in England. Hull followed in 1837, Liverpool, Leeds, and Bradford in 1850, and London in 1881. In 1860 the body now known as the Association of the Chamber of Commerce of the United Kingdom was formed. In 1900 there was held in London a congress of all the chambers of commerce of the Empire.

In Canada the chambers of commerce and boards of trade of the various towns are associated in general provincial boards; and there is a Dominion Board of Trade, re-constituted in 1902.

The first to be established in the United States was the New York Chamber of Commerce, which was founded in 1768, incorporated by George III in 1770, and reincorporated by the State of New York in 1784. Its object, as expressed in the original charter, is 'to carry into execution, encourage, and promote, by just and lawful ways and means, such measures as will tend to promote and extend just and lawful commerce.' The membership is limited to 1,500 resident and 250 non-resident members. One of its features is a Committee of Arbitration, for the adjustment, without litigation, of differences arising between individuals, firms, or corporations, open to members or non-members. There are chambers of commerce in the chief cities of the United States, and even in many of the smaller towns.

The Chamber of Commerce of the United States was organized in Washington, D. C., on April 23, 1912, at a national conference called by the President of the United States. Its primary function is to obtain the matured judgment of business upon national questions, and to present and interpret those views to the agencies of government and to the public. It issues a monthly publication, *The Nation's Business*, and maintains a general and legislative bulletin service for the benefit of its members.

In September, 1912, the Fifth International Congress of Chambers of Commerce was held in Boston, and was attended by over 500 foreign delegates. The principal subjects of discussion were: the standardization of laws of exchange, unification of commercial statistics, international traffic regulation, international postal reform, uniformity in consular invoices, and international arbitration.

Chambertin, shän-ber-tañ', a famous red Burgundy wine, obtained from a vineyard (62 acres) of that name in the French department of Côte-d'Or; 7 miles south of Dijon by rail. It is distinguished by good body, mellowness of flavor, and excellent bouquet.

Chambêry, shän-bā-rē', capital of the former duchy of Savoy, and of the present department of Savoie, France; 55 miles S.E. of Lyons. The surrounding scenery, with the River Leisse flowing through the valley, is exceedingly fine. Notable edifices are the Cathedral (15th century), the Palace of Justice, and the old Castle of the dukes of Savoy, restored early in the 19th century. It has manufactures of cloth, silk gauze, gloves, soap, hats, paper, and trade in silk, wine, and coal. Pop. about 20,000.

Chambe'zi, the farthest head stream of the Congo River (q. v.), rises in the highlands south of Tanganyika, about 9° 40' s. lat., and 33° 15' E. long.

Chambly River. See Richelieu.

Chambord, shäñ-bor', a celebrated château in the French department of Loir-et-Cher, about 10 miles east of Blois, in the midst of a walled park of 13,000 acres. Commenced by Francis I in 1526, it is a remarkable structure, illustrating Renaissance principles grafted on the French mediæval type. Chambord, the 'Versailles of Touraine,' was a residence of the French kings down to Louis XV, who gave it to Marshal Saxe; and here in 1670 Molière gave the first representation of his *Bourgeois Gentilhomme*. Marshal Berthier, upon whom it was bestowed by Napoleon in 1809, left it to his widow, who sold it in 1821 for $308,400 to the future Comte de Chambord.

Chambord, Henri Charles Dieudonne, Comte de (1820–1883), posthumous son of the Duc de Berri, and grandson of Charles X of France, was born in Paris. On the day of his baptism the 'Child of Miracle' was presented by the Legitimists with the Château of Chambord; hence in 1844 he dropped the title of Duc de Bordeaux. When Charles X abdicated at the July Revolution of 1830, the elder Bourbons were driven into exile. They fixed their court successively at Holyrood, Prague, and Gorz, where the old king died in 1836, and the young Count was trained in clerical and absolutist ideas by his aunt, the Duchesse d'Angoulême, and his tutor, the Duc de Damas. He had three times a chance of regaining the crown of his ancestors—in 1848, 1870, and 1873, on which last occasion, three months after Thiers' overthrow, he paid an incognito visit to Versailles. A fall from his horse (1841) had lamed him for life; and his marriage (1846) with the princess of Modena (1817–86) brought him no successor. The Comte de Paris inherited his claims. See Bourbon. Consult Comte de Falloux, *Mémoires d'un Royaliste*.

Chambre Ardente, shäñ'br'-är-däñt' (French, 'fiery chamber') was the name applied to a French court, first established by Francis I in 1535, for the suppression of the new Protestant 'heresy.' It was so called on account of the frequency with which it pronounced the sentence of death by burning. At the same time an Inquisitorial Tribunal was instituted for searching out cases to be brought before the chamber. Under

NOV 1 9 1949

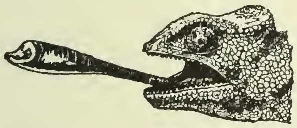
Louis XIV a court of the same name was in 1679 authorized to investigate the rumors of alleged poisoning circulated in connection with the trial of the Marquise de Brinvilliers (q. v.).

Chamdo, chäm'dō, or CHIAMDO, town, Tibet, 400 miles northeast of Lhassa, on the Lantsang (Upper Mekong). It has several Lamaist monasteries.

Chameleon, k*a*-mē'li-un, or CHAMÆLEON, a large genus of lizards, forming a distinct family. Distinguishing features are the soft, tuberculated skin, with its power of changing color; the coiled tail, adapted for curling round the branches of trees; the absence of an external ear-drum or tympanic membrane; the long, worm-like insect-catching tongue, capable of extremely rapid protrusion.

The Chameleon.

The body is flattened, and bears a toothed crest of skin along the back. The head is triangular, surmounted by a ridge. The animal stands unusually high upon its legs. The fore feet are divided into three united internal digits and two external; the reverse occurs in the hind feet. The digits are tipped by long, sharp claws. The long, compressed tail is curled ventralward. The mouth aperture is small, but the tongue extremely long. It is the most active part of the animal, is cup-shaped at the end, covered with a viscid secretion, and very efficient in insect catching. The large lateral eyes, with circular lids leaving only a small aperture, are very active, and can be rapidly turned in all directions.



Tongue of Chameleon Extended.

Among internal peculiarities may be noted the largeness of the lungs, which admit of being greatly distended, so as to puff out the body. This habit, along with its power of fasting, gave origin to the ancient supposition that it fed on air.

Except as regards tongue and eyes, the chameleons are very sluggish. They are strictly arboreal lizards, moving very slowly, in perfect silence, and waiting rather than hunting for their insect prey. At a distance of several inches, about half as long as the body in some cases, they can most unerringly catch the unconscious insect.

Probably the most familiar fact about chameleons is their power of changing color. Under the thin outer skin there are two layers of pigment-containing cells, the outer bright yellow, the inner brown to black. Under nerve control the disposition and expansion of the pigment-containing cells vary, and this produces change of color. The change depends much more on internal emotions, expressing themselves in nervous stimulus and inhibition, than on external physical influences.

The genus is a large one, and some naturalists split it up. Chameleons are especially at home in the Ethiopian region, but may occur beyond its limits. The commonest of the species is *C. vulgaris,* abundant in Africa, and also found in Southern Europe (Andalusia). The dwarf chameleon (*C. pumilus*) occurs in South Africa; the Indian chameleon (*C. Calcaratus*) in Southern India and Ceylon. The predominant color varies in different species. Many males are adorned with horns on the head.

A species of lizard (*Anolis*) is popularly called a chameleon in the United States.

Cham'fer, in architecture, an angle which is slightly pared off. A large chamfer, as in a wall at the window opening, is called a *Splay*. The chamfer is sometimes made slightly concave, in which case it is called a *hollow* chamfer. Chamfers, in Gothic architecture, have frequently ornamental terminations of various kinds.

Chamfort, shäṅ-for', NICOLAS (1741–94), French author. His writings gained him a footing in distinguished literary circles, and as a brilliant conversationalist he was patronized by Louis XVI and Marie Antoinette. He supported the popular party at the Revolution; but having exercised his cynical wit upon even his own side, he fell into disfavor. To escape arrest he committed suicide. His chief works were collections of maxims and of anecdotes, including a brilliant series of Parisian society portraits.

Chaminade, shȧ-mē-nȧd', CÉCILE LOUISE STÉPHANIE (1861–1944), French pianist and composer, was born in Paris, and studied in that city under Le Couppey, Savard, Marsick, and Godard. She gave her first concert at the age of eighteen; and from that time her piano playing secured her a wide reputation in the principal cities of Europe. She made her first tour of the United States in 1908–9, with a programme confined to her own compositions. She was an orchestra director of considerable ability, but is best known as a composer. Among her compositions are: *Callirhoë* (a ballet symphony, 1888), *Les Amazones* (a 'symphonie lyrique'), *Ménétriers, Pas des Amphores, La Lisonjera,* many other pianoforte pieces, and a large number of songs.

Chamisso, shä-mē'sō *or* kä-mē'so, ADELBERT VON (1781–1838), German author, whose real name was LOUIS CHARLES ADELAIDE DE CHAMISSO, was born in Boncourt, Champagne, his family being of Portuguese origin. In Paris he met A. von Humboldt and Wilhelm Schlegel, and the latter introduced him to Madame de Staël, whom he followed to Coppet. Here he began the study of botany, henceforth his main pursuit. Appointed custodian of the Botanic Gardens at Berlin (1819), with G. Schwab he edited the *Deutscher Musenalmanach* (1832–8), and was elected member of the Berlin Academy (1835). He wrote a number of poems (first collected in 1831), delicate in feeling and graceful in form; also ballads whereof the subjects are mainly modern, and in which the influence of Heine and Wilhelm Müller is manifest. He is best known by his *Peter Schlemihls wundersame Geschichte* (1814), the story of a man who sold his shadow to the devil.

Chamois, sham'i, *Fr.* shȧ-mwä' (*Rupicapra* or *Antilope;* German *Gemse*), a goat-like species of antelope, inhabiting the Alps and other high mountains of Central and Southern Europe. The chamois is about the size of a large goat, but the neck is longer in proportion, and the body shorter; the horns on both sexes are seldom more than 6 or 7 inches long, black, rising nearly straight up from the forehead, and so bent back at the tip as to form a hook. The summer color is reddish brown, with a darker dorsal band, and a yellowish central surface; the winter color is a darker brown, but white below. A dark brown band runs from the eye along each cheek. The rest of the head is pale yellow. The short tail is black.

The usual summer resort of the chamois is in the higher regions of the mountains, not far from the snow line, and it is often to be seen lying on the snow. In winter it descends to the higher forests. The aromatic and bitter plants of the mountain pastures are its favorite food. Like the ruminants generally, it is very fond of salt, and often licks stones for the saltpeter which forms on them. The chamois is gregarious. Flocks of one hundred used sometimes to be seen; but in the Swiss Alps, where the numbers have been much reduced by hunting, the flocks generally consist only of a few (four to twenty) individuals. The female bears one or rarely two young at a birth, in the month of March or April.

Chamois.

The chamois is of extraordinary agility, and flocks may often be observed sporting in a remarkable manner among the rocky heights. It can leap over ravines 16 to 18 feet broad; a wall 14 feet high presents no hindrance to it; and it passes readily up or down precipices which almost no other quadruped could attempt. The scent, sight, and hearing of the chamois are extremely keen. When a flock is feeding, one is always on the watch, and by a sort of whistle announces danger. The flesh is highly esteemed.

Chamonix, shȧ-mō-nē', CHAMOUNIX, or CHAMOUNI, a celebrated valley and village among the French Alps, in the department of Haute-Savoie, 40 miles southeast of Geneva, at an elevation of about 3,400 feet above sea level. The valley, bounded on the east by the Col de Balme, is about 13 miles long and 2 broad, and is traversed by the Arve. On the north side lie Mont Brévent and the chain of the Aiguilles Rouges; and on the south, the giant group of Mont Blanc, from which enormous glaciers glide down, even in summer, almost to the bottom of the valley. The chief of these are the Glacier des Bossons, des Bois, de l'Argentière, and du Tour; the Glacier des Bois expands in its upper course into a great mountain lake of ice called the Mer de Glace. In 1787 the attention of travellers was called to it by the Genevese naturalist De Saussure and others. Since then the number of visitors has gradually increased. From this point Mont Blanc is usually ascended. The village is connected with Geneva by an electric railway.

Champagne, shän-pän'y', district and ancient province of France, surrounded by Luxemburg, Lorraine, Burgundy, Ile de France, and Orléanais; now forming the departments of Marne, Haute-Marne, Aube, and Ardennes, and parts of Yonne, Aisne, Seine-et-Marne, and Meuse. Its chief towns were Troyes, Bar-sur-Aube, Leon, and Rheims. The province was about 180 miles long by 150 broad, its surface largely plain with ranges of hills, especially in the north and east. Champagne was the scene of important action all through the course of the World War. Here the Allies were driven back just before the First Battle of the Marne (q. v.), and here in September, 1914, Langle de Cary's Fourth French Army took its stand against the Duke of Würtemberg.

First Champagne Offensive. —The French resumed active warfare in Northern Champagne during January and February, 1915. Here the same armies faced each other as had been holding the lines of the First Battle of the Aisne. The main fighting was on a front of a little over four miles between the town of Perthes and the farm of Beauséjour, on the watershed between the Suippe and the Torbue. The French line was served by the railway from Rheims by St. Ménéhould, to Verdun, while the German lines had behind them the minor line from Bazancourt to Grand Pré in the Argonne. The direct French objective was to push back the enemy three miles, and so threaten his lateral communications. But the ultimate objects of the offensive here were to wear him down, to compel him to waste men and ammunition and detain as large a number of troops as possible which might otherwise be sent to reinforce von Hindenburg on the Russian front.

During January there were several small advances. The general advance began on Feb. 16. It was of the familiar type—a violent bombardment of the German positions followed by an infantry charge. The Germans held a strong position north of Beauséjour, on a ridge which they had turned into a fortress. Between Feb. 25 and 27 there was heavy fighting here, and the place was eventually carried by French Colonial troops. First one and then another of the little woods and ridges were carried, but by March 24, not a point had been won which enabled the French to threaten seriously the Bazancourt-Grand Pré railway. Here, however, the result was not to be measured by the length of the advance but by the effect upon the enemy's strength. The Russian stand on the Marev and the later British success at Neuve Chapelle were the direct consequences of the battle among the Champagne dunes. The German losses were out of all proportion to those of the French.

Second Offensive and German Counter-Offensive.—The second Champagne offensive came at the end of the summer of 1915. The German front in the west formed a blunt salient with its apex at Compiègne, and the corner of Northern Champagne and the Argonne as its re-entrant angle. A wedge driven at this point would threaten the communications of all the southern side of the salient and at a point far from their railroads. Any blow which embarrassed the communications would cut the direct avenues of supplies from the central Rhine valley, and force the whole transport of the Western front into the northern railway system based on Maubeuge. Apart from its strategical importance, Champagne offered a *terrain* particularly suited to an attack of massed artillery and an infantry concentration.

The striking force of the French movement was Langle de Cary's Fourth Army. Pétain's army was in reserve on this front. Opposed to the French were the armies of Von Heeringen and Von Einem. The French lines lay roughly east and west from just south of Auberive to just north of the little town of Ville-sur-Tourbe. The German lines were immensely strong, since the section was strategically so vital. On Sept. 23, the main bombardment began. From La Bassée to Arras, and along the Champagne front, hell was loosed from thousands of pieces. The German first position was methodically destroyed, while by direct fire the howitzers were battering their second line. The bombardment continued all through the next day and at midnight drew to a head. In the early hours of the morning troops were moving into the communication trenches. The great masses behind the front were beginning to percolate into the labyrinth of narrow ways which led to the first line. As dawn began to struggle through the gloom, the guns suddenly ceased firing. At 9:15 A.M. the order of attack was sounded, and at the same mo-

NOV

ment at lengthened ranges, the guns flung their curtain of fire between the enemy and his supports.

The first German positions had been devastated by the great bombardment. Over them the French swept, under a hail of fire from the German batteries. Ploughing through the *débris* of the first line they left detachments to 'clear up'—to ferret out prisoners from the deeper dug-outs and take the machine guns which a few heroic survivors still tried to man. Struggling on, the infantry crossed the support and reserve trenches of the first position. At the edge of the woods they faced the German field batteries. With a clear goal before them they flung themselves on the guns, and in a few minutes the 77's, the 105's, and the big Austrian 147's were theirs. At the end of the day the French had advanced an average of two and one-half miles on a 15-mile front, and then they faced the Lübeck trench, the chief position of the second line. Because of the stiff resistance no impression was made on the Butte de Tahure or on the Butte de Mesnil, but part of the Hand of Massiges and the Maisons de Champagne had been carried. Practically the whole German first line had gone, and the French held parts of the second line. The French artillery was pushed forward and resumed the bombardment all through the night to prevent the enemy from consolidating his remoter defenses and bringing up resources. The next day (Sept. 26) the left wing cleared all the summits from Auberive to Souain; the center cleared the woods east of Souain, and joined up with the right of the left wing on Hill 193. The so-called 'Camp of Sadowa' with great quantities of material was taken. All along the front, by means of alternate artillery bombardments and bomb attacks, the line was advanced. The German line was not broken. All that the French could do was to dig themselves shelter trenches, and cling to the position and wait.

During the latter part of September the Germans received reinforcements from Russia, and they were soon ready to launch a counter-stroke on the Champagne front. After Sept. 29 they had been driven back upon their third and final line of defense in many places. On Oct. 6, the French had carried the crest of the Butte de Tahure, and had captured the village of Tahure, reaching their farthest point in the Champagne campaign. Driven to desperate efforts, the Germans began to construct new lines on the heights north of the Py valley, and on Oct. 8, counter-attacked east of Navarin Farm and against the Butte de Tahure after a preliminary bombardment with asphyxiating and lachrymatory shells. The French advance in the Champagne in September, 1915, had left on the west a German salient between Auberive and Rheims. Here Von Heeringen decided to make a counter-offensive with the object of cutting the Rheims-Châlons railway; success in this quarter to be followed by a continued attack on Rheims.

On the night of Oct. 18, the Germans began a bombardment upon the six miles of French front from La Pompelle to the village of Prosnes. Under cover of the bombardment several divisions amounting to 60,000 men, were concentrating on the German side. Early the next morning the German infantry attacked in four successive lines. The first two were blotted out before they reached the French trenches. The third gained a footing but was driven out by bombs. The fourth effected a lodging in some parts of the advanced trenches. In the afternoon, however, the French reinforcements pushed through the curtain of fire, counter-attacked and drove back the assailants. The next day another effort was made farther to the west. The front was much the same, a little over five miles. After a long bombardment and a gas attack, the infantry three times tried to rush the French lines and were driven back each time. In two days' battle two German divisions were destroyed.

On Sunday, Oct. 24, after desperate fighting, the French carried La Courtine on the southwest point of the Butte de Mesnil salient. The next two days they broke off two violent German counter-attacks aimed at the recovery of this point, and were left with an appreciably straightened front. On Oct. 30, the Germans, strongly reinforced from the Russian front, attacked all along the section on a front of four miles, but especially at La Courtine and the Butte de Tahure. The La Courtine effort, four times repeated, failed, but at the Butte their artillery preparation drove the French from the crest, and the Germans retook the summit. This forced the French back to the southern side of the hill just below the summit. The German attempt to break the French line at Tahure by a frontal advance, combined with a flanking attack from the Mesnil failed in its main purpose, but by driving the French from the top of the Butte, it gave a further lease of life to the Bazancourt-Grand Pré railway, and eased the German position in the winter stagnation that followed.

Third Offensive.—According to Nivelle's plan of the Second Battle of the Aisne Anthoine's Fourth French Army, east of Rheims, in the Champagne opened the attack on the Moronvilliers *massif* on April 17, 1917. The line of attack ran on a front of ten miles, held by some 40,000 troops in line, the same number of reserves, and artillery. The plan at this time was only to uncover the heights north and east of Rheims in order to broaden the entrance into the plain of Laon. The result of the first day of the Moronvilliers frontal assault was that the French right broke through the enemy's first line and had reached the second position and entered the labyrinth of Le Golfe. The next day the assault advanced steadily. To the left the German second line was being hammered by French artillery, the positions on Mont Blond and Cornillet slopes were consolidated. Mont Haut was taken, and the Foreign Legion carried the remainder of Le Golfe. On April 19 the German resistance stiffened, resulting in violent fighting along the whole line. The heights of Le Téton were finally taken and held by the French, and to Auberive fell the Legionaries. On April 20, Anthoine was still heavily engaged against a counter-attack which forced his army back from the crest of Mont Haut and Le Casque. As the first phase of the action came to an end, Anthoine had won most of his objectives east of the Thuizy-Nauroy road. Above all, he had faced and defeated violent counter-attacks delivered by fresh German divisions. The better part of the Moronvilliers *massif* was now in the hands of the French, but not enough to complete any strategical purpose.

On April 30 the attack was renewed by the French. Trouchaud's division reached the summit of Cornillet, but was forced to a standstill and repelled by furious counter-attacks. Brulard failed in his attack on the higher summit of Mont Haut, but reached the top of Mont Perthois and the Fosse-Froide trenches on the far side, and won the southern end of the Le Casque Wood. For the next few days Hennoque struggled in La Grille Wood on the left, which he did not clear until May 8. Anthoine brought up fresh troops, while his guns began a new preparation. Sunday, May 20, was the culmination of the Moronvilliers battle. The sector of attack was the highest ground from Cornillet to Le Téton. Three new divisions were detailed for the attack. After a mighty artillery bombardment, they advanced to the assault. Joba's division raced the 250 yards to the summit of Cornillet under a heavy enfilading fire, gained the crest, and moved down the farther side towards Nauroy. Ferraedini's division found the enemy's position too strong to allow of an advance far down the northern slopes of Mont Haut and Mont Blond, but Aldebert was able to push well to the north of the Le Casque and Le Téton.

June-July, 1917.—On June 9, 1917, General Anthoine was transferred to the First French Army in Flanders and General Gouraud took command of the Fourth French Army in the Champagne. He started an attack just before dawn on June 21. The operation was completely successful—the Flensburg and Blond trenches were won, and the enemy lost all chance of observation over the southern slopes of the Moronvilliers range, except two positions; one on the saddle between Mont Blond and Mont Haut, and one on the western side of the latter hill.

Von Below brought up three fresh divisions with the intention of regaining the crest line. But on July 12 and 13 the French guns deluged the position of the new divisions. On July 14—the *jour de France*—Gouraud attacked on two fronts with the purpose of clearing the saddle between Mont Blond and Mont Haut and extending the French hold on the Téton. Within half an hour he had secured all his objectives. Violent counter-attacks followed. During the night the saddle changed hands for an hour or two but on the Téton the enemy made no progress. On the night of July 22 Von Below attacked the French lines northwest of Mont Cornillet, on the 25th the whole front on Mont Haut, and on the 26th he made no less than five separate assaults. By the end of the month he had given up the task.

Campaign of 1918.—During the final stages of the war the Champagne was again the scene of fierce fighting. Ludendorff's plan of attack was to strike out from the salient in which von Boehn's Seventh Army had been entrapped following the third battle of the Aisne, and to press beyond the Marne and cut the great lateral railway from Paris to Nancy. It was the last great German offensive, in which Rheims once again resisted all assaults. The struggle ended in the Germans' second rebuff on the Marne, July 17.

On Sept. 25, 1918, the Germans between the North Sea and the Moselle held a position that was difficult, but not hopeless. In the battle which Foch was about to wage against the whole German front various points became main objectives. At 2:30 A.M. Sept. 26, the guns of both French and American armies began the severest kind of a 'preparation' between the Suippe and Verdun. At 5:30 A.M., on a front of forty miles, the infantry of the two armies crossed the parapets. The first rush took Gouraud's six corps of attack through the front positions which had been ceaselessly strengthened ever since 1915. It became evident to the enemy that Gouraud's advance was a containing battle and that the Americans were the spearhead which was directing its main effort on the Meuse. Von Gallwitz consequently threw such reserves as were available against the Americans.

On Oct. 8, the French were two miles north of the Arne, and on the 10th, with Pershing's army, were able to advance and seize the Grand Pré defile. The next day they took Challeranges. Gouraud, Pershing, Guillamat, and Mangin were advancing in linked movement. The deathblow had been struck to the remnant of Germany's military power. By the 10th of October Gouraud and Pershing had cleared the Argonne Forest (see Argonne), and were threatening the southern section of the vital lateral railway. Ludendorff's object was now to retire in order to protect the railway. Accordingly, he expedited the retirement between the sea and the Meuse and massed his chief resistance in the sections where the railway was most directly threatened—against Pershing and Gouraud in the south, and against Rawlinson, Byng, and Horne in the center.

Gouraud opened the last stage of the offensive on Nov. 1 by attacking north and east of Vouziers, and the Americans advanced between Olizy and the Meuse. The whole line swung forward. On Nov. 2 Pershing took Halles; both armies advanced more than six miles. The next day the Americans were looking north by Stenay to the Metz railway, and by Nov. 4 held positions which enabled them to bring the railway at Montmédy and Longuyon under their fire. On Nov. 5, the enemy's resistance was broken on the whole front in the West. The two wings of the German army were separated and were now not in retreat but in flight. On the afternoon of the next day the vanguard of Liggett's American army took the outskirts of Sedan on the west bank of the Meuse. On Nov. 11, 1918, at eleven o'clock, the Armistice went into effect, and peace descended over the battle-field.

For Nov. 14 Foch had planned a great sweep of the Americans northeastward between the Meuse and the Moselle.

The Champagne country was again the scene of violent military operations in the European war in May, 1940, following the German violation of the neutrality of the Netherlands and Belgium. Severe devastation resulted from the air bombing and the onrush of the German mechanized forces.

Champagne, sham-pān, a variety of effervescent wine originally produced in the province of Champagne, France, from grapes grown on the slopes of the River Marne and the mountains of Rheims. While the term was formerly limited to the wines produced in that district, at the present day it refers to the method rather than the locality of production, excellent champagne now being made in Germany and America.

Champagnes are pale straw or pink in color. The first runnings from the press constitute the *vin de cuvée,* and produce the finest sparkling wine; while the other pressings go to form inferior qualities both of wine and of brandy. From the presses the 'must' flows directly into great reservoirs, from which it is drawn off into large vats. After standing for some hours, until it is comparatively clear, it is transferred to casks in which it is stored while fermentation takes place.

At the beginning of the following year the wine is racked off and fined, when it is ready for blending or 'making the *cuvée.*' This consists in combining various vintages until wine of the quality and flavor demanded is obtained. At this stage, also, the wine is tested for sugar strength, for upon the amount of sugar contained in the wine before secondary fermentation will depend the effervescence of the champagne. The blended wine is then bottled and undergoes a second process of fermentation, which converts the sugar into alcohol and carbonic acid, causing effervescence. In spite of every precaution and the use of specially prepared bottles, the pressure of the developed gas bursts many bottles, the loss in some cases amounting to 10 per cent.

The filled bottles are stacked in a horizontal position, in which they remain for eighteen or twenty months, or even longer. During this stage a deposit, consisting principally of tartar and yeast, is formed. In order to remove this, the bottles are then placed horizontally in 'A' shaped stands (each bottle having a hole to itself), and shaken up day by day for many weeks; and are gradually brought from the horizontal to the vertical position, being tilted forward a little each time until the sediment has accumulated on the cork. Cork and sediment are then removed (*disgorgement*), and the remaining wine, which is perfectly clear, is classed as extra dry or *brut.* When the sediment has been poured off, some portion of a liqueur—a solution of sugar candy in old wine of the best quality with a dash of cognac—is added (*dosage*), the amount depending upon the desired sweetness of the wine. Every bottle is then filled up with bright, clarified wine, re-corked, and stored in cool cellars.

The alcoholic strength of champagne is from 9 to 12 per cent. Still or non-effervescent champagne is first racked off in the March after the vintage. Creaming or slightly effervescent champagne (*demimousseux*) has more alcohol, but less carbonic acid gas, than sparkling champagne.

The discovery of champagne, at the end of the seventeenth century, is attributed to Dom Pérignon, a Benedictine monk of the Abbey of Haut Villers, France, who quite by chance found that wine bottled under certain conditions underwent a second process of fermentation, rendering it effervescent. Dom Pérignon also adopted the use of cork for stopping the bottles, and blended the products of different vineyards with excellent results. For years the secret of champagne making was kept by the Abbey of Haut Villers, but it eventually became public, and many wine establishments sprang up throughout the province of Champagne.

It was long believed that champagne could not be made successfully outside the province. Equally fine champagne, however, is now produced in other sections of France, in Germany, and in the United States—notably by the Italian Swiss colony in Sonoma county, Calif., where the wine is bottled, disgorged, and handled in exactly the same way as the finest French brands.

Champagne War, the term applied to the disturbances which arose in the Aube district of France during March and April, 1911. Aube was formed in 1790 from Basse-Champagne and a small part of Burgundy. In 1903 a law was passed in France delimiting the area which alone could legally grow grapes for the manufacture of champagne. This law, which was necessitated by the frauds of certain firms, removed from Aube a lucrative business; hence the outbreaks, which were characterized by much sabotage. Subsequently, but not without fresh outbreaks in other districts, the Chambers approved of a measure for repressing fraud without limiting the area of production.

Chamonix and the Mont Blanc Range.

Champaign, city, Illinois, Champaign county, on the Wabash, the Illinois Central, and the Cleveland, Cincinnati, Chicago, and St. Louis railroads; 126 miles southwest of Chicago. It has glove and alloy metal manufacturing, soy bean processing, and railroad shops. The University of Illinois (q. v.) is partly in Champaign. Pop (1930) 20,348; (1940) 23,302.

Champaigne, shăn-pān'y', PHILIPPE DE (1602–74), portrait painter, was born in Brussels. After being 'queen's painter' and rector of the Paris Art Academy, he retired from the world to become the accredited painter to Port-Royal and the Jansenists.

He executed many works for palaces and churches, and for Cardinal Richelieu; and was a distinguished portraitist. Most of his pictures are in the Louvre, including *The Dead Christ* and *Portrait of Cardinal Richelieu.* His *Triple Portrait of Cardinal Richelieu* is in the National Gallery, London.

Champeaux, William of. See William of Champeaux.

Champ de Mars, a large parallelogram in Paris, between the Seine and the École Militaire, used principally for military purposes and drills. It has been the scene of many events of historic interest. On it stands the Eiffel Tower.

Champerico, chäm-pā'rē-kō, seaport on the Pacific coast of Guatemala, Central America; 100 miles southwest of Guatemala city. It is a port for Mexico, the seat of a U. S. consulate, and the terminus of a railroad (60 miles) to Quezaltenango. Pop. 1,500.

Champerty, cham'per-ti, or Champarty, is a legal term denoting assistance rendered to a litigant in a lawsuit by a third party for a consideration which is other than fixed remuneration for work done. The most obvious instance is where the third party is to share in the proceeds of the action, or where the remuneration of an attorney is proportional to the amount recovered. Champerty may then be classed as a special form of maintenance, and is forbidden both by the common law as contrary to public policy, and by many ancient and modern statutes. In some jurisdictions, however, an attorney is now permitted to make a charge varying to a certain extent according to the proceeds of the action; and an agreement only to charge in the event of success is not champertous. Transactions which are champertous or even savor of champerty will be set aside, and the parties thereto may theoretically be punished for misdemeanor. Such punishment is now practically obsolete; but if one of the offenders is an attorney he is liable to censure or deprivation for professional misconduct.

The purchase of property, the title to which is under dispute, is quite valid if a definite price is paid, and the seller is not the purchaser's client. In New York, however, all purchases of this nature have by statute been declared void, unless made in pursuance of a contract entered into previous to the origin of the dispute. On the other hand, such a transaction as the sale of the mere right to sue in return for part of the proceeds of the suit is everywhere champertous, and therefore void. Further, the purchase by an attorney of property with respect to which he is carrying on a litigation on the seller's behalf is voidable at the option of the client.

A party to an action is not entitled to plead that his opponent has been guilty of champerty, this being quite irrelevant to the original ground of action or defense. A champertous agreement may be validly acquiesced in by one entitled to set it aside, but only if he is fully aware of his legal right so to do. One champertous agreement can not, however, be confirmed by another also champertous.

Champfleury, shäṅ-flû-rē', called Jules Fleury-Husson (1821–89), French writer, was born in Laon. He went at an early age to Paris, and joined the circle of Baudelaire, Murger, and Banville, whose Bohemian life he shared. He achieved distinction as a realistic writer of plays and romances, and wrote works on the history of caricature, of literature, and of art. His works include: *Chien-Caillou* (1847); *Confessions de Sylvius* (1849); *Aventures de Mariette* (1856); *Bourgeois de Molinchart* (1855); *Les Souffrances du Professeur Delteil* (1853; Eng. trans. under title *Naughty Boys*); *Le Violon de Faïence* (1862), considered his masterpiece; *Les Chats* (1868; Eng. trans., *The Cat, Past and Present*). Consult Troubat's *Life,* in French.

Champigny, shäṅ-pē-nyē', town, France, department Seine, on the Marne; 6 miles southeast of Paris. It has manufactures of embroideries and piano keys. Two battles were fought here in 1870, during the Franco-German War. Pop. (1931 est.) 27,000.

Champion. In the judicial combats of the Middle Ages it was allowed to women, children, and aged persons, except in cases of high treason or of parricide, to appear in the lists by a representative. Such a defender was called a champion. Those who followed this profession were often of the lowest class, and were held disreputable (see Battle, Trial by). At a later period, in the age of chivalry, the word champion came to have a more dignified acceptation, and signified a knight who entered the lists on behalf of an injured lady, of a child, or of any one incapable of self-defence (see Chivalry). In England the crown had its champion, the Champion of England, who challenged, at every coronation at Westminster, all who should deny the king to be the lawful sovereign. The ceremonies of the championship were last exercised at the coronation of George IV.

Championnet, shäṅ-pyo-nā', Jean Antoine Etienne (1762–1800), French general, was born in Valence (Drôme). On the outbreak of the Revolution, after suppressing the Girondist movement in the Jura without bloodshed, he in 1793 took part in the campaign of the Rhine, in which he contributed directly to the victory of Fleurus (June, 1794). In 1798 he was appointed commander in chief of the French army in Italy, and defended Rome against the Neapolitans, cleared the Papal States of the enemy, and captured Naples (Jan. 23, 1799). There he proclaimed the Parthenopean Republic. In the following June he was named commander in chief of the Army of the Alps, but was defeated by the Austro-Russian troops at Gendla (November, 1799), and forced to retire toward Nice. He died at Antibes.

Champlain (sham-plān'), **Lake,** lies in the basin between the Green Mountains and the Adirondacks, partly in Vermont, partly in New York, crossing the Canadian boundary, and draining through the Richelieu River northward to the St. Lawrence. It lies 96 feet above sea level, stretches north and south for 121 miles, with a maximum breadth of 15 miles, and covers an area of 500 square miles. Its greatest depth is about 300 feet, and it is navigable for the largest vessels. The shores are very irregular, the scenery is most picturesque, and there are many islands. The principal cities on its shores are Burlington, Vt., and on the New York side, Rouse's Point, Plattsburg, and Whitehall, from which a canal extends to the Hudson River.

The lake was discovered by Samuel de Champlain in 1609, and French forts were later erected on its shores, at Crown Point (1731) and Ticonderoga (1755). In October, 1776, Benedict Arnold failed to check the advance of a formidable British flotilla on the lake. In the War of 1812 the Americans defeated the British here in the Battle of Lake Champlain (September, 1814) or Plattsburg (q.v.).

In July, 1909, the Tercentenary celebration of the discovery of the lake took place. There was a week of pageantry, in which the great historical events connected with the lake were reproduced, and speeches were made by representatives of the English, French, and United States governments.

Champlain, Samuel de (1567–1635), early French explorer in

America, and the 'Founder of New France,' born at Brouage (Saintonge), France. The son of a captain in the French navy, he early became proficient as a sailor. Though a stanch Roman Catholic, he served under Henry IV in the war against the Catholic League, and peace having been declared (1598), he was captain of a vessel in a Spanish expedition under Don Francisco Colombo, sent to the West Indies, also visiting the City of Mexico and Panama, where he was impressed with the great value that would accrue to trade through the construction of a ship-canal across the Isthmus. He returned to France in 1602; prepared a report of his journey, first published, in English, in 1859, as *Brief Narrative of the Most Remarkable Things Which Samuel Champlain of Brouage Met in the West Indies on the Voyage Which He Made There in the Years 1599 and 1601,* and was made a royal geographer by Henry IV. On behalf of Aymar de Chaster, he, with Pontgravé, made a reconnoitering voyage to Canada in 1603, proceeding up the St. Lawrence as far as the site of the present Montreal. From 1604 to 1607 he was again in Canada (having sailed with De Monts and Poutrincourt), passing one winter (1604–5) on the Isle St. Croix, thereafter having headquarters at Port Royal (Annapolis, N. S.), and exploring carefully the New England coast as far south as Buzzard's Bay. Returning to Canada as lieutenant governor in 1608, he founded Quebec, and thereafter spent most of his life in New France, making various trips, however, to and from France. In 1609 he discovered Lake Champlain (named in his honor), and by taking part in an engagement with the Iroquois began the traditional warfare between the French (allied with the Hurons) and the redoubtable Five (later Six) Nations—a warfare of the greatest significance in the history of New France. In his expeditions of 1613 and 1615 he visited and was the first white man to explore (in part) the Ottawa River, Georgian Bay, and the Muskoka Lake region. In 1612 Champlain had been invested with almost vice-regal power in New France, and until his death, with the exception of the period of English possession (1629–32), he was the dominant figure in the colony. 'In Champlain alone,' says Parkman, 'was the life of New France. By instinct and temperament he was more impelled to the adventurous toils of exploration than to the duller task of building colonies. The profits of trade had value in his eyes only as a means to these ends, and settlements were important chiefly as a base of discovery. Two great objects eclipsed all others—to find a route to the Indies, and to bring the heathen tribes into the embraces of the Church, since, while he cared little for their bodies, his solicitude for their souls knew no bounds.' Champlain kept full journals of his voyages and explorations, and these are of the utmost importance to the student of the history of New France; they were published originally in 1604, 1613, 1619, and 1632, but may be most conveniently consulted in Laverdière (ed.), *Œuvres de Champlain* (6 vol., 1870) and *Voyages* (2 vols., 1870), and in his *Voyages* (3 vols., 1878–82), translated into English by Otis and prefaced with a memoir by Slafter. Consult, also, Parkman, *Pioneers of France in the New World* (last ed., 1897); Winsor, *Cartier to Frontenac* (1894); Gravier, *Vie de Samuel Champlain* (1900), and Dix, *Samuel Champlain* (1905).

Champlain Epoch, in geology, a period of post-Glacial time, which has left important deposits around Lake Champlain and elsewhere. Old lake basins now dried up, and raised beaches and deposits of littoral character, are the principal traces left by the Champlain Epoch. The raised beaches are found around the Great Lakes of the United States and Canada, and on the Eastern seaboard. Among the more important of the Champlain lakes were those of Bonneville and Lahontan, in the Great Basin region of the west, now represented by small bitter lakes, of which the best known is the Great Salt Lake of Utah.

Champlin, John Denison (1834–1915), American author, born at Stonington, Conn., and graduated (1856) at Yale. He studied for the bar and practiced for a short time in New York; then took up newspaper work and was editor of the Litchfield, Conn., *Sentinel* (1865–9). From 1873 until its completion he was a member of the revising staff of the *American Cyclopaedia.* He published the *Young Folks' Cyclopaedia* series (5 vols., 1879–1905), and edited the *Cyclopaedia of Painters and Paintings* (4 vols., 1886–8) and the *Cyclopaedia of Music and Musicians* (3 vols., 1888–90). He was joint editor of the *Liber Scriptorum* (1893), and an associate editor of the *Standard Dictionary* (1892–4).

Champney, Benjamin (1817–1907), American painter, was born at New Ipswich, N. H., and received an academic education. He worked in a lithographic establishment at Boston, studied art in the same city, and from 1841 to 1848 passed his time principally in Europe, painting at the Louvre and visiting the Rhine and Italy. After 1853 his summers were spent at North Conway, N. H., where he painted the White Mountain landscapes and New England flower-pieces for which he was noted. Champney was a founder, and at one time president, of the Boston Art Club, and in 1900 he published his *Sixty Years' Memories of Art and Artists.*

Champney, James Wells (1843–1903), American painter, was born in Boston, Mass., and began work as a wood-engraver in 1859. After serving in the Civil War he studied art at Ecouen, France, with Edouard Frère (1867–8), and at Antwerp and Rome (1868–70), and he made many sketching expeditions in later years to the Continent, Africa, Nova Scotia, and South America. In 1876 he built a studio at Deerfield, Mass., where he worked in summer, his winters being passed in New York. Champney's early work was principally genre. In later years he became noted as a rapid and clever worker in pastel portraiture. He was made an associate of the National Academy in 1882.

Champneys, Basil (1842–1935), English architect and author, born at Lichfield. Among the public buildings of his designing are the Divinity and Literary Schools, Cambridge; Lady Margaret Hall and Mansfield College, Oxford; the Girls' Schools and New Grammar School buildings, Bedford; the school buildings and Butler's Museum at Harrow; Rylands' Library, Manchester. Champneys also built many churches, and was cathedral architect at Manchester. His books are *A Quiet Corner of England* (1875), *Henry Merritt* (1879), *and Coventry Patmore* (1901).

Champollion, Jean François (1790–1832), French Egyptologist, known as 'Champollion le Jeune,' born at Figeac (Lot). He studied Coptic in Paris, and was later made professor of history at Grenoble (1816). By comparison of MSS. and monuments he found a clue to the essential identity of the three systems of Egyptian writing, and in the Rosetta inscription he discovered the twenty-five letters mentioned by Plutarch. He was sent on scientific missions to Italy (1824–6) and to Egypt (1828–30), being made conservator of the Egyptian collections (1826), and appointed to a new chair of Egyptology in the Collège de France (1830). Works include *L'Egypte sous les Pharaons* (2 vols. 1811–14); *De l'Ecriture Hiératique des Anciens Egyptiens* (1821); *Précis du Système Hiéroglyphique* (1824; 2nd ed. 1828). After his death appeared *Grammaire Egyptienne* (3 vols. 1836–41), *Monuments de l'Egypte et de la Nubie* (5 vols. 1835–45), and *Dictionnaire Egyptienne* (1842–4).

Champollion-Figeac, Jean Jacques (1778–1867), French antiquary, born at Figeac (Lot). He was librarian and Greek professor at Grenoble, and in 1828 was made conservator of mss. in the Royal Library in Paris, later (1848) being appointed librarian to Napoleon iii. His chief works are: *Annales des Lagides ou Chronologie des Rois Grecs d'Egypte* (1819–21), *L'Ecriture Démotique Egyptienne* (1843), *Le Palais de Fontainebleau* (1867), *Documents Paléographiques Relatifs à l'Histoire des Beaux-Arts et Belles-Lettres pendant le Moyen-Age* (1868). He edited several volumes of documents dealing with French history.

Chanar, anc. tn. and fortress on the Ganges, India, United Provinces, 20 m. E. of Mirzapur; was a favorite residence of Warren Hastings. Pop. 9,926.

Chanaral de las Animas, tn., Chile, Atacama, 75 m. N. of Copiapó, on the W. coast. The extraction of salt forms the chief industry. Copper mines in the vicinity. Pop. about 3,000.

Chance. See Probability.

Chancel, that portion of a church in which the altar stands, and which is devoted to the use of the clergy, so called because separated from the rest of the church by a screen or rail (Lat., *cancellus,* 'screen'). In English usage the term is practically synonymous with choir (q. v.).

Chancellor. The primary meaning is one who is stationed at the lattice-work (*cancellus*) of a window or a doorway to introduce visitors and others. The *cancellarius* under the later emperors was a chief scribe or secretary, ultimately invested with judicial powers. Most of the chief countries of Europe have had high officers of state with this title. For instance, the arch-chancellor of the Holy Roman Empire was the Archbishop and Elector of Mainz, while the Abbot of Fulda was the official arch-chancellor of the Empress; the Archbishop of Cologne was arch-chancellor in Italy, and the Archbishop of Trèves arch-chancellor in Burgundy. The chief judicial officer or president of the chief judicial colleges in Germany was often called chancellor. Under the former German Empire, the head of the administration was known as the imperial chancellor. In France, the highest official of the kingdom bore, down to the revolution, the title of chancellor. **(1.)** The Lord High Chancellor of Great Britain is the chief lay officer of the crown, and takes precedence after the Archbishop of Canterbury. He is a member of the Cabinet, and retires on a change of ministry. He is called the keeper of the king's conscience, because, as keeper of the Great Seal, he is the officer through whom and by whose consent the king expresses his will on all important occasions. The Lord Chancellor is patron of all crown livings of the value of less than £20, according to the valuation taken in the reign of Henry viii; he appoints all the judges of the High Court except the lord chief-justice (but not the judges of the Court of Appeal, who are appointed by the Prime Minister), and all county court judges, king's counsel, and justices of the peace except in the duchy of Lancaster. Owing to his ecclesiastical patronage, he may not be a Roman Catholic (or probably a Jew); but this disability does not apply to the Irish lord chancellor. He is chairman of the House of Lords, but his powers are much less extensive in this respect than those of the Speaker in the Commons. He is *ex officio* president of the House of Lords as the supreme court of appeal for the three kingdoms, of the Court of Appeal in England, and also a member of the judicial committee of the Privy Council. All writs are issued in his name. Though called Lord Chancellor of Great Britain, he has no jurisdiction over Scotland except as a member of the House of Lords in its character as a court of appeal. The Irish lord chancellor has similar functions in Ireland. **(2.)** Chancellor of a Cathedral, one of the higher clergy attached to some of the elder cathedrals in England, who has the custody of the seal of the dean and chapter, and exercises oversight in educational matters. In some places, as at Lincoln, he is the head of a theological college. **(3.)** Chancellor of a Diocese. The judge of the consistory court of a diocese. Usually he is a member of the bar, but sometimes the office is held by a clergyman. The appointment to the office lies with the bishop. See also Exchequer; Lancaster, Duchy of; University.

Chancellor, Richard (d. 1556), English navigator, was appointed pilot-general in 1533 to Sir Hugh Willoughby's expedition in search of a northeast passage to India. The fleet being separated by a storm off the Lofoden Islands, Chancellor, in the *Bonaventure,* reached the meeting-place, Vardöhus, in the north of Norway, and hearing nothing of his companions, pushed on into the White Sea, whence he was permitted to visit the Muscovite Czar at Moscow. The result was the establishment of the Muscovy Trading Company. A second voyage to the White Sea in 1555 ended in Chancellor's shipwreck and death off Pitsligo, on the coast of Aberdeen. See Hakluyt's *Navigations* (vol. i, 1589).

Chancellorsville, Battle of, a battle of the American Civil War, fought on May 2–4, 1863, at Chancellorsville, Va. (about 55 m. N. by W. of Richmond), between the Federal Army of the Potomac, numbering about 130,000, under Gen. Hooker, and the Confederate Army of Northern Virginia, numbering about 60,000 under Gen. Lee, Hooker being outgeneralled and badly defeated. After the Battle of Fredericksburg (q. v.) the Federal army, of which Hooker, succeeding Burnside, was in command, lay at Falmouth across the Rappahannock and a short distance up-stream from Fredericksburg, where the Confederate army remained encamped. Late in April Hooker by skillful maneuvering massed a large part of his command on Lee's left flank at Chancellorsville, but, hesitant and unequal to his opportunity, he withdrew (May 1) into the Wilderness from the position which he had assumed, and awaited attack. Lee, early on May 2, contemptuously dividing his force in the face of a superior enemy, dispatched 'Stonewall' Jackson with 30,000 men, by a famous flanking march, to attack Hooker's right (the Eleventh Corps, under Gen. Howard). The attack was made late in the afternoon (at 5 o'clock), completely surprising the Eleventh Corps (outnumbered two to one), though military critics generally agree that the purpose of Jackson's movement should have been perceived and adequate provision made to meet it; and the Federals quickly gave way. Jackson himself, however, while returning to his lines in the dark, after having ridden forward beyond the line of battle, was fired upon and mortally wounded by his own men. Early on the 3d (Sunday) Gen. Lee renewed the attack, and by 10 A.M., according to his own report, was 'in full possession of the field.' Hooker's conduct throughout was in strong contrast with that of Lee, the story of the day's fighting being, says Rhodes, 'that of an incompetent commander in a state of nervous collapse confronted by an able and alert general.' About 9 A.M., while leaning against a pillar struck by a cannon ball, Hooker was rendered unconscious, but by this time the battle had already virtually been won by Lee. After the first day's fighting Hooker ordered Sedgwick, commanding about 22,000 men near Fredericksburg, to join him at Chancellorsville. Sedgwick attacked and finally overcame General Early (commanding about 9,000 men and occupying the strong position of Marye's Heights), but on the 4th he was met by Lee between Fredericksburg and Chancellorsville, and after a stubborn conflict withdrew across the Rappahannock during the night. Hooker, though greatly superior in numbers, failed, through bad generalship, to bring all his troops into action, and, according to General Dodge, Lee outnumbered him wherever he encountered him. The total Federal loss in the Chancellorsville campaign was about 17,200; that of the Confederates about 12,400. Consult Johnson and Buel's *Battles and Leaders of the Civil War*.

Chancery Division. See Equity; Supreme Court.

Chancre (Fr.), shang'k*e*r, the sore which arises at the point of inoculation with syphilitic virus. See Syphilis.

Chanda, chän'dä, town, India, in Central Provinces; 85 miles south of Nagpur. It is an important coal mining center. It has interesting archeological remains and a collection of ancient statuary known as Rayappa's idols. Pop. 23,000.

Chandarnagar, chun'd*e*r-nug'*e*r, or Chandernagore (correctly *Chandannagar,* 'city of sandalwood,' or perhaps 'moon city'), city, French Indo-China, on the right bank of the Hugli; 20 miles north of Calcutta. It is the seat of a French sub-governor and owing to the silting up of the river it is now of little commercial importance, though at one time a rival to Calcutta. It was settled by the French in 1673; was taken by the British in 1757 and 1794; and finally restored to France in 1816. Pop. (1941) 38,284.

Chandausi, chun-dou'sē, town, India, United Provinces, 27 miles south of Moradabad. Pop. *c.* 27,000.

Chandeleur Islands, shan-d*e*-lo͞or', a group of about 15 small islands in the Gulf of Mexico, separated from the east coast of Louisiana by Chandeleur Sound. There is a lighthouse on the most northerly island.

Chandler, Charles Frederick (1836–1925), American chemist, was born in Lancaster, Mass. He studied at the Lawrence scientific school, and at the University of Göttingen (PH.D.) and was professor of chemistry at Union College from 1857 to 1864. In the latter year he helped to establish the Columbia School of Mines, in which he was professor of analytical and applied chemistry until 1877, and subsequently professor of chemistry in both the scientific and arts departments. He served as chemist and president of the Metropolitan Board of Health of New York City (1865–84), and during his incumbency effected many reforms in the sanitary arrangements of the city's food supplies in tenement-house management. He was also professor at the New York College of Pharmacy after 1866, and filled other important offices, state and local, conducted many important investigations for public and private bodies, and in addition to his numerous reports and scientific papers from 1870 to 1877 with his brother, W. H. Chandler, edited *The American Chemist.*

Chandler, Seth Carlo (1846–1913), American astronomer, was born in Boston, Mass., and was educated in his native city. He became a volunteer assistant at the Harvard observatory, and while there invented an improved almucantar, an instrument floating on mercury and bearing a telescope that points to the same altitude as the instrument is turned. He gave his principal attention to the observation of variable stars, of which he prepared the standard catalogue. He edited the *Astronomical Journal* from 1896 until his death, and made valuable contributions to other scientific periodicals. He was a member of the National Academy of Sciences.

Chandler, William Eaton (1835–1917), American public official, was born in Concord, N. H. He was graduated from Harvard Law School, and was admitted to the bar in 1855. For several years he was reporter of the New Hampshire Supreme Court, served in his state legislature, and filled minor legal government positions in Washington. Resuming his law practice in 1867, he became active in Republican politics, and was prominent in his party's counsels for many years. He was Secretary of the Navy under President Arthur (1882–5), and during his régime the building of the modern navy was commenced. He was U. S. Senator from New Hampshire from 1887 to 1901, and in the latter year became president of the Spanish Treaty Claims Commission.

Chandler, Zachariah (1813–79), American statesman, was born in Bedford, N. H., and removed to Detroit, Mich., in his twenty-first year, where he became a successful dry-goods merchant. He was elected mayor of Detroit in 1851 as a Whig, and took an active share in the organization of the Republican party, by which, in 1857, he was elected to the U. S. Senate, serving in that body until his appointment (1875) by President Grant as Secretary of the Interior. He was an ardent supporter of the Union cause during the Civil War, and advocated its vigorous prosecution. On the expiration of his term as Secretary of the Interior he was again elected to the Senate but died suddenly six months later.

Chan'dos, an English family of Norman descent, extinct in direct male line in 1428; but in 1554 Sir John Brydges, a descendant in the female line, was created Baron Chandos, James Brydges, son of James, the eighth Lord Chandos, was made Duke of Chandos (1719), the title passing by marriage (1796) to the Grenvilles, dukes of Buckingham and Chandos.

Chandragupta (d. ? 286 B.C.), chan-dr*a*-go͞op't*a*, or Sandrocottus (of Megasthenes), first emperor of India of the Maurya dynasty, reigning from 316 to 292 B.C.(?). Of humble birth, Chandragupta Maurya attained great power in the valley of the Ganges by building up a kingdom which had for its capital Palaliputra or Palibothra (modern Patna). After the death of Alexander the Great (323 B.C.) he made an alliance with his most powerful western neighbor, Seleucus Nicator, king of Syria. His empire extended from the Hindu-Kush to the Bay of Bengal. See Maurya Dynasty.

Chang, chäng, province, Tibet, lying immediately west of U or Us, the province in which Lhasa is situated. It is traversed by the Sanpo or Brahmaputra, and its largest town is Shigatse.

Changarnier, shän-gär-nyā', Nicholas Anne Théodule (1793–1877), French general, was born in Autun. He entered the army, served in the Spanish war (1823), and in 1848–9 was governor-general in Algeria. He soon returned to a military post in Paris, where he crushed the outbreaks of the communists. In 1851, for manifesting opposition to Napoleon III, he was arrested, and exiled from France, to which he returned after the amnesty of 1859. In the Franco-German war he was with Bazaine at Metz, and at the fall of the town was sent a prisoner to Germany, but returned to France in 1871.

Chang-chia-ku. See KALGAN.

Changeling, in fairy lore an elf infant substituted for a human infant shortly after birth, and soon developing a repulsive appearance and peevish temper. As a precaution against such fairy theft, infants were ceaselessly watched, a Bible or other charm being left in the cradle, although baptized children were generally considered safe.

Chang-pai-shan, chang-pī-shän' LAO-LING, or SHAN-ALIN MOUNTAINS, mountain range, Manchuria, China, between Kirin and Korea, altitude 8,000 feet.

Changsha, chang-shä', city, China, capital of the province of Hunan, on the Siang River; 200 miles southwest of Hankow. It was formerly surrounded by a wall, which has been torn down, and its streets are fairly wide and clean. Changsha is the seat of Yolo University, more than 700 years old, and of 'Yale-in-China,' an American institution for Chinese students. Leading industries are linen weaving, brassware and pewter, making of bamboo articles and the manufacture of firecrackers. It was opened to foreign trade in 903. Pop. (1931) 606,972.

Changteh, chang-tē', city, China, Hunan province, on the Yuan River, which forms the highway from the neighboring province of Kwei-chou to Hunan. It is an important trade center. Pop. 150,000.

Chang Tso-lin, chang so-lin' (1876–1928), Chinese general, was born in Haichen Hsien, Fengtien. During the Russo-Japanese War he fought on the side of Japan and after the war, at Japan's request, surrendered to the Chinese Government, being taken into government service and receiving rapid promotion. In 1911 he was appointed commander of the Fengtien Defense Force in China and after the establishment of the Republic became commander of the 27th division of the National Army. He was appointed military and civil governor of Fengtien in 1916, assisted Tuan Chi-jui in restoring the Republic when it had been overthrown a second time, and in 1918 was made Inspector-General of the Three Eastern Provinces. In conjunction with Generals Tsao-Kun and Wu-Pei-fu he disbanded the Anfu Party. In 1920 he was made Marshal and in 1921 High Commissioner for Mongolia, but after being defeated by Feng Yu-hsiang in an attempt to eliminate General Wu-Pei-fu, he was deprived of all his posts. He ruled Manchuria as an independent province, and then engaged in struggles for supremacy in Peking.

Chang Yin Tang, Chinese statesman, was born in Canton, the son of a noted general. Though educated in China, he became thoroughly imbued with Western ideas. While minister resident in Tibet, he was one of the negotiators of the Tibet Convention with Great Britain. He became vice-president of the Chinese foreign office, and in 1909 Chinese minister to Washington.

Chanler, AMELIE RIVES. See RIVES, AMELIE.

Chanler, LEWIS STUYVESANT (1869–1942), American lawyer, was born in Newport, R. I., a great-grandson of William B. Astor. He was educated at Cambridge (Eng.) and Columbia Law School and was admitted to the bar in 1891, settling in New York to practice. He was lieutenant governor of New York in 1906–08, and unsuccessful candidate for governor (1908). He was a member of various philanthropic boards.

Chanler, WILLIAM ASTOR (1867–1934), American public official, a descendant of the first John Jacob Astor, was born in Newport, R. I. He was graduated (1888) from Harvard and was a New York Member of Congress (1897–1901). He made two expeditions to Africa. His published works include *Through Jungle and Desert: Travels in Eastern Africa* (1896).

Channel Islands, THE, a group of small rocky islands off the northwestern coast of France, about 75 miles south of England. The group consists of Jersey and Guernsey, two or three smaller islands—Alderney, Sark, and Herm—and various tiny islets of rock or sea crags, as the Casquets, Jethou, Brechou, Dirouilles, Paternosters, Burhou, Minquiers, and Chausseys; total area about 75 square miles. The adjacent waters are

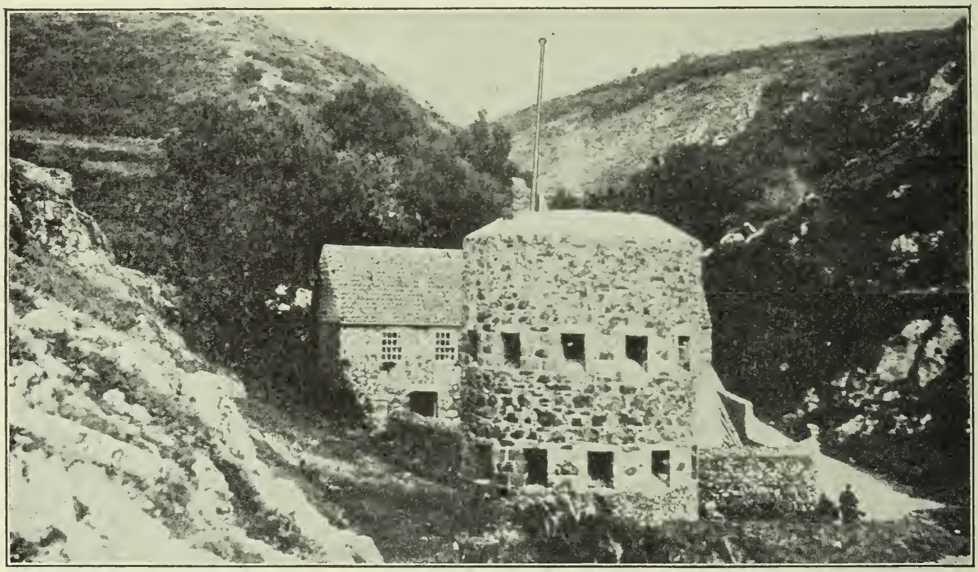


Photo by Publishers Photo Service, N. Y.

Old Tower on Coast of Guernsey, Channel Islands beset with dangerous reefs, especially to the south and east of Jersey and the west of Alderney. Many shipwrecks have taken place on the Casquets. The climate is mild, the annual mean temperature being 51.7° F., and there is much sunshine. The annual rainfall varies, on an average, from 34 to 38 inches. The soil is fertile and exceptionally well cultivated, the leading crops being potatoes, oats, and clover. Cattle raising is an important industry, the islands being famous for their individual breeds. Fisheries also are important, and fruit and flowers form a valuable export to England.

The people, who in 1931 numbered 93,205, are of Norman descent, industrious and fairly prosperous. The language of everyday intercourse is the Norman-French patois; of the popular assemblies, law courts, and churches, modern French. English, however, is taught in the schools.

The islands enjoy practically home rule. Jersey is administered by a lieutenant governor appointed by the Crown, and Guernsey, Alderney and Sark are under one lieutenant governor, the two former having their own government and Sark being under the jurisdiction of Guernsey.

The entire group was granted to the dukes of Normandy in the first half of the 10th century, during which period the peculiar insular (Norman) customs of the islands became established. Ever since the conquest of England the islands have loyally adhered to the English crown, in spite of repeated attempts on the part of France (*e.g.* 1461 and 1781) to subjugate them. They have often proved a refuge for political offenders. In the Second World War, the Islands were occupied by German forces (June 30, 1940) and were liberated May 9, 1945. Consult Wimbush and Carey, *The Channel Islands;* Foord, *The Channel Islands* (1924).

Channing, EDWARD (1856–1931), American historian and teacher, was born in Dorchester, Mass. He was graduated (1878) from Harvard where he became instructor in 1883, assistant professor (1887), and professor of history (1897–1913). In 1913 he was made McLean professor of ancient and modern history. He was a member of the American Academy of Arts and Letters. His published works include *Town and County Government in the English Colonies of North America* (1884); *Guide to the Study of American History* (with Prof. A. B. Hart, 1896); *English History for Americans* (with Thomas W. Higginson, 1893); *The United States, 1765–1865* (1896), in the Cambridge, England, Historical Series, which has been translated into Russian, German, Japanese, etc.; *A Student's History of the United States* (fifth rev. ed., 1924); *History of the United States* (6 vols., 1905–25).

Channing, WILLIAM ELLERY (1780–1842), American author and clergyman, was born in Newport, R. I., and was graduated (1798) from Harvard, where he took high honors. He acted as a private tutor in Richmond, Va., there gaining a knowledge of the workings of slavery, which determined his attitude toward that institution in later years. He studied for the Congregational ministry in Newport and Cambridge, and became minister of the Federal Street Congregational church, Boston (1803), where he remained until his death. Channing was an eloquent, powerful preacher. His religious views gradually developed into something akin to those of modern Unitarianism, and much controversy followed his sermon preached at Baltimore at the ordination of Jared Sparks (1819). Channing, however, stated that he was not a Unitarian in the sense of the word commonly understood, and had little 'sympathy with the system of Priestly and Belsham.' At the same time he was looked upon as a leader in the movement against ultra-Calvinistic tendencies in the Congregational church and became widely known as the 'apostle of Unitarianism.' In religious matters he was always struggling for more light, while he was a powerful advocate of all social and humanitarian causes. Especially was he the friend of the poor and the slave, denouncing war and slavery in scathing terms. In 1822–3 Channing traveled in Europe, and while in England he became the friend of Wordsworth and Coleridge. His most important works are: *Remarks on National Literature* (1823), *On the Character and Writings of Milton* (1826), *on the Character and Writings of Fénelon* (1829), *Negro Slavery* (1835), *Self-Culture and the Elevation of the Masses* (1838), and *Remarks on the Life and Character of Napoleon Bonaparte* (1840). His works were collected and published in 1841. A posthumous volume of sermons, entitled *The Perfect Life,* appeared in 1872. Consult *Life of W. E. Channing,* by his nephew, W. H. Channing.

Channing, WILLIAM HENRY (1810–84), American clergyman, nephew of W. E. Channing (q. v.), was born in Boston, Mass. He was graduated (1829) from Harvard, preparing for the ministry at the Harvard Divinity School. He was pastor of Unitarian churches in Cincinnati and various eastern cities (1835-57), establishing a reputation as a spiritual and eloquent pulpit orator, and as a forceful platform orator on public occasions. During this period he edited the *Memoir of William Ellery Channing* (1848), and was associated with Emerson and James Freeman Clarke in preparing the *Memoirs of Margaret Fuller Ossoli* (1852). He succeeded James Martineau as pastor of the Hope Street Unitarian Chapel, Liverpool, England (1857 to 1862), but returned to the United States because of his interest in the Civil War, and for two years was chaplain of the U. S. Senate. After the war he lived chiefly in England, where he died.

Chansons de Gestes, long narrative poems written by the old *trouvères* of Northern France, and dealing with subjects of French history. The word *gestes* comes from the Latin *res gestae,* 'public acts,' and is applied indifferently to the deeds of a hero and to the poetical account of these deeds. Gautier enumerates 110 extant *chansons,* extending from the 11th to the 15th century and ranging in length from four thousand to thirty thousand lines. The bulk of these divide themselves into three great cycles—that of Charlemagne, of Doon de Mayence, and of Garin de Montglane—together with some smaller cycles like that of Garin de Lorraine. These cycles are all connected with one another, and deal not only with the exploits of one hero, but with the fortunes of his house. The oldest of the chansons is that of *Roland* (about 1050), which is shorter than the others, and lacks the love interest and the broadly ludicrous interludes of the later poems. In some poems of the 14th century—*Hugues Capet,* for instance—this humorous side is developed into pure parody. *Roland* is written in decasyllabic verse, assonating in groups of lines, varying in number from one to fifty or more, known by the French as *tirades.* But rhyme soon displaced assonance, and the decasyllable ultimately yielded to the Alexandrine. The chansons are quite apart from the Arthurian romances, though the influence of these is visible in later examples, like *Ogier le Danois.* The popularity of the chansons was not limited to France; they spread into Provence, Italy, Spain, and even to Iceland. English renderings of late versions of *Fierabras, The Four Sons of*

Aymon, Huon of Bordeaux, and others, are published by the Early English Text Society. Consult Gautier's *Les epopées françaises,* and his monograph in Petit de Julleville's *Histoire de la littérature française.*

Chant, the name given to the simplest and most ancient form of choral singing, for psalms, canticles, and litanies, still used in the Roman Catholic and Protestant Episcopal communions and sometimes in other churches. A chant is called 'single' when one verse is adapted to the tune, 'double' when two verses are required. In singing, a number of words are intoned or recited to a certain note, the duration of which is determined by the number of words given to it; then follow several notes in strict time, which in the first half of the verse are called the 'mediation,' and in the last half the 'termination.' The number of words given to the notes of the chant is termed 'pointing'; for this there are no set rules. See Intoning; Plain Song.

Chant, Mrs. Laura Ormiston, *née* Dibden (1848–1923), English social and political reformer, was born in Chepstow, and previous to her marriage was a school teacher and assistant manager of a private asylum. She lectured in various parts of the world (visiting the United States for that purpose in 1896), advocating woman's suffrage, temperance, liberalism in politics, and other reforms. In 1895 she undertook a social purity campaign, in which she attacked the London music halls.

Chantarelle, shän-t*a*-rel′, an edible mushroom (*Cantharellus cibarius*) usually found in hemlock woods. See Mushrooms.

Chantenay, shäṅ-t′nā′, city, France, department of Loire Inférieure, on the right bank of the Loire; 2 miles s.w. of Nantes. It has extensive iron works, and manufactures preserves, oil, sugar, and brandy. Pop. 27,707.

Chantilly, shäṅ-tē-yē′, town, France, in the department of Oise; 26 miles north of Paris. Its chateau, built in 1527–31, restored in 1880, and presented by the Duc d'Aumale to the Institute of France, contains a valuable collection of works of art. Races are held three times during the year. During the First World War Chantilly was occupied for a few days by the Germans (Sept. 1914) and from October 1914 to December 1916 was French General Headquarters. Pop. (1931) 4,848.

Chan′trey, Sir Francis Legatt (1781–1842), English sculptor, was born in Norton, Derbyshire. His first work, an oil portrait, was exhibited at the Royal Academy (1804). Portrait busts of Duncan, Howe, Vincent, and Nelson for Greenwich Hospital ensured his reputation and in 1818 he was elected a member of the Royal Academy. His finest work is in portrait busts and in his representations of children, the most graceful among the latter being his well known *Sleeping Children* (Lichfield Cathedral) and the statue of *Lady Louisa Russel caressing a Dove,* both said to be influenced somewhat by Stothard. He willed his fortune and his valuable collections to the Royal Academy, for the purchase of works of art. Among his chief statues are *Washington* (State House, Boston, Mass.), *Pitt* (Hanover Square, London), *Watt* (Westminster Abbey), *Canning* (Liverpool), *The Duke of Wellington* (in front of the London Exchange). Consult Jones, *Sir Francis Chantrey;* Radcliffe, *Schools and Masters of Sculpture.*

Chantry (Fr. *chanter,* 'to sing'), the name given to a chapel or altar endowed for the purpose of having mass sung, generally for the repose of the soul of the founder; the term also applies to a bequest for endowing such chapel or altar.

Chanute, ch*a*-no͞ot′, city, Kansas, Neosho county, near Neosho River, on the Missouri, Kansas and Texas and the Atchison, Topeka and Santa Fe railroads; 127 miles southwest of Kansas City. There are many oil wells in the vicinity, and natural gas is used for lighting, heating, and motive power. Industries include railroad machine shops, cement works, brickyards, and cigar factories. Pop. (1930) 10,277; (1940) 10,142.

Chanzy, shäṅ-zē′, Antoine Eugène Alfred (1823–83), French general, was born in Nouart, Ardennes. He entered the army and was present at Magenta and Solferino (1859). After service in Africa for about thirty years he commanded (1870) the second army of the Loire during the Franco-German War. He was governor-general of Algeria (1873–79), ambassador to Russia (1879–81), and was a candidate for the presidency of the French republic (1879).

Chaones, kā′ō-nēz, a people who dwelt in Epirus, to the north of Greece; hence Epirus is sometimes called Chaonia.

Chaos, kā′os, a term applied by the Greeks to the void and infinite space (the word means 'the yawning') which existed before the creation of the universe. Chaos was said to be the mother of Erebus (Darkness) and Nox (Night).

Chapala, Lake, chä-pä′lä, the largest lake in Mexico, is situated on the boundary line between Jalisco and Michoacan. It is 70 miles long by 20 miles wide, with an area of 270 square miles. It lies more than 5,000 feet above sea level and its waters teem with fish.

Chaparral, chä-pär-räl′, town, Colombia, department of Tolima; 200 miles southwest of Bogotá. In the vicinity are rich mines of coal, iron, copper, and petroleum. Pop. 9,000.

Chapbooks, a term, apparently first used in the reign of George IV, denoting those small pamphlets or broadsides which at one time constituted the literature of the poor, not only in the British Isles, but throughout Europe (the German *Volksbücher,* French *Bibliothèque grise*). Their beginning in England is placed about the dawn of the 17th century. They were generally printed on inferior paper with poor type, and the price was small. Early romances—such as the tales of *Sir Bevis, Guy of Warwick, Valentine and Orson, Reynard the Fox, Patient Grizel,* and *Jack the Giant Killer*—form the theme of many of them; while others recite the adventures of *Robinson Crusoe* and more modern heroes, some of a very homely order. Still another class devotes itself to the interpretation of dreams, astrology, palmistry, and physiognomy. In Scotland the 'prophecies' of Peden had a great vogue, as also a variety of others of the same genus, more or less religious in character; but the chief favorites were those of a humorous cast, among which the foremost is *The Merry Exploits of George Buchanan.* After 1800, chapbooks declined in popularity, being supplanted by such publications as Hannah More's *Repository Tracts,* the *Penny Magazine* and similar publications. Consult Ashton, *Chapbooks of the 18th Century;* Fraser, *Humorous Chapbooks of Scotland.*

Chapel, a building used for divine worship. It may be entirely detached, in order to supply the needs of those in different parts of a parish, an example of which are the various chapels maintained by Trinity Church, New York City, or it may form a separate apartment in a church, school, palace or private house. In the Middle Ages nearly all castles and many homes of the gentry had their own chapels and at the present time most colleges and universities, as well as many hospitals and private schools are equipped with chapels. In England the houses of worship used by the dissenters were known as chapels in distinction to the buildings of the Established Church. Saint-Chapelle in Paris is one of the most beautiful chapels in existence. The 'Lady Chapel,' dedicated to the Virgin Mary, is usually directly back of the high altar in Roman Catholic churches.

Chapelain, shȧ'plaṅ', Jean (1595–1674), French literary critic, was born in Paris. He first attracted attention by his preface to the *Adone* of Marino (1623). He was long looked upon as *'le prince des poètes français,'* and it was expected that his *Pucelle,* one of the many pseudo-epics of the 17th century, would rival the *Iliad* and *Aeneid;* but after the outburst of applause which greeted the publication of the first twelve cantos in 1656 his reputation gradually declined, and he became in time the butt of the younger poets, such as Boileau. The last twelve cantos were not published until 1882. None the less, under Richelieu's patronage, he played a great part in the founding of the Academy.

Chapel-en-le-Frith, chap'el-en-li-frith', market town, England, in Derbyshire, 5 miles north of Buxton. It has paper and cotton industries, coal and lead mines, and limestone caverns and workings. Pop. (1938) 18,140.

Chapelle, shȧ-pĕl', Placide Louis (1842–1905), American Roman Catholic prelate, was born in the diocese of Mende, France, and went to the United States in 1859. He was educated at St. Mary's seminary, Baltimore, and afterward was affiliated with the diocese of that city. He was ordained priest in 1865, and after several years of mission work was successively pastor of St. John's and St. Joseph's churches, Baltimore. In 1882 Archbishop (later Cardinal) Gibbons appointed him pastor of St. Matthew's church in Washington, where he also filled important positions in the councils of the clergy until his appointment (1891) as coadjutor bishop to Archbishop Salpointe of Santa Fe, with the right of succession. In 1893 he was promoted titular archbishop of Sarasota, and he succeeded Archbishop Salpointe as archbishop of Santa Fe in 1894. Three years later he was made archbishop of New Orleans and in 1898 he was appointed apostolic delegate to Cuba and Puerto Rico, and commissioned to attend the peace negotiations in Paris. These duties he performed with great discretion, and in 1899 he was appointed apostolic delegate to the Philippines, receiving special commendation from the Pope for his work in the islands. He died of yellow fever contracted just after he had hastened to New Orleans in the epidemic of 1905.

Chapel Royal, a chapel connected with a court. The Chapel Royal of England is known to have existed in the reign of Edward IV. It comprises a dean, sub-dean, royal chaplains, priests, a lay choir, several clerks, and an organist. Its purpose in early days was attendance on the sovereign wherever he might be; formerly it held worship in the chapel at Whitehall, but now only at St. James' Palace, London.

Chap'lains, military clergymen, having the status of non-combatant officers, and made a part of almost all modern military and naval establishments, in many of which attendance on the religious services conducted by them is obligatory on all officers and men. Military chaplains have existed since very early times. Priests accompanied ancient armies to seek superhuman aid for the forces. In 742 the council of Ratisbon made provision in ecclesiastical law for army chaplains. The title is derived from the cape (capella) of St. Martin which was long considered a sacred relic in France. The tent or building where it was kept came to be called a chapel and the custodian a chaplain. British armies in America during the revolution and in the colonial peroid had their chaplains.

An official status was given to chaplains in the Army of the United States on July 29, 1775, when the Continental Congress voted that they should receive captain's pay ($20 a month) in the Continental Army. Current legislation requires that chaplains shall be ordained and accredited by some religious denomination. Appointment is normally made in the grade of first lieutenant, and regular promotion as far as the grade of colonel is authorized. The Act of Congress approved April 3, 1939, provides for 152 chaplains in the Regular Army.

The duties of chaplains as prescribed by existing laws are closely analogous to those performed by clergymen in civilian life, modified only by the peculiar conditions attaching to military life and especially by the necessity that each chaplain shall, as far as practicable, serve the moral and religious needs of the entire personnel of the command to which he is assigned, either through his own personal services or through the coöperative efforts of others.

Chaplains are called upon to hold appropriate religious services for the benefit of the command to which they are assigned at such times and places as may be designated by the commanding officer. The scope of the work of chaplains includes such activities as usually attach to formal and informal Sunday or weekday religious observances, Sunday Schools, Bible Classes, missions, confessions, and such other religious or patriotic exercises as may be apropriate to special occasions. Chaplains also serve as friends, counsellors, and guides, and strive to promote morality, religion, and good order.

Chaplains conduct appropriate burial services for the members of the military service, active and retired, and for members of the families when requested. They are authorized to perform marriage ceremonies, upon proper legal authorization, and administer Christian baptism, and perform such other religious rites as required.

Chaplains are not employed on duties other than those required of them by law, or pertaining to their profession as clergymen, except when there exists an exigency of the service, resulting in a deficiency in the number of officers present for duty. Under such circumstances chaplains will be assigned to no duty incompatible with their status as non-combatants under the terms of the Geneva Convention. While chaplains are subject to the same control as other officers in their military relations, in ecclesiastical matters they are governed by the rules and authorities of the church or religious body to which they belong.

There were chaplains on some vessels of the U. S. Navy during the Revolution, but exactly when the first chaplains were appointed is difficult to determine, though it is likely that this occurred in 1777. When the Navy was reorganized (1794–98), chaplains were included among the officers provided for in the various acts. Before the establishment of the Naval Academy at Annapolis, chaplains were used to train midshipmen. During the first two decades of the nineteenth century, some men were selected to serve as chaplains during the duration of a cruise who were not ordained clergymen. This laxity was corrected in 1823. During the years 1821–40, the number of chaplains on duty at any one time was limited to nine. From 1841 to 1914 the quota was fixed at twenty-four. The Act of June 30, 1914 established a ratio of one chaplain for every 1,250 Naval and Marine Corps personnel. During wartime, Navy Chaplains minister to the Coast Guard. A total of 3,352 chaplains are known to have served in the United States Navy to Dec. 31, 1945. Chaplains in the Navy hold rank and receive the same pay as other staff officers. The Chief of Naval Chaplains is the only chaplain on active duty who is a rear admiral. Their duties are practically identical with those of chaplains in the army.

Chapleau, shȧ-plō′, Sir Joseph Adolphe (1840–98), Canadian public man, was born in Sainte Thérèse de Blainville, Quebec. He studied law and was called to the bar in 1861, becoming Queen's Counsel in 1873. With the exception of one year he was solicitor-general in the Quebec Government from 1873 to 1878 and was Conservative premier of Quebec from 1879 to 1882, resigning to accept the position of secretary of state in the Dominion Government. In 1892 he was made minister of customs and the following year lieutenant governor of the province of Quebec, holding the position until 1897. He was for some years professor of international law in Laval University.

Chap′lin, Charles (1825–91), French painter, was born in Andelys, France, of English parents. He studied at the École des Beaux-Arts and found his true vocation as a portrait painter of women, in the *genre* of Watteau and Bouchers. He was very successful in reproducing the peculiar grace of the Parisian women. In 1860 he painted the Empress Eugénie's apartments at the Louvre, as well as the bathroom at the Elysée. He was also an accomplished engraver, and executed engravings of several pictures by Decamps, Watteau, and several of his own. Among his works are *Les bulles de Savon* (1864), and *Souvenirs* (1882), his most popular canvas, both at the Luxembourg Museum; *The Lottery,* at the Museum of Rouen; *The Birth of Venus, The Bath, Rising in the Morning,* and a great number of portraits of fashionable people.

Chaplin, Charles Spencer (1889–), English motion picture actor, was born in London, where he spent his youth. His parents were theatrical people. In 1910 he went to the United States as a leading comedian. In 1913 he made his first moving picture in Hollywood, Calif., in which he at once attained extraordinary success. He formed his own producing company in 1918, and since that time has continued to be regarded as one of the leading artists in the field of screen comedy. Among his best pictures are *A Dog's Life, Shoulder Arms, The Gold Rush, The Circus.*

Chap′man, a petty trader, usually itinerant. The 18th century traveling chapman sold chapbooks, needles, laces, linen, and bought old brass and old clothes.

Chapman, Frank Michler (1864–1945), American ornithologist, was born in Englewood, N. J. He engaged in the banking business in New York City until 1886, after which he devoted himself exclusively to ornithological work, which he had previously carried on in spare hours. He visited Florida for purposes of observation and collection, and in 1887–1908 was assistant curator, and from 1908–1945, curator of the Department of Ornithology in the American Museum of Natural History in New York, for which institution he did much collecting in Canada, Mexico, the West Indies and South America. Dr. Chapman was associate editor of *The Auk,* and established *Bird-Lore,* a bi-monthly magazine, in 1899, and received many scientific honors. He was the originator of the Habitat Group so widely used in museum exhibits. His publications include *Handbook of Birds of Eastern North America* (1895); *Bird Life* (1897); *Bird Studies with a Camera* (1900); *The Economic Value of Birds to the State* (1903); *The Warblers of North America* (1907); *The Travels of Birds* (1916); *Our Winter Birds* (1918); *What Bird Is That?* (1920); also various scientific and technical volumes.

Chapman, George (1559–1634), English dramatic poet of the second period of the Elizabethan era, was born near Hitchin, Hertfordshire. He published nothing until 1594, and in the interval he was supposed to have been in Germany, possibly with theatrical companies. His plays include *All Fools* and *The Gentleman Usher,* humorous comedies; *Bussy d'Ambois,* the one play that survived the Restoration, and *The Admiral of France,* both French tragedies. In some of his plays he collaborated with Jonson, Marston, and Shirley. But it is as a translator that Chapman is preëminent. His work includes translations of the *Iliad,* the *Hymns,* and the *Odyssey,* which were celebrated by Keats' noble sonnet 'On First Looking Into Chapman's Homer'; besides Hesiod's *Works and Days,* and a little of Juvenal. His merits were an exhaustless energy and a wide, though not very exact, learning; while his faults were those of his age—the age of Donne and 'wit combats.'

Chapman, John (1810–54), English political writer, was born in Loughborough, Leicestershire. After failing in business as a lace manufacturer (1834) he went to London, where he became editor of the *Mechanics' Magazine,* and invented improvements on the 'four-wheeler' which led to the hansom cab' (patented 1836). He wrote *The Cotton and Commerce of India* (1851).

Chapman, J. Wilbur (1859–1918), American clergyman and evangelist, was born in Richmond, Ind. He was educated at Lake Forest University and at Lane Theological Seminary and was pastor of Presbyterian churches in New York and Pennsylvania. In 1903 he was made executive secretary of the Presbyterian General Assembly's committee on evangelistic work, in which position he was very successful. He wrote several books on evangelistic subjects.

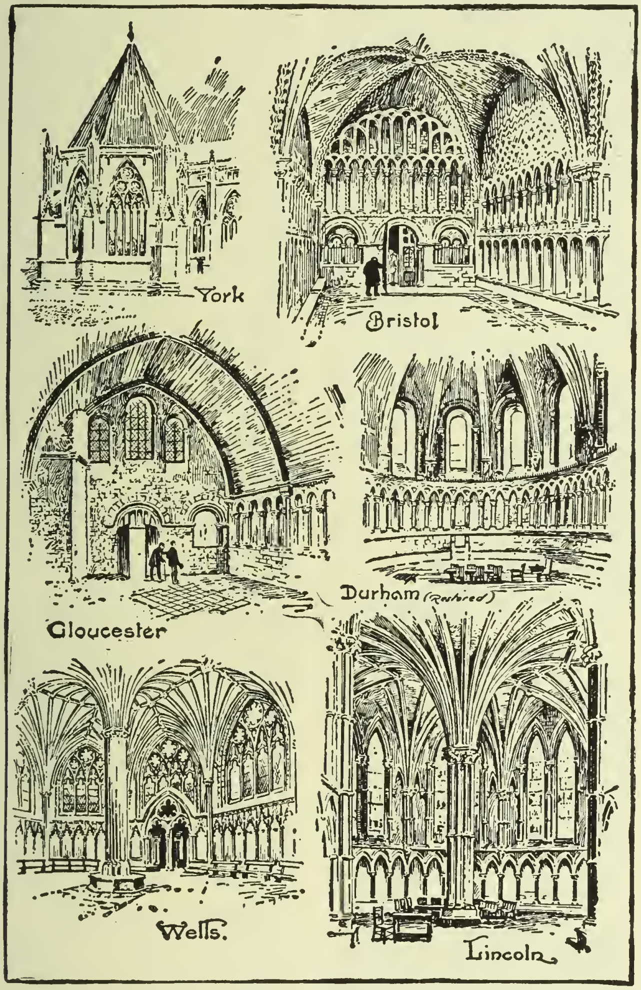
Chapman, Maria (1806–85), American reformer, was born (Weston) in Weymouth, Mass. She received her education at that place and in England, and was principal of a school for girls in Boston, 1829–30, in the latter year marrying Henry G. Chapman, a Boston merchant. Four years afterward she devoted herself to the abolitionist cause, and for many years was treasurer of the Massachusetts Anti-slavery Society. She visited France from 1848 to 1856, and there aided the anti-slavery cause by her writings. She published an anti-slavery annual, *The Liberty Bell,* and edited the *Autobiography* (1877) of her friend Harriet Martineau.

Chapone, shȧ-pōn′, Hester, *née* Mulso (1727–1801), English essayist, was born in Twywell, Northamptonshire. Her *Letters on the Improvement of the Mind* (1772) had a great vogue.

Chapra, chup′rä, town, India, Bengal, in Saran district, 32 miles northwest of Patna. Although Chapra has declined in commercial importance, it still has wealthy banking houses and large factories. Pop. 45,000.

Chaptal, shȧp-tȧl′, Jean Antoine, Comte de Chanteloup (1756–1832), French chemist and statesman, was born in Nogaret, Lozère. He was educated at Montpellier, where he was appointed to a new chair of chemistry (1781). He was a member of the Institute (1798); and Minister of the Interior (1800–4), when he founded the French Chamber of Commerce, created the first industrial school, and began the canalization of the rivers of France. In 1811 he was made minister of commerce in the 'hundred days.' His investigations in regard to alum and soda produced valuable results.

Chap′ter, a regular assembly of monks or canons; in modern usage the body of ecclesiastics connected with a cathedral or collegiate church, and presided over by the dean. The members are obliged to spend a certain fixed time in residence, during which they conduct the daily cathedral services, and act as an advisory council to the bishop. They have special stalls in the cathedral and usually a residence in the precincts. The place where they meet is the chapter-house. See CANON; DEAN.



Typical English Chapter-houses

Chapter-house, one of the monastic buildings appended to a cathedral, abbey, or collegiate church. It is usually a lofty, vaulted apartment situated contiguous to the cathedral. Its ordinary form is either polygonal or octagonal. In the case of the Benedictine churches it is square. In many instances the interior is richly carved and decorated, and a central shaft supports the ceiling. In the 10th century a chapter-house was built at Fontanelle, Italy. In the next century King Edward built the original structure at Westminster, England. Westminster Abbey and Worcester Cathedral depart from the usual Benedictine form of chapter-house. The first is octagonal, 58 feet in diameter; the second circular, 55 feet in diameter by 45 feet in height. Canterbury is square in form, 87 feet long, 35 feet wide, and 52 feet high.

Chapu, shȧ-pü', HENRI (1833–91), French sculptor, was born in Mée (Seine-et-Marne). He became a pupil of Pradier and of Duret and entering the École des Beaux Arts at Paris in 1849, he gained the *grand prix,* and later the medal (1855), his first exhibit in the Salon being *Mercury Inventing the Caduceus,* now in the Luxembourg at Paris. The most typical examples of his work are the pathetically beautiful *Princess Hélène at the Tomb of the Duc d'Orléans,* at Dreux; and *Youth,* the memorial to Henri Regnault. His *Joan of Arc at Domrémy,* in the Luxembourg, is less characteristic.

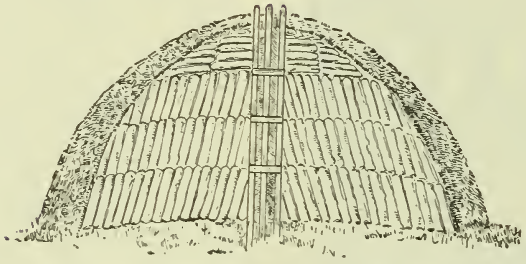
Chapultepec, chä-pōōl'tē-pek', an isolated hill, or large rocky mass, in Mexico, rising about 150 feet, between two and three miles southwest of the City of Mexico. It was occupied by the Aztecs (probably about 1245) and subsequently, according to tradition, was used as a summer residence of the chiefs. It was certainly used to some extent as a burial place, and the effigies of a number of the Aztec chiefs were carved on its base. In 1785 Don Bernardo de Galvez, then Spanish Viceroy of Mexico, completed a magnificent palace on Chapultepec. The palace was occupied by Maximilian during his brief career in Mexico, and since about 1887, remodelled and to some extent rebuilt, it has been the summer residence of the President of Mexico. The lower terrace of the palace has, since before the Mexican War, been occupied by a military school, now the National Military College, the West Point of Mexico. During the Mexican War, the hill, regarded as the key to the City of Mexico, was stormed and captured, Sept. 13, 1847, after a bombardment by Americans under the immediate command of generals Pillow and Quitman, who, after a stubborn struggle, overcame the Mexican defenders under Gen. Nicolas Bravo. Among the defenders were about 40 of the cadets of the Military College, to whose memory a monument was erected at the eastern base of the hill in 1880. Here, in February–March, 1945, was held the Inter-American Conference on Problems of War and Peace, at which was created a League of American States, each state pledged to protect the territorial integrity and political independence of the others against aggression from any quarter. In the 16-day session, some 60 resolutions were adopted, aiming to strengthen the political, military, economic, and social collaboration of the Western Hemisphere.

Chara, kā'ra, brittle green submerged plants, with branched shoots about a foot long, bearing at intervals whorls of apparent leaves, which are sometimes found rooted in the mud of stagnant ponds or nearly stagnant streams. They belong to the family of plants known as Characeae. These, which are the most highly developed plants among the green algae are all marked by a characteristic onion-like smell. The genus Chara comprises the stoutest members of the family.

Charade, sh*a*-rād', a kind of riddle the answer to which is one word. A popular form of amusement is to act out charades. A short dramatic sketch in three or more acts is organized, having a certain dramatic unity running through it. Each of the earlier scenes represents one syllable or more of the whole word, which is itself prominently presented in the final scene. Another variety is the dumb charade, which is similar to the acted charade except that the action must be in dumb show.

Charbon. See Anthrax.

Charcoal, a form of amorphous carbon obtained by thoroughly heating wood. If required for fuel, it is best prepared by the partial combustion of wood in heaps; but for an ingredient of gunpowder, such a process would be apt to introduce grit so that the wood is charred in externally-heated cylinders, the volatile products of the decomposition going to feed the fires. Charcoal is a porous solid, resembling the wood it was obtained from, and is usually black; the brown charcoal used in the preparation of brown or 'cocoa' powder being prepared at a lower temperature. The main uses of charcoal are as a fuel, in the manufacture of gunpowder, as a deodorant, for crayons, and, on account of its poor conductivity, for surrounding cold-storage chambers. Bone or animal charcoal is obtained by charring bones, and is used for decolorizing syrups, and in the arts because of its absorption powers. See Carbon.



Section of Charcoal-kiln, Showing the Arrangement of Wood

Charcot, shär-kō', Jean Baptiste Etienne (1867–1936), French explorer, was born in Paris. He studied medicine and was for a time a member of the faculty of the University of Paris. In 1903–5 and in 1908–10 he conducted scientific expeditions to the Antarctic regions, of which he published accounts.

Charcot, Jean Martin (1825–93), French physician, was born in Paris. In 1862 he became doctor at the Salpêtrière, where he delivered a celebrated series of clinical lectures on nervous diseases. In 1873 he was appointed professor of pathological anatomy at the University of Paris, whence he was transferred in 1882 to the chair of the Clinique of Nervous Disorders, expressly created for him; in 1883 he was elected a member of the Academy of Sciences. His researches in the pathology of nervous diseases were of far-reaching influence, as may be seen in his *Leçons cliniques sur les maladies des vieillards et les maladies chroniques* (2nd ed. 1874), *Localisations dans les maladies du cerveau et de la moelle epinière* (1880), *Leçons sur les maladies du système nerveux faites à la Salpêtrière* (3rd ed. 1880). His name has been given to several symptoms in nervous maladies.

Chard, Swiss Chard, or Sea Kale, a variety of leaf-beet grown especially for its stalks and leaves, which are prepared as greens. It is also used as a salad.

Chardin, shär'dañ', Sir John (1643–1713), French traveller, was born in Paris. He made two expeditions as a gem-dealer to Persia (1666 and 1670–7), the most complete account of which is contained in the *Voyages de M. le Chevalier Chardin* (1711). After his return from his second expedition he was knighted by Charles II of England (1681).

Charente, shä-ränt', river, France, rising in the department of Haute Vienne. It flows in a generally westward direction for about 225 miles through the departments of Charente and Charente-Inférieure, entering the Atlantic between the islands Ré and Oléron. It is navigable from Angoulême to the sea.

Charente, department, France, in the basin of the Charente; area 2,305 square miles. It consists mainly of gently undulating plateaus (highest point, 1,200 feet), the northeast being drained by the Vienne, flowing northwest towards the Loire basin. Physically, it is divided into (1) the *terres froides*, a damp district of clayey soil on the right bank of the Upper Charente; and (2) the *terres chaudes*, comprising the remainder. In the extreme south the beautiful Dronne forms the boundary for 20 miles. The climate is temperate and dry, and chestnuts, corn, and cognac are the chief products. Pastoral pursuits employ a large part of the population. There are important limestone quarries. Angoulême is the capital. Pop. (1936) 309,279.

Charente-Inférieure, añ-fā-rē-ûr', department, France, bounded on the west for 44 miles by the Atlantic Ocean, and on the southwest for some 30 miles by the right bank of the Gironde estuary. The department, which includes the islands of Ré and Oléron, is irregular in shape, and has an area of 2,791 square miles. The surface is low, undulating in the interior, and is flanked along the coast by sand dunes. Only three-fifths of the area is drained by the Charente. Agriculture and cattle-breeding are actively pursued, and cognac is manufactured. The coast and islands yield salt and oysters. Foreign trade is confined to La Rochelle, the capital, and naval activity is concentrated in Rochefort. Pop. (1936) 419,021.

Charenton-le-Pont, shär-än-tôn-l*e*-pôn', town, France, a suburb of Paris, on the Seine at its junction with the Marne; 3 miles southeast of Notre Dame cathedral. The river is here crossed by a fortified bridge. Pop. (1931) 20,529.

Chares, kā'rēz', Athenian general, whose chief exploits were the relief of the Phliasians in 367 B.C., and the capture of Sestos in 353. He commanded the Athenian forces at Chaeronea in 338 B.C. In private life he was notorious for his profligacy, and his rapacity made him more dreaded by his country's allies than by her enemies.

Chares (*c.* 300 B.C.), of Lindus in Rhodes, a famous Rhodian sculptor, the favorite pupil of Lysippus. His most famous work was the Colossus of Rhodes.

Charette de la Contrie, shä-ret' d'la kôñ-trē', François Athanase (1763–96), French royalist, chief of the Vendean revolt against the French Revolution, was born in Couffé, near Oudon (Loire-Inférieure). In 1793 he became the chief of Lower Vendée, and after several successes was ordered to aid the royalist army against Nantes (June, 1793). The attack did not succeed, and Charette, retiring, began a harassing guerrilla warfare. At the beginning of 1795 a short-lived armistice took place between Charette and the Convention. After the defeat at Quiberon (June 27, 1795), he was vigorously pursued by Hoche, who, after repeatedly defeating him, at length captured and executed him (Mar. 26, 1796).

Chargé d'Affaires, shăr-zhā′ dȧ-fâr′, a subordinate diplomatic agent accredited to an embassy in a foreign land, and either (*a*) in charge during the temporary absence of an ambassador, or (*b*) representing his country at one of the less important courts. See Diplomatic Service.

Char′ing Cross, district of London, England, which derives its name from the cross of stone which was erected there (1291–4) to Eleanor, queen of Edward I, to mark her last resting-place before interment in Westminster Abbey. It stands at the junction of Whitehall, the Strand, and Cockspur Street. Charing Cross Station (the Southeastern Railway terminus), Charing Cross Hospital, Grand Hotel, Hôtel Métropole, Hôtel Victoria, the National Gallery, and Trafalgar Square, are all situated in the vicinity of Charing Cross. Distances are measured from here for the authorized list of London cab fares.

Charitable Trusts or Charities, institutions or funds dedicated by private individuals to the relief and benefit of the poor. The oldest charities in England are St. Bartholomew's Hospital, Smithfield, founded in 1123, and St. Katharine's Hospital, founded in 1145, both situated in London. A large number of educational charities was instituted in the 16th century, such as St. Paul's School (1509), Christ's Hospital (1553), and the Merchant Tailors School (1561). During the 18th and 19th centuries charitable endowments multiplied to an enormous extent. In London alone there are thousands of institutions in existence besides numerous funds and parish missions. In the United States and on the Continent of Europe, especially in France and Germany, many similar institutions have been established with highly beneficial results.

In England a body known as the Charity Commissioners has the general supervision of all funds dedicated to charitable uses. The power was formerly in the hands of the Lord Chancellor, who under an act of 1601 might appoint in certain circumstances commissioners of inquiry. Later the protection of charities, such as it was, fell practically under the control of the attorney general, who took such action as was necessary in the Court of Chancery. The procedure of the court was notoriously cumbrous and expensive, and much time and money were squandered. Lord Brougham was the prime mover in the matter of reforming charity administration, and as a result of his labors many flagrant abuses were detected, including the perversion of large amounts of charitable funds to private purposes. In 1853 the Charitable Trusts Act was passed which erected a Charity Commission consisting of two persons appointed by the Lord Chancellor and a secretary. There were to be official trustees of charitable funds. At first the commission's powers were strictly subordinate to those of the Court of Chancery and other courts, but subsequent legislation conferred upon it functions of a judicial nature. Now the entire supervision of charitable trusts is in the hands of the Commissioners, the assistance of the law courts being invoked only when private trustees act in contumacy of its authority. Private persons may transfer charitable funds in their hands to the Commission, who annually appoint official trustees to manage them.

Charites, kar′i-tēz (Lat. *Gratiae*), in Greek mythology, the Graces or goddesses who personified graces and beauty. They were three in number, the daughters of Zeus, and were named Euphrosyne (Joyfulness), Aglaia (Brilliance), and Thalia (Luxury). Their especial province was to adorn life with refinement and elegance. They watched over poetry and athletic skill, particularly the latter, as representing the most perfectly harmonious development of bodily powers. They are closely allied to the Muses.

Chariton, shar′i-tun, city, Iowa, county seat of Lucas County, on the Chicago, Burlington, and Quincy, and the Chicago, Rock Island, and Pacific railroads; 52 miles southeast of Des Moines. Its manufactures include farming machines, gloves, tents, shirts, and overalls. There are also foundries and machine shops and important quarries and coal mines. The city has a public library. Pop. (1930) 5,365; (1940) 5,754.

Charity, in its restricted sense the relief of the poor and suffering. There is general agreement regarding certain principles of relieving poverty. These are chiefly negative in character; and positive principles are perhaps unattainable so long as social conditions are subject to constant change. (1) Charity must be adequate, and sufficient to secure the object desired—*i.e.,* to remove the cause of distress. Inadequate charity is generally useless, and sentimental charity is usually inadequate. (2) Charity must not attempt the work of the state in relieving destitution. It should not provide the necessaries of life, but confine itself to the provision of the material and immaterial conditions for the growth and revival of self-respect and independence. (3) It should aim at prevention, and at the removing of causes rather than at the remedying of effects. (4) it should be given only after inquiry. Poverty may be deserved or undeserved, and relief must be governed accordingly. Careful investigation, moreover, will prevent many of the evils of indiscriminate charity. It will checkmate impostors, and prevent overlapping, which are among the greatest of evils. Investigation, however, is generally too extensive for individuals to accomplish unaided; and charity organization societies (q. v.) have been established for this purpose. Consult C. R. Henderson's *Modern Methods of Charity.*

Charity Organization Societies, antecedent of family social work and co-ordinating councils. In 1869 the first charity organization society was founded in London to coordinate and systematize the services, especially those of relief-giving, by various voluntary agencies. The first in the United States was founded in Buffalo in 1877 with similar purposes. Increasing recognition of the causes of poverty and the failure of individuals to adjust themselves to their social environment resulted in specific efforts to improve health conditions and treatment facilities, housing, employment opportunities, and other factors adverse to individual and family welfare.

In 1909 the Russell Sage Foundation established a Charity Organization Department with Mary Richmond as director. In 1910 the National Association of Societies for Organizing Charity (now the Family Service Association of America) was organized with Francis H. McLean as director. Miss Richmond and McLean were pioneers in the development of the skills which came to be known as social case work. During and after the First World War there was increased recognition of the problems of individuals. It was in this period that social case work began to draw on the knowledge accumulating in psychiatry. The depression years of the 1930's were critical ones for family social work. Government agencies, as then constituted, were inadequate to meet the situation, and their resources were utterly insufficient. Under the leadership of the Family Welfare Association of America (now Family Service Association of America), they did much to establish the principle of governmental responsibility. There was also increased awareness that these agencies could give greatest service to individuals and families by helping them to understand their own problems, face them, and make needed adjustments.

The various functions of charity organization societies have been taken over and developed by three principal types of organizations. The Family Service Association of America is a voluntary federation of 230 private and public family agencies in United States and Canada, with definite standards of case work service, personnel, and community support. The Community Chests are organizations by which the health and welfare agencies of a community raise all funds in a single annual appeal. The joint planning function has developed into community-wide or neighborhood councils. Their general function is to study social service needs and resources stimulating coordinated action with the purpose of eliminating duplication of effort, inefficient use of funds, and the development of needed services.

Charivari, shȧ-rē'va-rē', a French term for an uproar made by the clanging of pans and kettles, hissing, groaning, and howling, against persons in disfavor. In medieval France it was specially indulged in at the weddings of widowers or widows, when masked brawlers sang derisive and indecent jingles, carrying their violence to such a pitch that the church threatened excommunication or some lesser punishment against those joining in the riot. 'Chevaree,' 'shivaree,' and 'skimmerton' occur in America, 'shivoo' in Australia. The Bavarian *Haberfeldtreiben,* which grew to scandalous lengths at the turn of the 19th–20th century, is a similar practice.

Charkieh, shär-kē'ye, or SHARKIA, province, Lower Egypt; area, 1,934 square miles. Pop. 1,012,382.

Charlatan, shär'la-tan, during the Middle Ages a special division of the jongleurs. Sismondi states that the charlatans amused the people by their buffooneries, exhibiting dancing apes and goats, and singing the grossest songs in public. In English, the word became peculiarly associated with the itinerant quacksalver, or vender of 'cure-all' medicines, and hence it is now understood to signify any quack, empiric, or boastful pretender to knowledge or skill.

Charlemagne, shär'le-mān, or CHARLES THE GREAT (742–814), grandson of Charles Martel, was probably brought up at the court of his father, Pepin the Short, and on his death became king of the Franks (768), at first jointly with his brother Carloman, and after the latter's death (771) he ruled alone. His long reign of forty-six years was occupied in consolidating and extending his power, waging war against every race that seemed to threaten the empire. He conducted or directed fifty-three expeditions, and warred against twelve nations. His forces were so overwhelming and so well organized, and his military and political genius so great, that the enemy rarely faced him; and in all the eighteen campaigns against the Saxons (772–804), for instance, whom he forcibly converted to Christianity, only two battles of importance were fought. The Saxons on his eastern frontier gave him much trouble during thirty-three years, and his ferocious measures of massacre and wholesale deportation against them are almost the only exceptions in his humane policy.

In 773 Pope Adrian I summoned Charles to Italy, to assist him against Desiderius, king of Lombardy. Charles crossed the Alps, and was soon master of Italy, the greater part of which he added to his Frankish empire; and in 776, after an unsuccessful revolt by the Lombards, he created Italy a kingdom, which he conferred on his son Pepin, who was crowned king of Italy by the Pope (781). Meantime Charles had his attention directed to Spain by the troubles among the Saracens, and in 778 he invaded the peninsula with two armies. Save that he added the Spanish borderland to his empire, making the Ebro his frontier, he accomplished but little; and on his return his rearguard was cut off at Roncesvalles.

The next twenty years were spent in border wars against Lombards, Bavarians (788), Avars (795–796), Saxons, Arabs, and Bretons. In 800, on the invitation of Pope Leo III, Charles again proceeded to Italy, and on Christmas Eve was crowned emperor of the Romans; and the foundation of the political system of the Middle Ages was laid. The remaining years of his reign were comparatively quiet, and he devoted himself to the consolidation and progress of his empire. He encouraged agriculture, commerce, and industry, both by precept and example. Himself no mean scholar, he welcomed to his court men of learning, such as Alcuin and Eginhard, established schools, promoted great public works, built splendid palaces, and in every way showed that he had the heart and the brain to rule the realms his military genius had won. Charlemagne was no recluse, but was fond of sport and hunting. He died in 814 at Aix-la-Chapelle, where he was buried. In the Second World War (1939–1945) his remains were removed from Aachen Cathedral for safekeeping and were returned on May 26, 1945. Consult Mombert, *Charles the Great;* Mullinger, *The Schools of Charles the Great;* Wells, *The Age of Charlemagne;* Davis, *Charlemagne,* in Heroes of the Nation series. For his governmental institutions, consult de Coulanges, 'Le gouvernement de Charlemagne,' in *Revue des Deux Mondes;* for the literature of the period, Ampère, *Histoire littéraire de la France sous Charlemagne* (1868); for arts, Schnaase, *Geschichte der bildenden Künste,* vol. iv (8 vols.); and for romance, Gaston Paris, *Histoire poétique de Charlemagne.*

Charleroi, shär-l'rwä', town, Belgium, in the province of Hainault, on the left bank of the Sambre; 35 miles south of Brussels. It is one of the centers of the coal and iron industries of Belgium. Machinery, cutlery, hardware, and glass are manufactured. In the First World War (1914), it was the scene of fierce fighting and several times changed hands, being eventually occupied by the German forces until after the armistice. Pop. (1938) 27,274.

Charleroi, borough, Pennsylvania, in Washington County, on the Monongahela River, and on the Pennsylvania Railroad; 40 miles southeast of Pittsburgh. It has coal and iron interests, manufactures of farming tools, caskets, and glass articles. Pop. (1930) 11,260; (1940) 10,784.

Charles, CAPE, the southern extremity of Smith Island, at the northern entrance to Chesapeake Bay. The lighthouse, lat. 37° 07′ 22″ N., long. 75° 54′ 24″ W., is near the point.

Charles III, THE FAT (839–888), emperor of the Romans, was the third son of Louis the German, from whom in 876 he received Swabia and Alsace. By the death of his brother Carloman (880) he added to them Carloman's dominions and Italy; in 881 was crowned by the Pope emperor of the Romans; and in 882, by the death of his other brother Louis, he came into possession of the rest of Germany. In 884 he was also offered the crown of France, so that the whole of the empire of Charlemagne was again in one hand. But Charles was not equal to the task put upon him. To the Normans, who plundered the Rhine region, and against whom he made an expedition in 882, he was forced to pay a large tribute; and again in 885, when they besieged Paris, he also bought their retreat with a large sum of money. The nobles, dissatisfied with his weak reign, deposed him at Tribur (887). Thereupon he retired to Swabia, where he died the following year.

Charles IV. (1316–78), emperor of the Romans, was born at Prague the son of John, king of Bohemia; was elected emperor (in opposition to Louis of Bavaria, died 1349) in 1346, as well as king of Italy at Milan (1355). In the following year he issued the famous Golden Bull, enlarging the privileges of the electors, and curtailing the power of the cities. In his hereditary dominions he ruled with exemplary wisdom, founding at Prague in 1348 the first of the German universities, fostering agriculture and trade, and preserving order and safe roads. See '*Vita Caroli IV. ab ipso conscripta*' (vol. i. of *Fontes Rerum Germanicarum*, 1843; German, 1885), and Werunsky's *Geschichte Kaiser Karls IV. und seiner Zeit* (4 vols. 1880).

Charles V. (1500–58), emperor of Germany, son of Philip, archduke of Austria, and of Joanna, daughter of Ferdinand and Isabella of Spain, became in 1516, by right of birth, ruler of Spain, the Netherlands, Sicily, Naples, and the New World; and on the death of his grandfather, in 1519, added Austria to his dominions. His grandfather, Maximilian, had endeavored to secure for him also the succession to the imperial throne; but the electors were by no means anxious further to aggrandize his power, and at first rather favored the claims of the rival candidate, Francis I. of France. By dexterous policy, however, the honor was secured for the young Charles, who was crowned at Aix-la-Chapelle on Oct. 22, 1520; and thus began that rivalry between Charles and Francis which is one of the determinating factors of European history. The war was waged in all quarters, but in Italy alone was it decisive; and the French were driven from the duchy of Milan in 1521, and out of Italy altogether in 1522. The discomfiture of the French king was increased by the treachery of the Constable of Bourbon, who openly joined the side of Charles. Francis again invaded Italy and occupied Milan; but he was defeated and made captive at Pavia (Feb., 1525), and forced to sign the treaty of Madrid (1526), by which he resigned all his pretensions, and agreed to coöperate with Charles in suppressing heresy. But the terms were too humiliating, and war again broke out. Threatened by the Turks on his eastern frontier, and annoyed by the spread of heresy in Germany, Charles agreed to the peace of Cambrai (1529), which, however, left him master of Italy.

Hitherto Spain had been the residence and headquarters of Charles, but Germany now demanded his presence. The Diet of Worms in 1521 had settled nothing, save to show Charles as a faithful supporter of the papacy. He had issued an edict against Luther; but the only result was to organize German national sentiment against the emperor. Social and political disturbances, however, such as the Anabaptist movement and the Peasants' War, strengthened the hands of Charles, and at the Diet of Augsburg (1530) he renewed the Edict of Worms, and was met by the formation of the Schmalkaldic league of Protestant princes. A threatened invasion by the Turks prevented Charles from taking immediate action, and, to secure the coöperation of the Protestants against the Turks, he was forced to make concessions (1532). But his policy was not changed; and although he was year after year diverted from his purpose—first by renewed war with Francis, which did not end till a joint invasion of France by Henry VIII. of England and Charles forced Francis to sign a most unfavorable peace at Crespy (1544), and again by campaigns undertaken against the pirates of Tunis (1536) and Algiers(1541)—he never quite lost sight of it. The death of his rival, Francis I., in 1547, at last left him free; and the chief interest of the remaining years of his reign lies in his German dominions. The two chief objects of his policy did not always harmonize, and his ultimate failure to secure either of them was, in part at least, due to this conflict between them. He wished to secure the reversion of the imperial throne for his son Philip; but in this he was disappointed, through the insistence of his brother, Ferdinand of Austria, who claimed the empire for himself. The other and more important object was to stamp out heresy, and restore Germany unbroken to the papacy. Charles at first easily broke the power of the Protestant princes, and also made prisoners of their leaders; but the harsh manner in which an unsatisfactory compromise called the Augsburg Interim (1548) was enforced created discontent, and Charles found himself faced by the formidable opposition headed by Maurice of Saxony. At one time Charles almost fell into the hands of Maurice, and was driven a wanderer from Germany. He was forced to agree to the treaty of Passau (1552), and to the peace of Augsburg in 1555, which acknowledged the existing conditions, and permanently established Protestantism over a great part of Germany. The peace of Augsburg was the culmination of his reign. In 1556, disappointed in his ambitions and broken in health, he abdicated in favor of his son Philip, and retired to the monastery of San Yuste, near Plasencia, in Spain, where he died, having continued from his retirement to direct the policy of his son.

See Robertson's (with additions by Prescott) *Life of Charles V.* (1769; new ed. 1886); Sir W. Stirling-Maxwell's *Cloister Life of Charles V.* (1852); Ranke's *Deutsche Geschichte im Zeitalter der Reformation* (6 vols. 7th ed. 1894; Eng. trans., incomplete, 1845–7); Mignet's *Rivalité de Charles Quint et François I.* (2 vols. 1875), and *Charles Quint, son Abdication . . . . et sa Mort* (10th ed. 1882); G. de Leva's *Storia Documentata di Carlo V. in Correlazione all' Italia* (5 vols. 1875–94).

Charles VI. (1685–1740), emperor, son of the Emperor Leopold I. His candidature (1700) for the Spanish throne on the death of Charles II., last of the Spanish Hapsburgs, led to the war of the Spanish Succession (1703–14). Meanwhile he was proclaimed emperor on the death (1711) of his brother, Joseph I. By the treaties of Utrecht (1713) and Rastadt (1714) Charles VI. added to his dominions the Spanish Netherlands, Milan, Naples, and Sardinia (exchanged later for Sicily); and by the treaty of Passarowitz or Pozarovats (1718), after a successful campaign against the Turks by Prince Eugene, he acquired Servia and Wallachia. Most of the Italian territories were, however, lost (1734–5) during the war of the Polish Succession, and Servia and Wallachia had likewise to be yielded, after another and unsuccessful Turkish campaign, by the treaty of Belgrade (1739). The ruling object of Charles's policy was to secure the succession (Pragmatic Sanction of 1713) of his daughter, Maria Theresa, in preference to the daughters of his brother Leopold. See biographical works by Massuet (in French, 1741), Schirach (in German, 1776), and La Lande (in French, 1843); also Foscarini's *Arcane Memorie. . . . di Carlo VI.* (1750).

Charles VII. (1697–1745), emperor, was the eldest son of the Bavarian elector Maximilian Emmanuel, and was born at Brussels. He succeeded to the electorate in 1726. Having married a daughter of the Emperor Joseph I., he refused to acknowledge the Pragmatic Sanction (1713) of Charles VI., and on the death of the last named joined the coalition against Maria Theresa. In 1741 he had himself proclaimed king of Bohemia, and in the following year was chosen emperor; but in 1743 the tide turned, and until his death, in 1745, he was a fugitive from his own dominions. See *Tagebuch Kaiser Karls VII.*

Charles I. (1600–49), king of Great Britain and Ireland, born at Dunfermline, was a sickly, backward child, but outgrew his weakness, and became an accomplished horseman, as well as something of a scholar and theologian. Created Prince of Wales (1616) four years after the death of his elder brother Henry, he in 1623 proceeded in company with Buckingham to the Spanish court, Madrid, to win the hand of the Spanish Infanta, and to secure the object of his father's dynastic policy, the restitution of the Palatinate to James's son-in-law. The English people, however, hailed with joy the rupture with Spain which ensued upon Charles's pique at his failure. But with the characteristic habit of doing the wrong thing, he immediately dashed his people's Protestant hopes by marrying the French (Roman Catholic) princess Henrietta Maria by proxy. Succeeding his father in 1625, he was soon involved in controversy with Parliament, particularly regarding the revenues rendered necessary by the extravagant policy of Buckingham, whose tool the king was; and after Buckingham's assassination (1628) he yielded his will to Queen Henrietta, whose influence over him was unbounded, and in the end fatal. In 1626, by the aid of loans and pawning the crown jewels, he fitted out two expeditions against Cadiz, which ended in failure, as did also the expedition to Rochelle (1627). Charles was not by nature a tyrant, perhaps not even a bigot; but the force of his two chief advisers—Laud (made archbishop of Canterbury, 1633) and Strafford (who, as Sir Thomas Wentworth, passed into the king's service after the assassination of Buckingham) drove him into courses which his natural obstinacy welcomed, and the issue of which his lack of foresight prevented him from perceiving. Parliaments did not prove subservient, and for eleven years Charles, through his ministers, governed without one, meantime violating not only the liberties which Englishmen held dear, but irritating the conscience of England by carrying out Laud's High Church ideas. He levied 'tonnage and poundage' (1629), exacted fines for encroaching on forest lands and for not taking up knighthood (1630), and raised money by granting monopolies and demanding ship money from the seaports (1634) and the inland counties (1635). Abroad his policy was weak and shiftless; for, with all his economy, he could find no revenue to justify a warlike policy. In 1639 Laud drove the Scots to rebellion by his attempts to force a liturgy on them. Charles invaded Scotland, but was forced to sign the treaty of Berwick later in the same year. These two events induced Charles to summon Parliament, of which two—the 'Short Parliament' (of three weeks' duration) and the 'Long Parliament'—met in 1640. The Long Parliament impeached Strafford (whom the king sacrificed, partly because he did not understand his servant), and also forced Charles to assent to a bill enacting that Parliament could not be dissolved save with its own consent. Thus began the long struggle between Charles and Parliament; and the Long Parliament outlasted him. Charles hoped to win the Scots to his side; but he ruined his chances by plotting against the Covenanting leaders. His return to London was marked by the Grand Remonstrance, and by his consequent and vain attempt to arrest the 'five members' (1642). The royal standard was raised at Nottingham, and civil war broke out. Charles showed plenty of physical courage, but displayed the lack of wisdom and forehandness which ruined his career during the progress of the war. It ended with the disastrous battle of Naseby (1645). From that time till his death his history is one of plots and schemes, and of endless efforts to set his enemies by the ears. He surrendered himself to the Scots at Newark in 1646, who gave him up to the English; and he was kept in captivity till his trial at Westminster. No act of all his life became him like the leaving of it, and the story of his execution at Whitehall has a dignity which in part redeems his character. He was a pattern of the domestic virtues, but his conduct in public affairs was marked by duplicity and vacillation. His word could not be relied upon, and he was both too obstinate and too weak to cope with the tremendous issues he raised.

Charles I.

Charles II. (1630–85), king of Great Britain and Ireland, had none of his father's virtues, and his vices were all his own. He was dissolute where his father was chaste, but pliable where his father was obstinate; and his duplicity, unlike his father's, led to no fatal result. His whole domestic policy was governed by a desire 'not to go again upon his hands.' But with all his vices, Charles showed a gay bonhomie which kept him popular; and his shrewd cynical observations are evidence of the brilliance of his mind, as they are frequently also of the shamelessness of his character, which was abundantly clear in other ways.

Charles II.

Born at St. James's, London, Charles was present at Edgehill in 1642, but otherwise played no part in the civil war till after the death of his father. He was sent abroad, and did not return till the failure of his agents in Ireland and of Montrose in Scotland compelled him to throw himself into the arms of the Scottish Presbyterians in 1650. He was crowned at Scone, Jan. 1, 1651, and in the following August, at the head of an army of 10,000 men, he invaded England, only to be utterly routed by Cromwell at Worcester. After a series of romantic adventures he escaped to France, and led the life of a beggar prince at various courts of Europe, though his headquarters were chiefly in the Low Countries, from which he was recalled to the throne of his father, landing at Dover May 26, 1660.

From the restoration to Charles's death (1685) is perhaps the most humilating chapter in English history. Only in colonial policy is the record something less than disgraceful; at home and abroad there was little but cause for shame. His policy was mainly dictated by a desire to earn the subsidies which the king of France was willing to pay to secure the neutrality, if not the active aid of England in regard to his own European policy. During the first six or seven years his faithful minister Clarendon kept him true in the main to a national policy, although as early as 1661 he was in receipt of a subsidy from the French king, and in 1662 sold Dunkirk to the French. In the latter year he married Catherine of Braganza, pledging himself to support Portugal against Spain. The war with Holland, to which Clarendon was opposed, was on the whole popular, because Holland was the object of intense commercial jealousy, of which Shaftesbury was one of the chief exponents. But though the policy was Cromwell's, his hand was not there to carry it out; and, in spite of two English victories, the Dutch burned the shipping in the Medway, almost within sight of London, forcing Charles to conclude the peace of Breda (1667). This was advantageous only to France, in whose interest the war really had been waged. The Triple Alliance, arranged by Temple (1668) between Holland, Sweden, and England, was a mere pretence; Charles made the secret treaty of Dover with Louis in 1670, and became an open ally of France. But there was a strong anti-French as well as anti-papal feeling in England, and Charles had to make his peace with Holland in 1674, and allow his niece, Princess Mary, to marry William, Prince of Orange, in 1677.

In domestic politics, Charles's reign is marked by a strife between the court and the country party, and by a growing desire on the part of the king to favor the religion of which he was a secret adherent. But the nation would have none of Charles's indulgences, and even dissenters spurned a toleration in which they were included only to justify the toleration and indulgence of Roman Catholics. The result was the Test Act (1673); and when the brother of the King openly professed his Catholicism, the people had a ready welcome for Shaftesbury's Exclusion Bill, and were willing dupes of Titus Oates's trumped-up Popish plot (1678–80). Discontent found expression in the Rye House plot (1683), which brought Russell and Sidney to the block. All efforts to induce Charles to recognize Monmouth as his heir were in vain.

Charles I. of France. See CHARLEMAGNE.

Charles II., THE BALD (823–877), King of France (as Charles I.), and Emperor of the Romans, son of Louis le Débonnaire and grandson of Charlemagne. On the partition of the Empire in 837, Charles received the western part between the Weser and the Loire. In 840, on the death of Louis, Lothaire the Emperor, the eldest of his sons, was defeated by his brothers, Charles and Louis the German, at Fontenoy, near Auxerre (841), and compelled to sign the treaty of Verdun (Aug. 843), dividing their father's territories into the three kingdoms of France, Lorraine, and Germany—Charles obtaining France. His reign was characterized by frequent incursions of the Normans, by the growth of feudalism in France, and by the influence gained by the clergy, whom Charles protected, and upon whose power he afterward relied. In 875 he was crowned by the pope Emperor of the Romans. Two years later he died from fever near Mont Cenis, when going to help the pope against the Saracens.

Charles III., THE SIMPLE (879–929), King of France, posthumous son of Louis II. When his brother Carloman died (884) Charles was too young to reign, and Charles III., Emperor of Germany, was elected King of France; and upon this Emperor's deposition (887), Eudes or Odo, Count of Paris, usurped the French crown. But Charles was nevertheless crowned at Rheims in 893, and after the death of Eudes (898) became actual king over the whole of France. The most important event of his reign is the peace he concluded with the Normans in 911, by which he ceded to their chief the lower valley of the Seine —*i.e.* Normandy—as a hereditary dukedom. In 922 some of Charles's nobles revolted against him, and although he defeated them near Soissons (923), he was treacherously made a prisoner and kept in the castle at Peronne, where he died.

Charles IV., THE FAIR (1294–1328), King of France, the third son of Philip the Fair, ascended in 1322 the French throne, after the death of his brother, Philip V. He strengthened the royal power in the interior, and assisted his sister Isabella against her husband, Edward II. of England. With him the direct line of the Capets became extinct.

Charles V. (1337–80), surnamed THE WISE, King of France, son of John the Good, acted as regent during his father's imprisonment in England, and had to make large concessions to popular demands as the result of a movement headed by Etienne Marcel. Succeeding his father in 1364, he cleared the country of the numerous bands of mercenaries by dispatching them under Du Guesclin against the English in Spain, employed the same able captain in the successful expulsion of the English from France, except at Calais, Bordeaux, Bayonne, and Cherbourg, and effectually curbed the power of the feudal nobility. Besides this, he established the administration of justice on a firmer basis, introduced a new system of taxation, encouraged commerce, built palaces and the Bastille, and laid the foundations of the National Library by collecting MSS. in the Louvre. See Benoist's *La Politique du Roi Charles V.* (1886).

Charles VI. (1367–1422), King of France, son of the foregoing, succeeded to the throne at the age of twelve; and the Government was entrusted to the Dukes of Berri, Burgundy, and Bourbon, who governed so badly that the people of Flanders and the North of France rose in revolt. After Charles was crowned, in 1389, he governed well for some time, but throughout his reign was subject to recurring fits of insanity. For this reason the greatest anarchy reigned in France; the country was distracted by civil war between the Armagnacs and the Burgundians, and thus became an easy prey for the English when they invaded France under Henry V. In consequence of the brilliant victories of the English at Agincourt (1415) and elsewhere, Charles had to submit to the humiliating treaty of Troyes (1420), by which Henry V. married his daughter Catherine, and was acknowledged as heir to the French throne. See Duval-Pineux's *Histoire de France sous le Règne de Charles VI.* (2 vols. 1842); and books cited at HENRY V.

Charles VII. (1403–61), called THE VICTORIOUS, King of France,

‘SPEAKER LENTHAL REFUSING THE DEMAND OF CHARLES I. FOR THE SURRENDER OF THE FIVE MEMBERS.’
(FROM THE FRESCO IN THE HOUSE OF COMMONS.)

crowned in 1422, after the death of his father, Charles VI., in spite of the treaty of Troyes. At first he was supported by the people of the South of France only, the North acknowledging the English Duke of Bedford as regent. Charles made little headway against the English till the advent (1429) of Joan of Arc, the Maid of Orleans. The English thenceforth steadily lost ground, and the desertion of their cause by the Duke of Burgundy completed the ruin of their dominion in France. With their disastrous defeat at the siege of Castillon in 1453, the end of the Hundred Years' War may be said to have come, and England retained Calais only of her French possessions. During the remaining years of his reign Charles devoted himself to the suppression of the free companies (mercenaries, often disbanded) and of brigandage, and to the promotion of much-needed general reforms. A great stain on his fame was his cowardly surrender of Joan of Arc to the English. See Du Fresne de Beaucourt's *Histoire de Charles VII.* (6 vols. 1881–92).

Charles VIII. (1470–98), King of France, succeeded in 1483 his father, Louis XI. For eight years his sister Anne practically ruled France with a strong hand, repelling foreign invaders, while giving peace and prosperity at home. Charles, however, chafed under her control, and eventually shook off her influence; but personally he had not the ability to carry out the far-reaching plans of conquest his imagination conceived. He dreamed of conquering Italy, and of expelling the Turks from Europe; but when he invaded Italy (1495) in such force that his advance was like a brilliant progress, the people being eager for French rule, he so alienated them by his imprudence and thoughtlessness that they rose behind him and threatened to cut off his retreat. However, he gained a decisive victory at Fornova (1495). By his marriage to the heiress of the Duke of Brittany he added Brittany to France, from which it had hitherto been separate. See Cherrier's *Histoire de Charles VIII.* (2nd ed. 1870).

Charles IX. (1550–74), King of France, son of Henry II. and Catherine de' Medici, succeeded to the throne at the age of ten on the death of his brother, Francis II. His mother became regent, and consolidated her power during his reign. She was faced by two parties in the state, the Huguenots and the Guises. At first she favored the Huguenots, and appeared to encourage Henry's regard for Coligny; but when the Huguenots became too powerful, she plotted with the Guises, and tricked her son into giving consent to the infamous massacre of St. Batholomew, on Aug. 24, 1572. Charles was seized with remorse, and died at Vincennes. See De la Barre-Duparcq's *Histoire de Charles IX.* (1875).

Charles X. (1757–1836), King of France, was born at Versailles. After the restoration of the French monarchy, the direction of affairs, owing to the weakness of his brother, Louis XVIII., was largely committed to his charge. After Louis's death (1824) Charles ascended the throne, and abandoned the moderate policy his brother had favored. The king called Prince Polignac to power, and when the Chamber of Deputies met in 1830, a solemn assurance was given that the constitutional charter guaranteeing public liberties would be scrupulously respected. To divert the people from their demands for greater political liberties, Polignac appealed to the traditional French love of glory, and organized the expedition against Algeria, which was successful. But the French were not so dazzled by the military glories as to pardon the ordinances of July 25 suspending the liberty of the press and dissolving the chambers. Paris then quickly passed from riot to revolution, and Charles was compelled to abdicate, the crown being offered to Louis Philippe, who accepted it. Charles retired to England, and afterwards resided for some time in Holyrood Palace, Edinburgh. See Védrenne's *Vie de Charles X.* (3 vols. 1879), and Lamartine's *Histoire de la Restauration* (1852).

Charles II. (1661–1700), King of Spain, son of Philip IV.; succeeded to the throne in 1665, under the regency of his mother, Maria Anna of Austria. Weak bodily and mentally, he left the government of the country to various favorites, and during his reign Spain fell very low. She lost to France (1678) Franche-Comté and several towns in Flanders, and in the American colonies the situation became precarious. The greatest anarchy reigned in the interior; the administration was corrupt; there was no army or navy to speak of; commerce, industry, and even agriculture were at a standstill. Charles, having no heir, bequeathed the throne to Philip of Anjou, grandson of Louis XIV. of France; this subsequently gave rise to the War of the Spanish Succession. Charles was the last of the Hapsburgs to occupy the Spanish throne.

Charles III. (1716–88), King of Spain, eldest son of Philip V. by his second marriage with Elizabeth Farnese. Through the energetic action of his mother he became in 1731 Duke of Parma. In 1738 he succeeded as King of Naples and Sicily (which he had invaded in 1734 with the aid of the French), and ruled the country wisely. On the death of his brother, Ferdinand VI. (1759), he became also King of Spain. He was an ally of France in the war with England, and by the treaty of Paris in 1763 surrendered Florida to England, receiving at the same time the cession of Louisiana from France. He also joined France in aiding the American colonies during the Revolutionary War, and when peace was concluded received Florida again. His internal policy was most beneficial to his country. He established order and security throughout the realm; founded numerous schools and reorganized the universities; encouraged agriculture, and even endeavored to establish German colonists in the barren tracts beside the Sierra Morena; encouraged commerce by building new roads, improving the old ones, and by reforming the tariffs and freeing trade of many burdens; and created banks and commercial companies. He also abolished certain clerical abuses, curtailed the power of the Inquisition, and expelled the Jesuits (1767) from Spain. Nearly all the great buildings of Madrid date from this time. Spanish literature also flourished in his reign. See William Coxe's *Memoirs of the Kings of Spain of the House of Bourbon*, 1700–88 (2nd ed. 5 vols. 1815); Danvila y Collado's *Reinado de Carlos III.* (3 vols. 1892–5).

Charles IV. (1748–1819), King of Spain, son of Charles III.; born at Naples; succeeded his father in 1788, and at first followed in his footsteps. Eventually, however, he entrusted the Government to Manuel de Godoy the favorite of his wife, and through him was led to declare war against France (1793), and finally to conclude with her (1597) an offensive and defensive alliance, which involved Spain in a war with England and Portugal. Spain lost several colonies, her maritime commerce was destroyed, and her fleet annihilated at Trafalgar (1805). Napoleon, wishing to give the throne of Spain to his brother Joseph, interfered constantly in the internal affairs of that country; conspiring with Charles to aid him by sending troops to Denmark, while Napoleon promised to assist in the seizure of Portugal; and Charles was to become titular Emperor of America. After the revolt in favor of Charles's son, Ferdinand (Mar. 18, 1808), Charles was persuaded by Napoleon to abdicate the throne of Spain in his (Napoleon's) favor (May 6, 1808). He retired later to Rome, where he died. See Muriel's *Historia de Carlos IV.* (1894).

Charles I., King of Portugal. See CARLOS.

Charles VII., King of Sweden, reigned from 1155 to 1167, succeeding his father, King Sverker. In 1164 he founded the Archbishopric of Upsala. (The first Six Swedish Charleses are an invention of the chronicler Johannes Magnus.)

Charles VIII. (1409–70), King of Sweden, of the Bonde family. On the death of Christopher, last representative of the united monarchy of Denmark and Sweden, Charles was elected King by the Swedes (1448), but in 1457 was driven from the throne by a conspiracy under Archbishop Jöns Oxenstjerna. In 1464 he reigned again for a few months, and in 1467 was acknowledged King once more, this time keeping the throne till his death. The whole of his reign he was, however, engaged in a continuous struggle against the Danes and the Danish party in Sweden.

Charles IX. (1550–1611), King of Sweden, youngest and ablest son of Gustavus I. (Vasa). After the death of his brother John (1592) he summoned the Synod of Upsala to complete the religious reformation begun by his father, and, as administrator, vigorously opposed the reactionary measures of his nephew, King Sigismund. In 1600 he was elected king, but, despite solid abilities, was unfortunate in most of his undertakings, leaving to his youthful son and successor, Gustavus Adolphus, the unfinished wars with Denmark and Russia. It was his ambition to make Sweden the leading Protestant power in Europe. Charles was a hard and cruel but eminently capable ruler, well versed in the learning of his day, with a strong leaning to Calvinism. He was hated by the nobility, but beloved by the common folk.

Charles X. (1622–60), King of Sweden, son of the Count Palatine, John Casimir of Zweibrücken, and Catherine, daughter of Charles IX., was born at Nyköping. On Christina resigning in his favor, he was crowned king at Upsala (1654). In the following year he forced a war on Poland, and in a few weeks conquered the whole of Poland, compelled the Great Elector of Brandenburg to surrender Pomerania, and defeated the Poles at the three days' battle of Warsaw (July 28–30, 1656). Meanwhile the Dutch, jealous of Charles's commanding position, incited Denmark also to declare war upon him. In 1658 Charles, with his army, crossed the Little Belt on the ice, surprising and capturing a Danish army at Fünen, and by this and later victories in Zealand compelled Denmark to sign the humiliating Peace of Rôskilde (Feb. 26, 1658), whereby she surrendered to Sweden the provinces of Halland, Scania, Blekinge, Bohus, Bornholm, and the diocese of Trondhjem in Norway. The refusal of the Danes to close the sound against foreign ships of war, and to form an alliance with Sweden, led almost immediately after the conclusion of peace to a fresh war. But the heroic defence of Copenhagen gave Denmark's allies—Brandenburg, Holland, and the Emperor—time to hasten to her help; and Charles, while preparing for a third war, died suddenly at Gothenburg, February 13.

Charles XI. (1655–97), King of Sweden, only child of Charles X., succeeded his father (1660) under a council of regency till he attained his majority at the age of seventeen (1672). Misled by his counsellors, he embarked (1675) in a war with Brandenburg. On the defeat of the Swedish forces at Fehrbellin (1675), Denmark and Holland at once declared war against Charles: a large Danish army invaded Sweden; the Great Elector conquered all or most of the Swedish territory in Germany; and the Swedish fleet was annihilated by the combined Dutch and Danish squadrons at the great two days' battle of Oland. But Charles routed the Danes at Hahnstad and Lund (1676), and at Landskrona (1677). Fortunately, too, the victories of Charles's ally, Louis XIV., enabled him to dictate terms to Sweden's enemies on the Continent, and Sweden emerged from the war in 1679 with an almost inappreciable diminution of territory. By the *Reduktion*, or crown-land redemption, of 1680 and 1682, Charles so lessened the influence of the nobles that he became practically absolute; but he used his power entirely for the public good, and at his death Sweden was stronger and richer than she had ever been before.

Charles XII. (1682–1718), King of Sweden, sole surviving son of Charles XI., whom he succeeded in 1697. In 1699, Russia, Denmark, and Saxony having formed a league against him, Charles effected a landing near Copenhagen, and compelled the Danes to make peace (Treaty of Travendal, Aug., 1700). He then turned his arms against Peter I., defeated 50,000 Russians at Narva (Nov., 1700) with 10,000 Swedes, and then proceeded to invade Poland. He defeated the Poles in several battles, and despite the representations of his best counsellors, persisted in staying in Poland till he had procured the election of Stanislaus Leszczynski to the Polish throne (July, 1704) and the abdication of Augustus (Peace of Altranstädt, Sept. 24, 1706). Thereafter, on Aug. 22, 1707, he set out with an army of 43,000 for the invasion of Russia, and on June 15, 1708, he reached the Beresina. Want of food and supplies, and the persuasions of the rebel Cossack Hetman, Mazeppa, then induced him to turn southeastwards into the Ukraine, thus incautiously removing his army from its base. In February, 1709, Charles laid siege to Poltava, but was defeated there by an overwhelming Russian army (July 8), and barely escaped with a few hundred horsemen into Turkey. This collapse led to a fresh league against him of Russia, Denmark, and Saxony, which Charles attempted to counteract by three times persuading the Porte to declare war against Peter. But the Peace of the Pruth (July 23, 1711) between Russia and Turkey put an end to all his hopes from the Sultan, who, indeed, was induced to turn against his ally, and (1713) seized the person of Charles, whom he imprisoned at Demotika. Ten months later Charles succeeded in escaping, and on Nov. 21, 1714, reached Stralsund. Here he was besieged by Prussia and her allies, and on its reduction fled to Sweden (December, 1715). He at once began organizing a new army and fleet, and suddenly invaded Norway. In 1718, invading Norway the second time, Charles was killed (December 11) by a shot from the Fortress of Fredrikshald, which he was besieging. Although endowed with the heroic virtues of the hardy soldier—courage, simplicity, abstemiousness, powers of endurance—he coupled with them an obstinacy and vanity which led him into adventures that it is difficult to justify, and did little to further his country's real interests. See R. Nisbet Bain's *Charles XII.* (1895), Voltaire's *Histoire de Charles XII.* (1730), Lundblad's *Karl XII.'s Historia*(1835–9; Ger. trans.1835–40), and Fryxell's *Karl XII.* (Ger. trans. 1861).

Charles XIII. (1748–1818), King of Sweden and Norway, second son of Adolphus Frederick, became regent during the minority of his nephew, Gustavus IV. (1792–96), and again on the deposition of that monarch in 1809. On June 20, 1809, he was elected king. In 1812, and again in 1813, he joined the Grand Alliance against France, on the latter occasion dispatching 20,000 Swedes to Germany to aid the allies, in return for which he received Norway.

Charles XIV. (1764–1844), king of Sweden and Norway, originally JEAN BAPTISTE JULES BERNADOTTE, son of an advocate at Pau, France. He was war minister under the Directory, and was sent by Bonaparte to Vienna as French Ambassador. In 1798 he married Eugénie Clary, Joseph Bonaparte's relation by marriage; and in 1799 was made War Minister. In May, 1804, he received his marshal's baton. He took part in the Battle of Austerlitz, and was made Prince of Ponte Corvo for his distinguished services (1806). After very questionable behavior in the campaign of Jena, he rendered invaluable services to Napoleon in the later stages of the Prussian campaign of 1806, pursuing Blücher to Lübeck, and compelling his surrender there (Nov. 7). In 1809 he commanded the Saxon troops, with which he took Wagram by storm.

On Aug. 21, 1810, Bernadotte was elected crown prince of Sweden by the Riksdag, in the hope that this compliment to one of his marshals would induce Napoleon to help Sweden to recover Finland from Russia. In 1812 he joined Great Britain and Russia against France. His strategy and behavior generally were more than equivocal during the campaign of 1813, in that he flattered French susceptibilities as far as he dared. On Jan. 14, 1814, he dictated to Denmark the Peace of Kiel, and after vanquishing the Norwegians in a fortnight's campaign, was acknowledged as crown prince of Norway (Nov. 4, 1814). Succeeding to both crowns (Feb. 5, 1818) as king of Sweden and Norway, he won the respect and confidence of both nations by his good and careful government. Consult Sarrans' *Histoire de Bernadotte; Correspondance de Bernadotte avec Napoléon.*

Charles XV. (1826–72), king of Sweden and Norway, son of Oscar I., ascended the throne July 8, 1859. In 1866 he substituted for the cumbersome old method of government by Estates a parliament of two houses on modern lines. His foreign policy was characterized by dislike of Prussia, and by friendliness toward France and Denmark. His attempts to bring about a closer union between Sweden and Norway proved fruitless. He was a man of talent and culture.

Charles I. OF ANJOU (1226–85), youngest son of Louis VIII. of France, and brother of Louis IX., the Saint. His brother gave him Anjou and Maine, and in 1246 he became by marriage duke of Provence. He accompanied St. Louis on the crusade in 1248, and fought with great gallantry in the Nile delta, but both were made prisoners (1250). In 1265 Pope Clement IV. offered him the crown of Naples and Sicily; and after his victory over Manfred of Hohenstaufen at Benevento (1266), he entered Naples as king. But his government provoked great discontent in both Naples and Sicily, and in 1268 he had to cope with a revolt under Conradin, the nephew of Manfred. In 1270 he persuaded Louis IX. to undertake his second crusade (against Tunis), and after his brother's death Charles concluded a favorable treaty with Tunis. He was now the most important sovereign in Western Christendom, being all-powerful in France, and exercising great influence over the rest of Italy. A league was formed against Charles by the pope, the Eastern Empire, and Charles' Sicilian subjects, which found vent in a massacre of every Frenchman in Sicily. Charles besieged Messina, but was forced to give way when Peter of Aragon came to the help of the Sicilians. His fleet was defeated by the Spanish fleet near Reggio (1284), and the French lost Sicily forever. In the same year he suppressed a revolt of the Neapolitans.

Charles I. (1887), emperor of Austria and king (Charles IV.) of Hungary, was born in Persenberg, the eldest son of Archduke Otto, younger brother of Francis Ferdinand (q. v.), whose own sons were excluded from the succession by an oath taken by their father at his marriage. Charles was educated in the public schools of Vienna; entered the army, becoming major in the Thirty-ninth Austrian Infantry; and in 1914–16, during the Great War of Europe, was in command of the forces of the Central Powers in the Carpathians and Transylvania. In 1911 he was married to the Princess Zita of the Bourbon house of Parma. He is an accomplished linguist, and he has made a special study of the national problems of the Slavic races of the Austro-Hungarian empire. The proclamation of his accession as co-regent with Francis Joseph (q. v.) was set for Dec. 2, 1916; but by the death of the latter, Charles succeeded to the throne on Nov. 21, 1916.

DIED APRIL 1, 1922

Charles I. (1839–1914), king of Roumania, second son of Prince Charles Anthony of Hohenzollern-Sigmaringen, was elected prince of Roumania on April 20, 1866. (See ROUMANIA, *History.*) The new Prince was compelled to enter his principality disguised as a Russian merchant bound for Odessa. Among the reforms to which he specially gave his attention were the economic development of the country, the building of railways, and the organization of the army. At the outbreak of the Russo-Turkish War, Prince Charles proclaimed (May, 1877) himself independent—the country was until then under the suzerainty of the Porte. He concluded an alliance with Russia, and the Roumanian army, under his command, played a distinguished part in the campaign, especially at Plevna (q. v.), which the heroic Osman Pasha yielded into his hands. The independence of Roumania was confirmed in 1878, and on March 26, 1881, Prince Charles was proclaimed king. He married, on Nov. 15, 1869, Princess Elizabeth of Wied, better known under her literary name of Carmen Sylva (see ELIZABETH OF ROUMANIA). Their only child died at the age of six, and the succession was bestowed on Prince Ferdinand, the nephew of Charles. The most difficult position which the latter had to face arose during the European War, when he found his Prussian sympathies at variance with the national sympathy of his country. He died on Oct. 10, 1914, a few months after the outbreak of the war.

Charles Albert (1798–1849), king of Sardinia (1831–49), son of Charles Emmanuel, duke of Savoy-Cavignano, succeeded his brother, Charles Felix, in 1831. He was liberally inclined, and played a considerable part in the movement for a united Italy, but did not go far enough for the leaders of the popular party. Mazzini, in particular, distrusted his moderate and diplomatic policy. Nevertheless, in February, 1848, he granted his states a constitution. When Milan revolted against Austria, he hastened to the help of Lombardy and Venice, and declared war against Austria (March 23). After several successes in the beginning, he was defeated by Radetzky at Custozza (July 25). The Austrian general then occupied Milan (Aug. 6), and concluded an armistice with Charles Albert. But the latter, having soon declared war again, was disastrously defeated near Novara (March 23, 1849), and resigned the throne on the same day in favor of his son, Victor Emmanuel. He retired to Portugal, where he died four months later at Oporto.

Charles Alexander, DUKE OF LORRAINE (1712–80), son of Duke Leopold, was born at Lunéville. He distinguished himself against the Turks, especially at Krozka (1739) and Mehadia. In the War of the Austrian Succession he gained several successes in Bavaria (1743). In 1744 he married Maria Anna, Maria Theresa's sister, and was appointed governor of the Netherlands, where he thwarted a French invasion of Flanders, and in the same year expelled Frederick ii. of Prussia from Bohemia. After the conclusion of peace, in 1748, he devoted his energies to the Netherlands, introducing great reforms, encouraging commerce and agriculture, building roads and canals, putting the finances in order, opening public libraries, and founding (1762) the Academy of Arts and Sciences at Brussels, which city he embellished with numerous fine buildings. In the Seven Years' War (1757) he had the command of the troops in Bohemia, but was twice defeated by Frederick the Great.

Charles Augustus, Grand Duke of Saxe-Weimar (1757–1828), son of Duke Ernest Augustus, was given by his mother Amelia an excellent education. In 1774 he made the acquaintance of Goethe, and the acquaintance ripened into a friendship that lasted the whole of his life. Upon assuming the reins of government, in 1775, he summoned Goethe to his court. His capital, Weimar, became the centre of the intellectual life of Germany, and the residence of Goethe, Schiller, Herder, and Wieland. The young Duke also fostered the University of Jena by attracting the best professors. In 1791 he took part in the various campaigns against France; joined in 1806 the Rhine Confederation; but fought against Napoleon in 1813 and 1815, for which he received at the Vienna Congress (1815) an enlargement of territory and the title of grand duke. He was the first German sovereign to give his subjects a constitution (1816), and to establish freedom of the press, besides introducing liberal reforms into civil and judicial administration.

Charles City, city, Iowa, county seat of Floyd county, on the Cedar River, and the Chicago, Milwaukee, and St. Paul, and the Illinois Central Railroads; 40 miles northwest of Cedar Falls. It is the seat of Charles City College (German Methodist). The city has good water power. Its manufactures include traction and stationary engines, wagons, doors and sashes, and furniture. Pop. (1910) 5,892.

Charles Edward. See Stuart.

Charles Eugen, Duke of Wurtemberg (1728–93), son of Duke Charles Alexander (1684–1737), launched out into luxurious display, in the vain effort to make his court one of the most brilliant in Europe. He took part, though without much glory, in the Seven Years' War, fighting on the French side against Prussia. In 1785 he married Franziska von Bernardin, whom he had made Countess of Hohenheim in 1774. Under her influence he became an ardent economic reformer; encouraged agriculture, especially the cultivation of the vine; developed commerce by building and improving roads; and fostered art and science by creating schools, especially the renowned Karlschule in Stuttgart.

Charles Louis, Archduke of Austria, Duke of Teschen (1771–1847), third son of the Emperor Leopold ii., was born at Florence. He was adopted by the Duke of Saxe-Teschen, whom he succeeded in 1790 as governor of the Netherlands. In 1792, at the age of twenty-one, he fought against the French at the Battle of Jemappes; in 1793 at Neerwinden. After the Battle of Fleurus (1794) he was appointed (1796) field marshal, and sent to command the Army of the Rhine. He conducted a glorious campaign, winning many victories over Jourdan, Moreau, and Bernadotte; and after forcing the French to cross the Rhine, captured Kehl (1797). He was now given the command of the Austrian forces in Italy, and sent to oppose Napoleon; but owing to the faulty organization of the army and the military superiority of Napoleon, he was not successful, and the campaign ended with the Peace of Leoben (April 18).

The Archduke Charles was next appointed governor of Bohemia, where he tried to reorganize the army. When war broke out again in 1799, he beat Jourdan at Biberach and Ostrach; but when he invaded Switzerland he was defeated by Moreau near Zürich (June 4), and resigning his command retired to Bohemia. In 1801, being appointed chief of the military council, he introduced sweeping and effective reforms in the Austrian army; and when the war of 1805 broke out, he took command in Italy, and beat Masséna at Caldiero (Oct. 30, 31), But Napoleon's successes on the Danube forced him to bring his troops northward, and while he was concentrating in Western Hungary he received the news of the defeat at Austerlitz (Dec. 2). Napoleon expressed the desire to have a personal interview with the greatest of his adversaries, and the meeting took place at Stammersdorf, near Vienna (Dec. 27).

The Archduke was strongly opposed to the declaration of war in 1809, but when it broke out he was sent to invade Bavaria, and occupied Munich (April, 1809). But the French troops under Napoleon forced him to retire after five days of fighting, and Napoleon's victory at Eggmühl hastened his retreat. Charles retired to Bohemia, and effecting a junction with the other Austrian generals (May 16), marched upon the Danube and Vienna, and defeated Napoleon at the Battles of Aspern (May 21) and Esslingen (May 22); but as he did not take full advantage of these victories, Napoleon was able to cross the Danube on the night of July 4–5, and force upon Charles the Battle of Wagram (July 5 and 6). Charles himself was wounded and defeated, but was able to make his retreat in good order, and signed an armistice (July 12). The conditions of this armistice displeasing the Emperor, Charles resigned his command (July 31), and retired into private life.

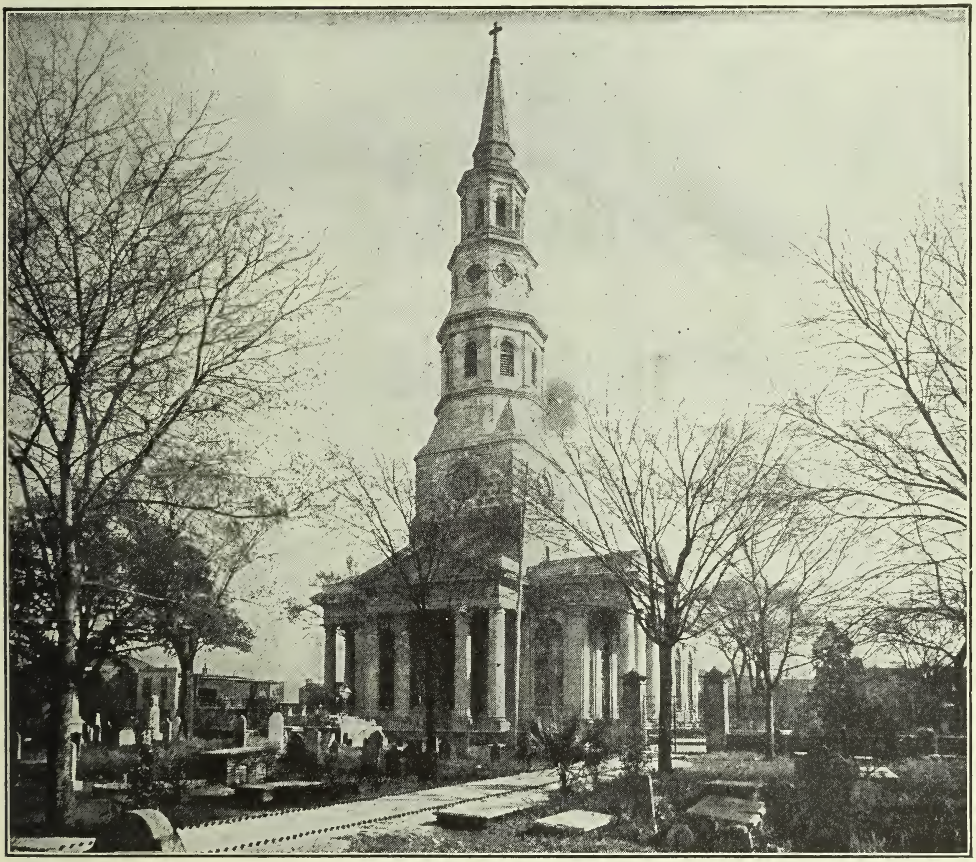
Charles Martel, natural son of Pepin of Héristal (689–741), led the Austrasians against the Frisians and Neustrians. He made himself duke of Neustria as well as of Austrasia, thus uniting what was to become the Frankish kingdom (719), and set the Merovingian Clotaire iv. on the throne, becoming his 'mayor of the palace.' He led expeditions against the Bavarians, Alemanni, and Saxons. Subsequently he came into conflict with Aquitaine, and through Aquitaine with the Saracens, whom he defeated in 732 in an epoch-making battle between Tours and Poitiers. He thus came to be regarded as the savior of Christendom. In 737 he again defeated the Saracens at Narbonne. Pope Gregory iv. called him to his assistance against the Lombards; but Charles could not be persuaded to go to Italy. Though only duke and mayor of the palace, he was for all practical purposes the ruler of the Franks, and he was the real founder of the Caroling dynasty.

Charles the Bold (1433–77), duke of Burgundy, born at Dijon, was the son of Philip the Good of Burgundy. As count of Charolais he headed the league of vassal nobles, known as the League of the Public Weal, against Louis xi. of France, and won a Pyrrhic victory over that monarch at Montlhéry (1465). In 1467 the death of his father made Charles duke of Burgundy. He at once began to carry out his ambitious scheme of throwing off all allegiance to France, and of restoring the old kingdom of Burgundy, including Lorraine, Switzerland, and the south of France. For seven years war was waged between Burgundy and France, and in 1475 Charles subdued Lorraine. In the beginning of the following year he invaded Switzerland with 60,000 men, but was utterly defeated by 15,000 Swiss at Granson. Before midsummer he had gathered a fresh army, with which he overran the Pays de Vaud, only to meet a second reverse at Morat. The Duke of Lorraine seized this opportunity to reoccupy his dominions, and in a desperate battle at Nancy on Jan. 5, 1477, Charles was slain, and his army routed. Consult M. Hofer, *La vie et la mort de Charles le Téméraire* (1932); J. K. Kirk, *History of Charles the Bold* (3 v, 1864); J. Michelet, *Louis XI et Charles le Téméraire* (1932).

Charles River, in eastern Massachusetts, rises in Norfolk county, about 25 miles southwest of Boston, and follows a meandering course to Boston Harbor. At Norumbega, above Waltham, is a stone tower which marks the site of a supposed Norse settlement.

Charleston, city, South Carolina, port of entry, the county seat of Charleston county, the largest and most important commercial city in the State, situated on a narrow peninsula formed by the Ashley and Cooper rivers, 7 miles from the sea. It is served by four railroads and a municipal airport. A fine landlocked harbor, six miles long and three miles wide, improved by jetties, gives a depth of 35 feet at mean low water with a tidal range of more than five feet and permits, with few exceptions, the largest ocean vessels to enter. A U. S. navy yard of first magnitude is six miles from the city, while the Charleston Dry Dock and Machine Company meets the needs of commercial craft. This is the finest deep water harbor south of Hampton Roads and is defended by Ft. Sumter, Castle Pinckney, and Ft. Moultrie on Sullivan's Island. Natural superiority has caused Charleston to be selected for the headquarters of the Sixth Naval District, of the Sixth Lighthouse District, and for an $11,000,000 Army Supply Base. The city government owns the chief waterfront properties on Cooper River with belt line railroad, and has set up the Port Utilities Commission to operate it. The foreign trade of Charleston is substantial, consisting of cotton, cotton byproducts, tobacco and coal, as the chief exports, and fertilizer materials and mineral oils as the chief imports. Coastwise trade consists principally of cotton and cotton goods, lumber, crossties, petroleum products, fertilizer, and miscellaneous goods. Ships carry to Pacific Coast terminals textiles, oyster shells, canned vegetables, granite, furniture, peanuts and general merchandise, and bring in talc, canned milk, beans, dried fruits, doors, lumber, hay, flour, etc.

Charleston has beautiful garden estates, including the famous Magnolia Gardens and Middleton Place Gardens. Beach resorts on the Isle of Palms, Sullivan's Island, and Folly Beach are popular watering places. The Proprietor's Club at Yea-



St. Philip's Church, Charleston, S. C.

In the tower, 200 feet high, is a beacon light for the guidance of mariners at sea.

man's Hall (a colonial estate), and the Charleston Country Club provide golf courses as does the municipal course at Riverland Terrace across the Ashley River. There is a municipal stadium. A zoning and city planning commission looks after the preservation of historic landmarks and the regulation of buildings. Magnolia Cemetery is beautified with shrubs and flowers.

Notable public buildings are the Custom House, built of white granite, the Court House, City Hall, the Post Office, and the Gibbes Memorial Art Gallery, containing many art treasures. Among the city's educational institutions are the College of Charleston, the oldest municipal college in the United States (1785); the State Medical College, the oldest in the South (1824); Porter Military Academy (1867); South Carolina Military College, also called the Citadel, known as the West Point of the South. The public schools provide for both white and colored children. There are about 115 churches, three famous for historical reasons and beauty of architecture: St. Michael's, built in 1765, having a chime that was imported in 1764, carried to London by British soldiery in 1780, brought back two years later, with public rejoicings, sent to Columbia for safety during the Civil War, melted when the city was burned in 1865, recast and replaced in 1868; St. Philip's, founded in 1704, the present edifice of beautiful Gothic design, with a tower 200 feet high; in its cemetery are buried the remains of Calhoun, Gadsden, Rutledge, Pickens, and other historic figures; the Huguenot Church (French Protestant) organized in 1681, the present building, the third on the site was built in 1845. Other churches of interest are the cathedral of St. John the Baptist (R. C.), the Circular Congregational, Scotch (Presbyterian), Citadel Square (Baptist), Bethel (Methodist), and the Unitarian.

Large deposits of phosphate rock, discovered soon after the Civil War, have made Charleston one of the world's largest manufacturing points for commercial fertilizer. The Factory of the General Asbestos and Rubber Company has long been the country's largest asbestos textile plant. The Standard Oil Co., the Gulf Refining Co., the Texas Co., and the Sinclair Oil Co., have located distributing plants. One of the South's largest creosoting plants is in Charleston. Other important manufactures are lumber, tobacco, textiles, wool products, paint, and machinery.

The population in 1930 was 62,265; in 1940, 71,275.

Government.—The government of the city, which was incorporated in 1784, and is conducted under a charter of 1836, is vested in a mayor serving for four years and a council elected half by wards and half at large.

History.—Charleston was founded in 1670 by English colonists under Col. Wm. Sayle. In 1685–6 a colony of Huguenots, which made a lasting impression upon both the character and aspect of the city, settled there, and in 1755, the French element was reinforced by 1,200 Acadians from Nova Scotia.

The inhabitants of Charleston early united with the other colonists in resistance to Great Britain. In March, 1776, they declared their independence. On June 28 of that year, the town repulsed from its rude palmetto fort on Sullivan's Island an attack by the British fleet under Sir Peter Parker, and in 1779 another attack by General Prevost; but in May, 1780, Sir Henry Clinton, with 16,000 men, after a six weeks' siege, captured it and General Lincoln, whom with 7,000 men he had hemmed in on the peninsula. It was reoccupied by the Americans Dec. 14, 1782.

Charleston was the head center of nullification in 1832, and of secession in 1860–1. In April, 1860, the Democratic presidential convention was split there by the withdrawal of the Southern delegates. The first secession convention in the United States was held there, Dec. 20, 1860. The first shot in the Civil War was fired in February, 1861, at the steamer *Star of the West* carrying supplies for the United States garrison; and the next at Fort Sumter, April 12, when the fort was captured by the Confederates. For nearly two years, from April, 1863, it successfully resisted a constant bombardment and numerous desperate assaults upon its forts and batteries by the Union forces. The occupation of Morris Island and the harbor by General Gillmore brought the city within range of the Union fire, which destroyed many buildings and shattered towers and steeples; but not until February, 1865, and because of General Sherman's occupation of Columbia, the state capital, did the Confederates withdraw.

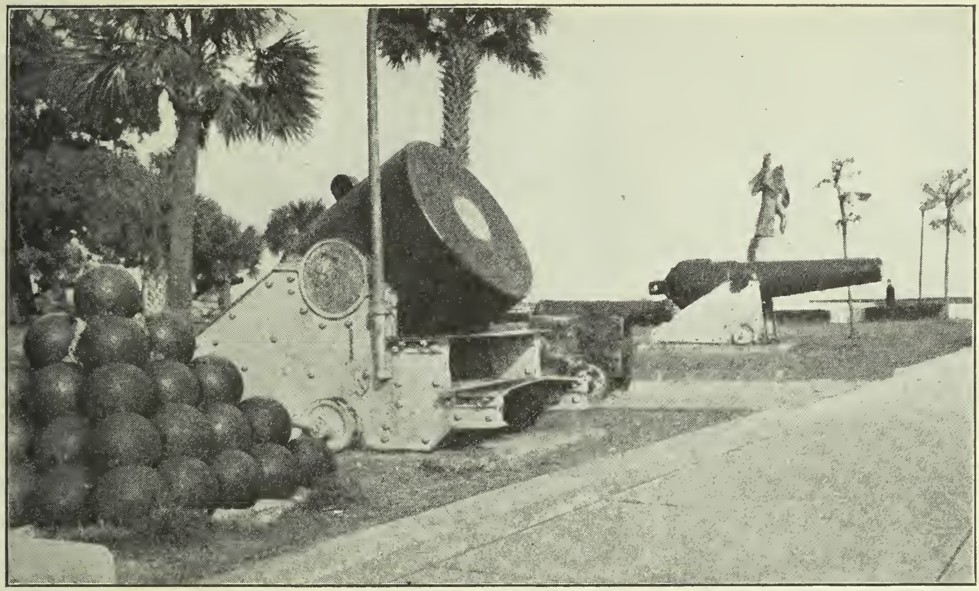
Charleston suffered a severe earthquake in 1886 and devastating hurricanes in 1893 and 1911. In 1926 Ashley River Memorial Bridge was opened and in 1929 Cooper River Bridge, the latter 3 miles long and 152 ft. above mean high water. In 1930 Charleston celebrated its 250th anniversary.

Consult T. P. Lesesne, *History of Charleston County, South Carolina* (1931); H. Leiding, *Charleston, Historic and Romantic* (1931); A. Simons and S. Lapham, Jr., *Charleston, South Carolina* (1927); C. W. Smith, *Old Charleston* (1933).

Charleston, city, capital of West Virginia and county seat of Kanawha county, is situated on the Great Kanawha River at its junction with the Elk, and on the Chesapeake and Ohio, the Baltimore and Ohio, and the New York Central railroads; 66 m. s. of Parkersburg. It has steamboat connection with all ports on the Kanawha to the Ohio. The Capitol, the Court House, the Public Library, and the Custom House are the most notable buildings. Bituminous coal, natural gas and oil, salt, and hardwood are found in the vicinity, and there are steel and metal works, paper and pulp mills, and manufactories of chemicals, glass, axes, tools, boilers, and furniture. A fort was established here about 1786. The town was incorporated in 1794, and the city in 1870, since which time, excepting from 1875 to 1885, it has been the capital of the State. Being on the pioneer route into the Ohio valley, it early became a trading center, and after the coal fields of the state were developed, it became important as an industrial center. Pop. (1930) 60,408; (1940) 67,914.

Charlestown, formerly a city in Middlesex county, Massachusetts, incorporated in 1874 with Boston (q. v.), is situated on a point between the Charles and Mystic rivers. Here are a State Prison, a U. S. Navy yard, and the Bunker Hill Monument, commemorating the battle of Bunker Hill (q. v.). Charlestown is the birthplace of Samuel F. B. Morse (q. v.) and was the home of John Harvard (q. v.). It was settled in 1628 or 1629 by Salem colonists and incorporated as a town in 1634. On June 17, 1775, the battle of Bunker Hill was fought here, and the British set fire to the town and destroyed over 320 buildings.

Charles Town, city, West Virginia, county seat of Jefferson county, is situated on the Baltimore and Ohio and the Norfolk and Western railroads; 7 miles s.w. of Harper's Ferry. It is in a fertile district in the Shenandoah Valley and is a much visited resort. It has garment factories, a brass foundry, and an apple products plant. Here John Brown (q. v.), after the Harper's Ferry Raid, was tried, condemned and hanged, Decem-



Charleston Chamber of Commerce.

BATTERY PARK IN CHARLESTON (S. C.) HARBOR.

Charleston Chamber of Commerce.

THE HISTORIC RECORDS BUILDING, CHARLESTON, S. C.

ber 2, 1859. Pop. (1930) 2,434; (1940) 2,926.

Charles' wain. See Ursa Major.

Charleville, shärl-vēl', industrial town, department of Ardennes, France, situated on the left bank of the Meuse opposite Mézières, with which it is connected by a suspension bridge. The chief industries are metal-founding and the manufacture of iron goods, bricks, brushes, and clay pipes. The town was founded in 1606 by Charles of Gonzaga, Duke of Nevers and Mantua, and was fortified until the last part of the seventeenth century. During the First World War it was occupied by the Germans and was the seat of German General Headquarters for almost two years. Pop. (1930) 22,708.

Charlevoix, shär'le-voi, town, Michigan, county seat of Charlevoix county, is situated on Lake Michigan and on the Pere Marquette Railroad; 46 miles N.E. of Traverse City. It has steamboat connections and is a popular summer resort. It has white fish and trout fisheries and is in a region of diversified farming. There are manufactures of lime and cement. Charlevoix was settled about 1866 and was incorporated as a city in 1905. Pop. (1930) 2,247; (1940) 2,299.

Charlevoix, shärl-vwä', Pierre François Xavier De (1682–1761), French traveler and historian, was born in Saint-Quentin, France. He went as a Jesuit missionary to Quebec in 1705, returned to France in 1709, and again visited Canada in 1720. On his second visit he ascended the St. Lawrence, traveled through Illinois, and sailed down the Mississippi, to New Orleans. His most important work is *Histoire de la Nouvelle France* (1744; Eng. trans. 6 vols. 1865–72).

Charlock, chär'lok. The Common Charlock, known also as Wild Mustard (*Brassica arvensis*), belongs to the order Cruciferæ. It may be known by its long, beaked, knotty, tapering seed-pods, by its rough, dentate leaves and by its small, yellow, four-petalled flowers. It blooms from May to September and is found throughout North America except in the extreme north. It is an annual weed, and, when once established, is very troublesome. Spraying with a copper or iron sulphate 2 per cent solution is useful in exterminating it.

Charlois. See Rotterdam.

Charlotte, shär'lot, city, Michigan, county seat of Eaton county, is situated on the Grand Trunk and the Michigan Central railroads; 19 miles S.W. of Lansing. It is in the vicinity of dairy and grain farms. There are manufactures of furniture, culverts, and radios. Pop. (1930) 5,307; (1940) 5,544.

Charlotte (1840–1927), empress of Mexico, only daughter of Leopold I, of Belgium, born at Laeken, near Brussels, was married to Maximilian, Archduke of Austria, in 1857, who became emperor of Mexico in 1864. In 1866 Maximilian sent her to Napoleon III for assistance when he realized his position was no longer tenable. Failure in her mission and fear for her husband (who was shot) caused her to become insane. She resided in Belgium until her death.

Charlotte, city, North Carolina, county seat of Mecklenburg county, is situated in the heart of the Piedmont section of the south, on the Norfolk and Southern, the Seaboard Air Line, the Piedmont and Northern, and the Southern railroads, midway between Washington and Atlanta. It is in an agricultural region producing cotton, peanuts, truck crops, and fruits. Charlotte is at the heart of a hydro-electric development and is the textile center of North and South Carolina. It has important manufactures of cotton, automobiles, automobile tires, mill machinery and supplies, cottonseed oil, farm implements, tobacco machinery and mine machinery. It is a distributing center. Printing and publishing are important. Notable buildings are the Federal Building County Court House, City Hall, Carnegie Library, and homes of the Y. M. C. A. and Y. W. C. A. The educational institutions include Queen's College for Women (Presbyterian) and Johnson C. Smith University, formerly Biddle University (colored Presbyterian)). The leading religious denominations are represented.

Charlotte was settled about 1750, and incorporated in 1768. In May, 1775, the famous convention of the county militia met here and adopted certain patriotic resolutions which have since remained a matter of dispute (see Mecklenburg Declaration of Independence). In 1780 Lord Cornwallis occupied the town for several days; the historic oaks under which he maintained his headquarters are still preserved. Pop. (1930) 82,675; (1940) 100,899.

Charlotte Amalie, since 1921 renamed St. Thomas, city, Virgin Islands, is situated on the southern coast of the island of St. Thomas, of which it is the capital. It has a fine spacious harbor and is an important coaling station. Pop. (1940) 9,801.

Charlottenberg, shär-lot'en-bar'y', iron-working center, in Vermland county, Sweden, 3½ miles from the Norwegian frontier, and 21 miles from Arvika.

Charlottenburg, shär-lot'en-bo͞orch, a suburb of Berlin, Prussia, is situated on the river Spree. It owes its name and existence to the royal palace which was built in 1695–1707 for Sophie Charlotte, wife of Frederick I of Prussia. In the palace garden is the mausoleum containing the tombs of Frederick William III and Queen Louise, and Emperor William I and Empress Augusta. Other features of interest are the Emperor William Memorial Church; Trinity Church; the Technical Academy, which has a valuable architectural museum; a fine municipal opera-house, completed in 1912; and numerous educational institutions, including the Royal Academy of Art, Royal Academy of Music, an artillery and engineering school, a technical high school, and a military preparatory school. The Royal Porcelain Factory, which was founded in 1761, is located here. There are many other industries, notably iron works.

Charlottesville, shär'lots-vil, city, Virginia, county seat of Albemarle county, is situated on the Chesapeake and Ohio and the Southern railroads; 67 miles N.W. of Richmond. It is the seat of the University of Virginia (q. v.), founded by Thomas Jefferson in 1819, Saint Anne's School for Girls, the University Summer School, and Miller's Manual Training School. Monticello, the home of Thomas Jefferson, and Ash Lawn, the home of James Monroe, are located a few miles to the south. The city is situated in the vicinity of fine fruit, poultry and cattle farms, soapstone and slate quarries, and has manufactures of textiles, men's underwear, women's dresses, electrical fuses, machine parts, and law books. The town was named after Queen Charlotte. Charlottesville was settled as early as 1744, incorporated as a town in 1762, and chartered as a city in 1888. It has a commission manager form of government. Pop. (1930) 15,245; (1940) 19,400.

Charlottetown, shär'lot-town, city, Canada, the capital of Prince Edward Island and county seat of Queen's county, is situated at the head of Hillsborough Bay at the confluence of three large tidal rivers, and on the Canadian National Railways. It has a commodious harbor and steamship connection with several Dominion ports. The city is built on rising ground overlooking the harbor and has broad well-paved and well-lighted streets. Notable edifices are the

Provincial Government and Dominion buildings, the Court House, Prince of Wales College, St. Dunstan's University (R. C.), Normal School, Y. M. C. A. building, and Roman Catholic Cathedral. Charlottetown is in a rich farming district, and agricultural products are exported. There are extensive fisheries, and manufactures of brooms, tin cans, canned products, butter, and biscuits. The city was founded in 1768. Pop. (1931) 12,361.

Charlton, John (1829–1910), Canadian statesman, born near Caledonia, N. Y., in 1849 went to Canada, where he engaged in business. From 1872 to 1904 he was a member of Parliament, taking special interest in tariff and trade questions and in legislation regarding morality. In 1889 he was chairman of the Ontario Royal Mining Commission. He was a lifelong advocate of friendly relations between Canada and the United States and spoke and wrote extensively on that subject. He was a member of the British-Canadian Joint High Commission in 1898. His publications include *Parliamentary Recollections.*

Charm (through Fr. from Lat. carmen, 'a song'), properly a form of words, generally in verse, supposed to possess some occult power of a hurtful, a healing, or a protective kind; hence applied to anything which exercises an irresistible power to please and attract. Charms are believed to exert their influence either by being recited, or by being written and worn on the person; in the latter case, they may be classed with Amulets (q. v.). See also Incantation.

Charmes, shärm, Francis, (1848–1916), French journalist and 'Immortal.' He was editor of the *Journal des Debats* from 1872 to 1880 and again from 1889 to 1907, when he became manager of the *Revue des Deux-Mondes.* In 1908 he was elected to the French Academy. He held various public offices and was a member of the Chamber of Deputies and later was senator from Cantal. He published, besides literary and political articles in his periodicals, *Études historiques et diplomatiques; L'Allemagne contre l'Europe; La Guerre, 1914–15.*

Charnel-house, a chamber situated in a churchyard or other burying-place, in which the bones of the dead which were thrown up by the grave-diggers were reverently deposited. It was often a chapel with a vault beneath.

Charnockite, an important group of igneous rocks, widely distributed in India, Ceylon, Madagascar and Africa; Archaean system. The tomb of Job Charnock, founder of Calcutta, was made from this rock; hence the name.

Charnwood Forest, chärn'wo͝od, barren but picturesque tract, 20 square miles in area, 5 miles southwest of Loughborough, West Leicestershire, England, culminating in the volcanic Bardon Hill (912 feet). The district was enclosed by Act of Parliament in 1812, because of its geological interest.

Charny, Count of. See Chabot, Philippe de.

Charon, kā'ron, in classical mythology the son of Erebus and Nox, appointed by the gods to ferry the souls of the dead across the river Styx. For this service he exacted an *obolus* from each, and consequently this coin was placed at burial in the mouth of the dead. If proper burial had not been provided or if the coin was not supplied, the unhappy soul was doomed to wander about the river bank for a hundred years, at the end of which time Charon would carry it across without a charge. He is generally depicted as a squalid but vigorous old man.

Charondas, ka-ron'das, an ancient Greek lawgiver of Catana in Sicily, who probably lived between 600 and 500 B.C. Aristotle, in the *Politics,* remarks that he was distinguished for his graduation of fines according to the wealth of the criminals, and for the severity with which he treated perjury in a witness. He is said to have killed himself for having inadvertently broken one of his own laws.

Charpentier, shär-pän-tyā', Gustave (1860–), French composer, was born in Dieuze, Alsace-Lorraine. He studied at the Lille Conservatoire and later at the Paris Conservatoire where he was a pupil of Massart, Pessard, and Massenet. *La vie du poète,* a symphony drama, of which he composed both words and music, was produced in 1892 and established his reputation, but his most important work is the opera *Louise,* first produced in Paris in 1900. Other works are *Impressions d'Italie, Fleurs du Mal, Sérénade à Watteau, Orphée, Tête rouge,* and *La Courronement de la Muse.* Consult M. Delmas, *Gustave Charpentier et le lyrisme français* (1931).

Charpentier, Johann Friedrich Wilhelm Toussaint von (1738–1805), German mining expert. In 1785 he went to Hungary to study an improved chemical process, which, on his return to Freiberg, he introduced into the chemical work at the mines. In 1801 he became director of the mines there. He was the author of *Mineralogische Geographie der Kursächsischen Länder* (1778), *Beobachtungen über die Lagerstätten der Erze* (1799).

Charr, chär, or Char, a group of salmonoid fishes, belonging to the genus *Salvelinus,* distinguished from the genus *Salmo* by the fact that teeth are present on the head of the vomer only, and not on both head and body. The genus is represented in America by four species and six or seven subspecies. The *Salvelinus fontinalis,* commonly known as the American Brook Trout, is probably the most beautiful and favorite game-fish in American waters. The only well-authenticated species found in European waters is the red charr (*S. alpinus*). See Trout

Charrière, shä-ryâr', Isabelle Agneta (van Tuyll) de, (1740–1805), Swiss author, was born in Holland. She was married to Saint-Hyacinth de Charrière, a Swiss nobleman, her brother's tutor, and settled near Lausanne. She was a friend of Madame de Staël and Benjamin Constant. Among her works are *Calliste,* her masterpiece, *Lettres neuchâteloises, Les trois femmes, L'Emigré, Sir Walter Finck.* See G. Scott, *The Portrait of Zelide* (1925).

Charron, shä-rôn', Pierre (1541–1603), French divine and ethical philosopher, was born in Paris. He studied law but after a few years turned his attention to preaching and attained a high reputation. He was a friend of Montaigne and borrowed largely from the latter's writings. He would be described nowadays as a 'broad churchman' with a tendency to agnosticism. His treatise *De la Sagesse,* which appeared in 1604, was more than once translated into English in the 17th and early 18th centuries (new Eng. trans. 1891). He also wrote *Les trois vérités* (1593), a defence of Catholicism; and *Discours chrétiens* (1600), in which he condemned the violence of the League.

Charruas, chär-ro͞o'äs, a warlike South American people formerly dominant in Uruguay and the adjacent parts of Southern Brazil, where the progress of settlement was long retarded by their stubborn resistance. They were gradually driven from the open plains to the encircling Brazilian woodlands, and by 1832 are said to have been practically annihilated. The Charruas were a dark-skinned people, of a taciturn and apathetic temperament. Their weapons were the bow and the sling, which they used with surprising dexterity.

Chart, a marine map of a portion of the sea or other body of water, for practical use in the navigation of ships.

The invention of charts is generally ascribed to the Italians. The earliest chart extant of which the date can be fixed is Vesconte's chart of 1311. Meridians and parallels were first represented on charts in 1427 by equidistant parallel straight lines, dividing the chart into equal squares or rectangles. These were charts in which the sphericity of the earth was disregarded and they were known as 'plain charts.' In 1569, Gerhard Krämer, a Flemish map-maker, better known by his Latin name of Mercator, published his famous Universal Map, taking into account the sphericity of the earth in his system of projection or lines representing the meridians and parallels. The correct principles on which this projection should be constructed were developed by Edward Wright of Garveston, Norfolk, and published in 1599. A chart constructed on this projection is known as a Mercator chart. It has the unique property that the course of a ship sailing on a constant bearing (crossing the meridians at a constant angle) is represented by a straight line. This is so valuable to navigation that almost all charts are constructed on the Mercator projection. Other projections have been used for charts, but unless they fill some specific need, as the Gnomonic, from which points along a great circle course are transferred to a Mercator chart, in great circle sailing, they are being replaced by Mercator charts.

A chart is constructed with more accuracy than ordinary maps, and all available information of navigational value that it is practicable to chart is shown thereon, such as the shoreline, wharfage and land marks back of the shore; the depth of water; depth curves, and character of the bottom; rocks, reefs, shoals, and other dangers; the fairways and improved channels; lighthouses, light vessels, beacons, buoys and range lines. Established well-known symbols and abbreviations are used to represent the various objects. Compass roses, resembling the face of a compass card, are placed where they are most needed and on large scale charts both the numerical and graphic scales are given. Notes are added giving the tidal range, dates of surveys used, the sounding (depth figure) unit, and the plain of reference.

Charts are considered so vital to the safe navigation of ships, and therefore in promoting commerce, that the governments of most of the maritime nations of the world produce them and sell them at a price that is insignificant compared to their cost.

In the United States there are three chart-making establishments; the U. S. Coast and Geodetic Survey, of the Department of Commerce, which produces charts of the coasts of the United States and its possessions; the Hydrographic Office of the Navy Department, which produces sailing charts of the oceans and foreign charts; and the Corps of Engineers, U. S. A., of the War Department, which produces charts of the Great Lakes and Lake Champlain. In Great Britain the issuing of charts is done by the Hydrographical Department of the British Admiralty.

Charter, a formal document emanating from the sovereign power, in the nature of a grant, either to the whole nation, or to a portion of the people, or to a colony or dependency, assuring to them certain rights or powers.

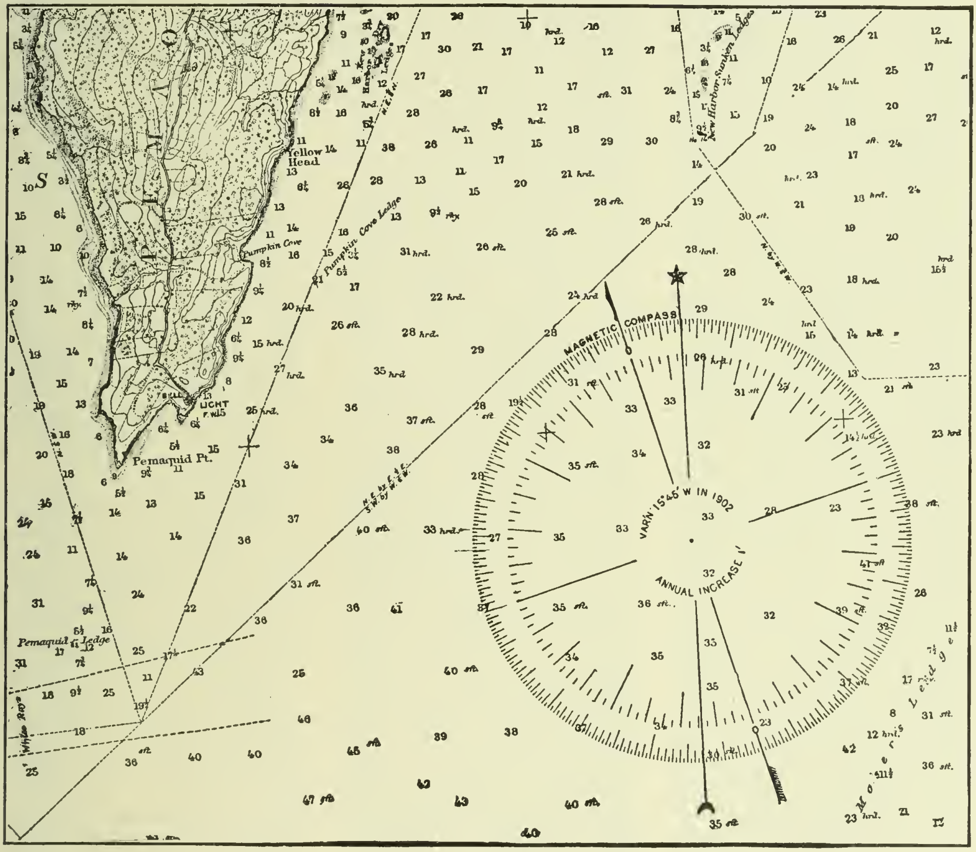
In England the Great Charter of King John is a striking example of a sovereign bestowing rights upon the whole body of people, but the scope of a charter may be much narrower both as to the privilege granted and the number to whom granted. The most important forms of charter are those by which the executive or legislative authority in a country or state confers rights and privileges of incorporation, trade, jurisdiction, and the like, upon bodies of individuals. In Britain such documents proceed from the sovereign and pass under the great seal. The rights of the American colonies were founded upon royal charters granted by Queen Elizabeth and the Stuart kings, and at the present day large tracts of British territory in Africa are governed by chartered companies. Likewise, towns, universities, schools, banks, joint-stock companies, etc., often derive their privileges from royal charters. At the present day, however, parliamentary sanction is generally obtained for grants of important privileges. In the case of companies, Parliament has passed a general act, by complying with the provisions of which any body can obtain the privileges of incorporation, just as if a royal charter or special act had been granted or passed.

In the United States most corporations are created by charters granted by act of State legislature. If the corporation is a public one it is held that it is a mere agency of the State and as such its charter may be changed by the legislature, but if the corporation is a private one it is held to be a contract between the State and the incorporators, and as such the State cannot impair its force. It is, therefore, customary in such cases for the State to insert a clause reserving to itself the right to alter or revoke the charter for just cause. Even if this reservation be not inserted, the State is not prevented from exercising its right of eminent domain, nor from amending the provisions of a charter to suit altered circumstances.

Chartered Companies, trading companies operating under special charters granted by the sovereign power. Such companies have played a large part in the history of colonization and in the building up of the British Empire, although colonization was not always their avowed purpose, and territorial expansion, in the most notable instance of the British East India Company, was accidental rather than designed. A large number of such companies were formed during the first half of the 17th century, and again in the last quarter of the 19th century, when the nations of Europe were entering on a policy of economic exploration of hitherto virgin territories—America and the East in the 17th, and Africa in the 19th century. Nineteenth-century charters differ from the earlier charters in granting no exclusive monopoly, and in them there is no delegation of sovereignty. The rights of natives are safeguarded, and the activity of the modern company is jealously supervised. Among the most famous of the early companies are the British East India Company and the Hudson's Bay Company. The American companies, of which the Virginia Company was the best known, were early superseded or absorbed by the government. After 1650 most of the charters were reconstitutions; few new charters were granted, although the Hudson's Bay Company was chartered in 1670. The Sierra Leone Company, at the beginning of the 19th century, was of a semi-philanthropic character. The British North Borneo Company (1881) was the first of the new development in the 19th century. The Royal Niger Company (1886), the Imperial British East African Company (1888), and the British South Africa Company (1889) received charters. The Niger Company has already been absorbed by the government, and in 1895 the British East African Company surrendered its charter, rights, and property in exchange for $1,250,000. See East India Company; Hudson's Bay Company.

Charterhouse (the ultimate form of Chartreuse or Carthusian), a hospital and school, erected on ground once occupied by a Carthusian Monastery in Charterhouse Square, London. The hospital originated (1611) in the purchase of the site by Sir Thomas Sutton, a banker, from the Earl of Suffolk, for £13,000.

The school is no longer a school exclusively for 'poor children'; it is now under a different governing body from that of the hospital. It was transferred to Godalming (Surrey) in 1872 and is now one of the great public schools of England. Consult Taylor's *Charterhouse of London.*



Section from a U. S. Coast and Geodetic Survey Chart

Charteris, chär'tris, Archibald Hamilton (1835-1908), Scottish clergyman and educator, was born in Dumfriesshire. He was professor of Biblical Criticism, Edinburgh University (1868-98) and Moderator of the General Assembly of the Church of Scotland in 1892. In 1901 he became chaplain in ordinary to the King in Scotland. His published works include *Life of Professor James Robertson* (1863); *The Church of Scotland* (1874); *Canonicity, or Early Testimonies to the Canonical Books of the New Testament* (1881); *The New Testament Scriptures* (Croall Lectures, 1882).

Charter Oak, an oak tree (standing until 1856) in Hartford, Conn., in which, according to tradition, the Connecticut Charter was concealed in 1687, when Gov. Edmund Andros, whose jurisdiction included Connecticut, came to demand its surrender to the Assembly. The colonists were loath to give it up and one of their members is said to have seized the document after the lights had been suddenly extinguished. The story is not substantiated by any contemporary document and rests on doubtful authority.

Charter Party, a contract between a merchant and a shipowner, by which the shipowner agrees to put the *whole* of his ship at the service of a merchant for a definite time, or more often for a definite voyage or voyages. A charter party generally contains the following covenants by the shipowner: (1) that the ship is fitted for the voyage; (2) that he will load a definite amount of cargo; (3) that he will sail with all convenient speed; (4) that he will deliver the cargo. Certain perils similar to those mentioned in a bill of lading are excepted—*i.e.* the shipowner is not liable if he cannot carry out his contract in consequence of the act of God. The merchant generally contracts to put the cargo on board in a certain number of days. Special provision must be made for incidental expenses on the voyage, for liberty for the ship to deviate from its course—*e.g.* to help a ship in distress, or for similar reasons.

A time charter is one in which the ship is chartered for a specified time, and not merely for a specified voyage. The writing is not generally under seal. Time is considered to be of the essence in a charter party, and the vessel must sail within the time set.

Chartier, shär-tyā', Alain (*c.* 1390-1441), French writer, was born in Bayeux. He acted as secretary for Charles VI. and Charles VII. Living during the period of the Hundred Years' War, he tried to fortify the courage of his countrymen by his poems—*Le lay des quatre dames* (1415), *Traité de l'espérance*, *La ballade de fougières*, *La belle dame sans merci* (Eng. trans. by Chaucer, or perhaps by R. Ros, 1526)—written in clear and, for that epoch, unusually musical language. His best political work is *Le quadriloge invectif*, in which, with great perspicacity, he shows the reasons of the downfall of his country and the remedies for its salvation. His *Brêviarie des nobles* and *Le curial* (trans. into English as *The Curial* by W. Caxton) are didactic works which enjoyed great vogue in their day.

Chartism, chart'iz'm, a popular reform movement in England in the third and fourth decades of the 19th century, occasioned by the widespread disappointment with the political results of the Reform Bill of 1832, for which the middle class reformers had sought the support of the working classes, only to abandon them when the bill had become law. The six points included in the charter, drafted by Francis Place, were: Universal Suffrage, The Ballot, Annual Parliaments, Payment of Members, Equal Electoral Districts, and Abolition of Property Qualifications. These were not peculiar to the Chartists, but were adopted chiefly from John Cartwright's *Plan of Reform* (1776), and from the Duke of Richmond's bill of 1780, called the 'People's Rights' measure.

Its history may be divided into two periods, the first aiming at industrial amelioration, while the second conceived this industrial reform as a more or less definitely socialistic revolution. The first period lasted from 1836 to 1839, the second from 1840 to 1848. During the first period Chartism was promoted by a time of commercial depression, by the increasing introduction of machinery, and by the operation of the new Poor Law of 1834. Discontent with existing conditions was fostered by the declaration of Lord John Russell against all further reform; and the result of this declaration was the formation of a national convention, mainly under the guidance of Feargus O'Connor. The Chartists, though their ostensible objects were political, had recourse to menaces in place of parliamentary action, and eventually to open disturbances—both alike ineffectual. The charter, which was drawn up in 1838, was received with tumultuous enthusiasm, and disturbances took place throughout the country. A petition, signed by 1,280,000 names, was presented to Parliament, but the House of Commons refused to receive it.

The second period is of greater importance, not so much because of the strength of the movement as because it had become distinctively socialistic in character. The Chartists revealed their revolutionary tendencies by their refusal to support the Anti-Corn Law League, because the repeal of the Corn Laws would, by cheapening food, keep down wages and benefit the middle classes only. Disturbances took place in Great Britain; and, contemporaneously with the Continental revolutionary movement, Chartism came to a head in 1848. A great demonstration was announced to be held on Kennington Common, London, where 500,000 men were to convey the petition for reforms, signed by 6,000,000 names. The procession was forbidden, nearly 200,000 special constables being enrolled, and the meeting proved a fiasco; and the signatures to the petition were found to be largely fictitious, although probably there were more than two million genuine signatures.

After 1848 the movement died out. Industrial conditions became more favorable, and the leaders became identified with agitation for more specific reforms. Most of the political reforms demanded by the Chartists have since been granted; and in trade unionism and coöperation the leaders of the popular movement have found more practicable scope for their energies. Consult Gammage's *History of the Chartist Movement*.

Chartres, shär'tr' (anc. *Autricum* of the Carnutes), town, France, capital of the department of Eure-et-Loir, on the left bank of the Eure; 50 miles southwest of Paris. Its glory is the cathedral of Notre Dame, one of the finest examples of Gothic architecture. The crypt dates farther back than the 11th century; some parts of the building date from 1120, but most of it belongs to the early 13th century. It has two spires, the northwestern (375 feet) being regarded as one of the most beautifully designed spires on the Continent. The cathedral is lavishly adorned with statues (1,800); and other features of note are the three rose-windows, and the remarkable stained glass (13th century) which fills more than a hundred other windows, and contains figures of some 5,000 persons. The other interesting buildings are the church of St. Pierre (12th century), the Porte Guillaume (14th century), and an obelisk to General Marceau. M. Regnier (1573), General Marceau (1769), Brissot (1754), and Pétion (1756) were all born here. The town is the centre of a grain-producing district (Beauce), and its weekly corn market is important. The industries comprise chocolate manufacture, hat-making, and tanning. Pop. (1921) 22,869.

Chartres was the chief place of the Carnutes. It was burned by the Normans in 858 and seized by the Burgundians in 1417. Henry IV. was anointed in Chartres in 1594, and during the Franco-German War it was occupied by the Germans.

Chartreuse, shär-trûz', LA GRANDE, a celebrated Carthusian monastery in France, picturesquely situated in an Alpine valley at an altitude of 3,206 feet, in the department of Isère; 14 miles northeast of Grenoble. It was founded by St. Bruno in 1084. It is a huge pile occupying 12 acres, but repeated conflagrations have left little of the original building. The present building dates from 1678, and formed the headquarters of the order till the revolutionary period of 1793 and later from 1816 to 1903, when owing to the action of the French Government, the monks were again compelled to quit their monastery. The headquarters were removed to Pinerolo, Italy, and the manufacture of liqueur, for which the monks were famous, was transferred to Tarragona, Spain.

Chartulary, kär'tū-ler-i, a collection of charters; *e.g.* the monastic chartularies were registers kept by the several religious houses, in which were entered the deeds and charters from various benefactors, also rentals and surveys of their estates, papal letters and bulls, and occasionally contemporary chronicles of events.

Charybdis. See SCYLLA.

Chase, GEORGE (1849–1924), American educator and legal writer, was born in Portland, Me. He was graduated (1870) from Yale and studied law at Columbia, where he became assistant professor of municipal law (1874–8), and professor of criminal law, torts, and procedure (1878–91). In 1891 the New York Law School was chartered, and he became dean. He edited Johnson's *Ready Legal Adviser* (1881), editions of the *American Students' Blackstone* (1876), Stephens's *Digest of the Law of Evidence* (1886), and Chase's *Cases on Torts*.

Chase, PHILANDER (1775–1852), American Protestant Episcopal pioneer bishop, was born in Cornish, N. H. He was graduated (1795) from Dartmouth and studied for the ministry, being ordained priest in the Protestant Episcopal Church in 1799. He performed missionary services in New York State and in New Orleans, was rector of Christ Church, Hartford, Conn., in 1811–17, and in the latter year removed to Ohio with the purpose of establishing his church in that district. He was consecrated Bishop of Ohio (1819), visited England, where he raised considerable sums of money, and, returning to Ohio, bought 8,000 acres of land and founded Kenyon College and Gambier Seminary, so named from English benefactors. He resigned his presidency and bishopric on account of differences with his clergy in 1831, and on removing farther west and continuing his labors, was elected Bishop of Illinois (1835). Bishop Chase in 1838 founded Jubilee College at Robin's Nest, Ill. He published *A Plea for the West* (1826), *The Star in the West, or Kenyon College* (1828), and *Reminiscences: an Autobiography* (2 vols., 1848).

Chase, Pliny Earle (1820–86), American scientist, was born in Worcester, Mass., and graduated (1839) at Harvard. After several years of teaching, he engaged in business, but in 1871 was appointed professor of natural science at Haverford, Pa., and four years afterward was transferred to the chair of philosophy and logic. He was also a lecturer at Bryn-Mawr College from its foundation. For his paper on the *Numerical Relations of Gravity and Magnetism* he received the Magellanic Medal of the American Philosophical Society (1864), and he contributed a great number of papers to its proceedings, based on his investigations in meteorology, physics, and mental philosophy. He published several arithmetical text books and *Elements of Meteorology* (1884).

Chase, Salmon Portland (1808–73), American political leader, financier, and jurist, born at Cornish, N. H., on Jan. 13, 1808. His father, a farmer, died in 1817, and the boy spent several years with his uncle, Bishop Philander Chase, in Ohio, returning to N. H. in 1823. He graduated at Dartmouth College in 1826, and for three years thereafter conducted a private school in Washington, D. C., during this time studying law under William Wirt. In 1830 he was admitted to the bar and began practice at Cincinnati, O., where he became prominent as a lawyer and also took an active part in politics. Strongly opposed to slavery after 1836, though not technically an Abolitionist, Chase came to be recognized as the leader of the political anti-slavery men, first in Ohio and then in the Middle West, and probably no man in the U. S. did more to make the anti-slavery sentiment in the North a political force to be reckoned with. At first a National Republican and then a Whig, he identified himself with the Liberty Party (q.v.) in 1841; and in 1848 was the leading spirit in the National Free Soil Convention at Buffalo, drafting the resolutions, the essence of which was 'no more slave states and no more slave territory,' and, more than any one else, bringing about the nomination of Van Buren. From 1849 to 1855 he was an anti-slavery member of the U. S. Senate, having been elected by a coalition of Free Soilers and Democrats; here he showed himself a debater of great ability and was especially conspicuous as an opponent of the Compromise Measures of 1850 and of Douglas's Kansas-Nebraska Bill of 1854, Douglas later saying with reference to this latter bill, 'In opposition Seward's and Sumner's speeches were essays against slavery. Chase of Ohio was the leader.' In the political re-alignment which followed the passage of the Kansas-Nebraska Bill, Chase naturally became the leader of the Republicans in Ohio, and, as a Republican, he was Governor of the state (1856–60). He was an aspirant for the Republican presidential nomination in 1860; and in Feb., 1861, he was one of Ohio's delegates to the Peace Conference at Washington, in which he led the non-compromisers. On March 4, 1861, he re-entered the U. S. Senate, but resigned on the following day to become Secretary of the Treasury in Pres. Lincoln's cabinet. In this position, one of the utmost difficulty in the trying war period, although he unquestionably made serious mistakes, notably with regard to the issue of legal tenders, he rendered services of inestimable value to the nation, and he was one of Pres. Lincoln's most trusted advisers. In temperament, however, the two men were radically different; Chase, easily offended, resigned four times within three years, Pres. Lincoln each time inducing him to remain in the cabinet, but finally his fifth resignation was accepted and he gave way to Fessenden in Sept., 1864. Soon afterward, however, in Dec., 1864, Pres. Lincoln appointed him Chief Justice of the U. S. Supreme Court, and this position he held until his death, May 7, 1873. As Chief Justice he was called upon to deal with various important cases growing out of the Civil War and Reconstruction, the most famous decision, written by himself, being that in the case of *Texas vs. White* (1869), the keynote of which was the oft-quoted sentence, 'The Constitution, in all its provisions, looks to an indestructible Union composed of indestructible States.' He presided with fairness over the impeachment trial of Pres. Johnson (1868). He still, though Chief Justice, was (as he had been since 1860) an aspirant for the Presidency, and in 1868, after his friends had been working to obtain the Republican nomination for him, he turned and sought the Democratic nomination, on the ground that he had lost all confidence in his old party. Consult Hart, *Salmon Portland Chase* (1899), in the 'American Statesmen Series'; Schmuckers, *Life and Public Services of Salmon P. Chase* (1874); and Warden, *Account of the Private Life and Public Services of Salmon P. Chase* (1874).

Chase, Samuel (1741–1811), American jurist, born in Somerset co., Md. He began to practice law at Annapolis, soon became one of the leaders of the Md. bar, and was also prominent in politics as an opponent of the arbitrary measures of the British Government before the American Revolution. He was a member of the General Assembly of Md. (1764–84) and of the Continental Congress (1774–8 and 1784–5). With Benjamin Franklin and Charles Carroll of Carrollton, he was sent by Congress to Canada (1776) to gain the good-will and support of the Canadians, the mission failing to accomplish its object; and he did much to persuade Md. to give her vote for the Declaration of Independence, of which he was one of the signers. After the war he was a stanch Federalist in politics. In 1791 he became chief justice of the general court of Md., and in 1796 Pres. Washington appointed him an associate justice of the U. S. Supreme Court. His practice of commending the Federalist policies and arraigning those of Republicans in his charges to grand juries was bitterly resented by the Republicans, and through the efforts of John Randolph of Roanoke he was impeached, Nov. 30, 1804, the articles of impeachment being presented by Randolph to the Senate on Dec. 7, and the trial—one of the most famous impeachment trials in U. S. history—beginning on Jan. 2, 1805. There were eight articles, charging him with various offences, the worst of which, in Republican eyes, was his having made 'highly indecent and extra-judicial' reflections, before a grand jury, on Pres. Jefferson's Administration. Chase was defended by eminent counsel, including Luther Martin, and, the prosecution failing to secure the necessary two thirds vote, he was declared not guilty (Mar. 1, 1805).

Chase, Thomas (1827–92), American educator, was born in Worcester, Mass., and graduated (1848) at Harvard, where he was tutor in 1850–3. He then travelled in Italy and Greece, attended lectures at Berlin, and on his return was appointed (1855) professor of philology and classical literature at Haverford College, Pa., of which institution he became president in 1875, retiring in 1886. He was a member of the American board of revisers of the translation of the New Testament, and was senior editor of the well known Chase and Stuart's classical text-books, also publishing *Hellas: Her Monuments and Scenery* (1863) and a number of biographical and literary papers.

Chase, William Merritt (1849–1916), American painter, born at Franklin, Ind., and after studying under B. F. Hayes in Indianapolis, and at the National Academy schools in New York, took up still-life painting in St. Louis. From there he went to Munich in 1872 and joined the group of American students who were afterward known as the 'Munich secessionists' and who were to establish the Society of American Artists in New York as a means of obtaining a better showing for their work than the National Academy at that time provided. Chase studied under Wagner and Piloty at Munich for six years, and for one year at Venice, where he made a special study of Tintoretto's works. He returned to New York in 1878 and became a leading influence among the younger men, and was president of the Society of American Artists for ten years. He soon abandoned the rather heavy Munich colorings, and became noted for the brilliancy of his paintings, whether landscapes with figures (his special forte), still-life, portraits, or genre. His figure work is treated principally as an accessory to the general scheme of the picture, even in his portraits. Chase always was active as an instructor and lecturer. He taught in the Art Student's League for many years, conducted his own schools in New York and at Shinnecock, L. I., and was a regular instructor in the Pennsylvania Academy at Philadelphia. He was a member of the international juries at the Chicago and St. Louis expositions, and when not a juror received gold medals at the Paris and other expositions. His membership in the Society of American Artists dated from 1879, and that in the National Academy from 1890. See Isham's *American Painting* (1905).

Chasidim (Heb., 'pious') or Assideans, a Jewish sect or party, which becomes prominent in the Maccabean wars (I. Macc. 2:42; 7:13; II. Macc. 14:6), although they have existed for some time previously. They were excessively religious and conservative and some think they were the chief agents in stirring up the war. They are not heard of later, but some think they reappear in the Essenes, and others that they developed into the Pharisees. That they were ascetics is not certain. The name also designates a mystical, pietistic movement which originated in Poland in the eighteenth century and still has many adherents among the Jews of Eastern Europe.

Chasing and Embossing. All metals capable of being formed into thin plates or sheet lend themselves to chasing and embossing—*i.e.* the beating out of bosses from the under surface of the metal in the form of any ornamental design; these bosses are generally worked over from the front, to give detail and finish. Gold and silver are the most suitable media, though copper, brass, iron, steel, and other metals are used with excellent result, and are, indeed, preferable for larger and bolder styles. Egyptian, Assyrian, Greek, and Roman goldsmiths constantly used this method in the decoration of cups and other articles. Many ancient gold and silver vases are embossed with figures, animals, foliage, and ornament of most refined design and faultless execution. Mediæval craftsmen used embossed ornament freely. Theophilus, the monk, writing in the 12th century, described methods which do not appreciably differ from those used at the present time. In the 16th century Benvenuto Cellini devotes a chapter to the art, in which he was extremely skilful. Towards the middle of the 19th century a revival took place in this as in other decorative arts. See Goldsmith's Work; also Theophilus's *Christian Art of the 11th Century* (1847); B. Cellini's *Treatises* (1898); J. Harrison's *Decoration of Metals* (1894); Gawthorp's *Manual of Practical Instruction in the Art of Brass Repoussé* (1902): L. L. Haslope's *Repoussé Work for Amateurs* (1902).

Chaska, city, Minn., co. seat of Carver co., 20 m. s.w. of Minneapolis, on the Chi., Mil. and St. Paul and the Minneapolis and St. Louis R. Rs. Its most important industry is brickmaking. Among other manufactures are flour, iron goods, etc. Pop. (1910) 2,050.

Chaskoi, or Hashoi. See Constantinople.

Chasles, Michel (1793–1880), French mathematician, born at Epernon, Eure-et-Loir; appointed professor in the École Polytechnique in 1841. In 1863 the Royal Society of London awarded him the Copley medal. One Lucas palmed off upon the credulous *savant* forgeries which tended to give to Pascal the honor of some of Newton's discoveries. Two important papers by Chasles on the properties of cones were translated by G. Graves, and published in Dublin in 1841. Chasles's papers are to be found in the *Comptes Rendus* of the French Academy of Sciences. See also his *Rapport sur les Progrès de la Géometrie* (1871).

Chasles, Victor Euphémon Philarète (1798–1873), French writer, was born at Mainvilliers, near Chartres. A Jacobin, he was imprisoned after the restoration, but through Chateaubriand's intercession was released. He wrote largely on England, and contributed reviews of English books to French journals. Appointed librarian of the Bibliothèque Mazarin, Paris (1837), and professor of Northern languages at the Collége de France (1841), he exercised no little influence upon the literature of his country by his correct critical taste. Among his works are *Histoire Humoristique des Humoristes* (1846), *Oliver Cromwell* (1847), *Galileo Galilei* (1862), and *Études Contemporaines* (1866). His 'Discourses' on *De Thou* (1824) and *French Literature* were crowned by the Academy. See his *Mémoires* (1877).

Chassé, David Hendrik (1765–1849), Dutch general. After the Dutch revolution of 1793, he took service with the French; but after the abdication of Napoleon in 1814, he was made general by William, the first king of Holland, and fought against Napoleon at Waterloo. Chassé was Governor of Antwerp at the time of the Belgian revolt in 1830.

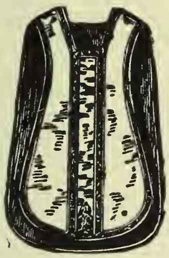
Chassepot, Antoine Alphonse (1833–86), inventor of the breech-loading centre-fire needle-gun, adopted by the French army in 1866, was born at Mutzig, Lower Rhine. Chassepot was in the government arsenal at the time of his invention, and for it he received the Cross of the Legion of Honor and a gratuity of 30,000 francs.

Chassériau, Théodore (1819–56), French painter, born in Samana, near San Domingo; studied under Ingres at Paris, and in the schools of French painting forms a sort of transitional link between Ingres and Puvis de Chavannes. His most notable achievement, frescoes on the walls of the Cour des Comptes at Paris (1844–8), was in great part destroyed in the commune of 1871. Other works include *Arab Riders and their Dead*, *Arab Chiefs*, *Macbeth and the Witches*, *Chaste Susannah*, *Tepidarium at Pompeii*. See Boqvenne's *T. Chassériau: Souvenirs;* Valbert-Chevillard's *Un Peintre Romantique* (1893).

Chasseurs. The Chasseurs-àpied, first organized in 1779, formed the greater part of the light infantry of the French army, and were renowned for their endurance, activity, and marksmanship. The Chasseurs-à-cheval formed a corresponding division of the mounted forces. The Chasseurs d'Afrique, first organized in 1831, served in Algeria, and were all mounted on Arab horses. The Belgian army also had chasseurs, both foot and mounted.

Chastellux, shä-te-lü', François Jean (1734–88), French army officer, was born at Paris. Having served with distinction during the Seven Years' War, he went to America in 1780 as a major general under Rochambeau, and fought for the United States until 1782. He published a number of works on diverse subjects, the best of which is undoubtedly *Voyage dans l'Amérique Septentrionale* (1786).

Chasuble (Lat. *casula*), the principal vestment worn by the clergy of the Greek and Roman churches during celebration of mass. Originally it was a secular garment worn by men and women indiscriminately, being in its first form of oval or circular shape, with a hole in the center. Its earliest restriction to priests appears in Canon xxviii of the Fourth Council of Toledo, in 633 A.D. The modern Latin form is now often a parallelogram with rounded angles, or else resembles the body of a violin in shape.



Chasuble.

In the Church of England the chasuble was enjoined as the celebrant's robe at Holy Communion by the Prayer-book of 1549, prohibited by that of 1552, but again legalized by Elizabeth in 1559.

Chat, a name sometimes applied both to the members of the thrush-like genera Saxicola and Pratincola, which include such common European birds as the wheatear (q. v.), whinchat and stonechat. The name is given in the United States to a large olive-green and yellow warbler, the yellow-breasted chat (*Icteria virens*), noted for its musical volubility.

Château, shä-tō' (Old Fr. *chastel;* Lat. *castellum*), French feudal fortress, corresponding to castle; also as generally used, a French country mansion. It enters as a component part into many French geographical names.

Châteaubriand, shä-tō'-bryän', François René, Vicomte de (1768–1848), French author, was born in St. Malo. In 1791 he visited America, travelling on the Great Lakes, over the prairies, and through the primeval forests, storing up impressions that later bore fruit in his prose epic *Les Natchez,* and the famous *Atala,* and *René.* On his return to Europe in 1792 he took service in the ranks of the *émigrés,* was wounded at Thionville, and subsequently went to England, where, in 1797, he published his *Essai sur les Révolutions,* supporting himself the while by teaching French.

Again in France in 1800, Châteaubriand established a literary reputation by *Atala,* which appeared in 1801, followed in 1802 by *Génie du Christianisme,* a vindication of the Church of Rome, seeking to demonstrate the beauty and power of Christianity. The success of the work was enormous and Châteaubriand was raised to the foremost rank of French letters. In 1806–7 he visited Greece, Palestine and Egypt, and upon his return to France published *Les Martyrs* (1809), a prose epic of the days of Diocletian. In 1814, following the fall of Napoleon, he issued a pamphlet, *De Bonaparte et des Bourbons,* declared by Louis xviii to be worth an army to the Legitimist cause. He was made a peer and a minister of state, and from 1822 to 1824 was ambassador at the British court. During the reign of Louis-Philippe he withdrew from public affairs, and occupied himself in preparing his *Mémoires d'outre Tombe* for posthumous publication.

The writings of Châteaubriand revealed new capabilities in the French language. With his magical play of color and his cunning felicity of descriptive phrase, he was the first great writer of French poetical prose, and the direct literary forerunner of Pierre Loti. In addition to the works already mentioned he wrote *Voyage en Amérique; Itinéraire de Paris à Jérusalem; Etudes ou discours historiques; Les Aventures du Dernier des Abencérages;* and various political pamphlets. His *Œuvres* were published by Sainte-Beuve in 12 vols. (1859–61).

Consult his *Mémoires* (ed. Biré, 6 vols. 1898–1900; Eng. trans. 1903); Faguet, *Etudes sur les Ecrivains du XIX Siècle;* Sainte-Beuve, *Châteaubriand et son Groupe Littéraire.*

Châteaubriant, town, French department of Lower Loire, on the Chère; 40 miles northeast of Nantes by railroad. It has several old churches and a castle, iron-founding and bell-casting, and productive iron-mines close by. Pop. 7,052.

Châteaudun, shä-tō-dun', town in the French department of Eure-et-Loir, on the Loir, 83 miles southwest of Paris by railroad. Dunois is buried in the chapel of the stately castle. Pop. 6,050.

Châteauroux, shä-tō-ro͞o', town, France, capital Department of Indre, on the Indre river; 65 miles southeast of Tours. The only edifice of archaeological interest is the Château Rauol (15th century). General Bertrand was born and died here. Manufactures include tobacco, sugar, linen, and cloth. Pop. 23,619.

Château-Thierry, shä'tō'-tyĕ'rē' (anc. Castrum Theodorici), town, France, department of Aisne, on the Marne River; 59 miles northeast of Paris. It was taken by the English in 1412, by Charles v in 1545, and by the Spaniards in 1591. Here Napoleon defeated Blücher (Feb. 12, 1814). Pop. 7,492.

In the First World War (1914–19), Château-Thierry was occupied by the Germans on September 5, 1914, and was the scene of bitter fighting in the ensuing Battle of the Marne (see Marne, Battles of), in the course of which it was retaken by the Allies.

In the Third Battle of the Aisne, Von Boehn advanced with the Seventh German Army to Verdilly, northeast of Château-Thierry, and on June 2, 1918, in a drive against the western flank of the French Army, occupied the northern part of the town and the high riverside ground as far as Chezy-sur-Marne. American troops having been brought into action on the western and southern side of the salient on June 5, counter-attacked with success west of Tarcy at the wood of Neuilly-la-Poterie, and defeated an attempt to ford the Marne at Jaulgonne, northeast of Château-Thierry. On June 7, the French and Americans took Neuilly-la-Poterie and Bouresches, in the vicinity, and the French captured the important Hill 204 above the town. (See Aisne, Battles of the).

In the opening offensive of the Second Battle of the Marne, German troops crossed the river at various points between Dormans and Château-Thierry, near which the Third and Twenty-eighth American divisions were engaged (July 15–16). Two days later Foch launched a terrific counter-stroke (the Aisne-Marne Offensive, July 18–August 6, 1918), thrusting with all his available reserves against the weak enemy flank between Château-Thierry and Soissons. Eight American divisions (1, 2, 3, 4, 26, 28, 32, 42) were employed in cooperation with the French troops. The front action extended from Fontenoy, on the Aisne, to Belleau, six miles northwest of Château-Thierry, and before the puzzled enemy could realize his danger, the French and Americans were through his defenses. By July 20 Château-Thierry was no longer tenable, and that evening Allied troops were in its streets. (See MARNE, BATTLES OF THE).

Châtel, shä-tel', FERDINAND FRANÇOIS (1795–1857), French reformer, was born at Gannat, in the department of Allier. In 1830 he definitely separated himself from the Catholic communion, and founded a new body, the 'Gallic Church.' He condemned priestly celibacy, auricular confession, and the use of Latin in the church services.

Châtelet, shä-tlā', town, Belgium, province of Hainault, on the right bank of the Sambre, 19 miles by rail southwest of Namur, with coal mines, hardware factories, and potteries. Pop. (1938) 15,000.

Châtelet-Lomont, lō-môn', GABRIELLE EMILIE, MARQUISE DU (1706–49), learned Frenchwoman, born at Paris, distinguished alike for her beauty and talent. Though married to the Marquis du Châtelet-Lomont, she formed, in 1733, a *tendresse* for Voltaire, who resided with her at her husband's château of Cirey, until 1747. Her first writing was *Institutions de Physique,* a treatise on the philosophy of Leibnitz. She also translated the *Principia* of Newton into French, accompanying it with algebraic elucidations.

Châtelineau, shä'tlē-nō', town, Belgium, province of Hainault, on the Sambre, 27 miles east of Mons. It has important iron works and extensive coal mines. Pop. (1938) 18,000.

Châtellerault, shä-tel-rō', town, France, department of Vienne, on the River Vienne, 40 miles south of Tours. It is a chief seat of the cutlery manufacture in France, and since 1820 has had a government small-arms factory. Its river-port makes it the entrepôt for the produce of an extensive district. Pop. (1938) 18,000.

Chatfield-Taylor, H. C. See TAYLOR, Hobart C. Chatfield-.

Chatham, chat'am, England, parliamentary borough, naval arsenal, and fortified town in Kent, on the Medway River, 33 miles southeast of London. Rochester to the west, and Gillingham to the east are included in the borough.

Chatham owes its importance largely to its military and naval establishments. There are infantry, royal marine, and naval barracks at Chatham proper; at New Brompton, half a mile away, are the royal engineer barracks, royal engineer institute, military hospital, and soldiers' institute; at Gillingham is a torpedo factory.

Buildings of interest are the ancient Church of St. Mary; hospital of St. Bartholomew; Jezreel's Tower, a huge pile of buildings begun by a sect called the New or Latter Day Israel, situated in Gillingham; Royal Naval hospital; and the convict prison. The dockyard, founded by Queen Elizabeth, covers over 500 acres.

In 1667 the Dutch Admiral de Ruyter sailed up the Medway and burned some ships off Chatham. Roman remains have been found in the town. Pop. (1937) 44,970.

Chatham, town, Ontario, Canada, county seat of Kent county, on the Thames River, and the Canadian Pacific, Canadian National, the Père Marquette, and the Wabash railroads. It is a shipping point for grain and agricultural produce. Industries include flour mills, sugar refinery, canning factory, tobacco factory, and manufacture of motor trucks, farm machinery, springs, automotive parts, metal furniture, filing cabinets, heating and refrigeration equipment, plastics, jute bags, cleaning compounds, and fertilizers. Pop. (1944) 18,061.

Chatham, town, New Brunswick, Canada, on the Miramichi River; 6 miles northeast of Newcastle. The three basic industries are lumbering, fishing, and farming. St. Thomas University is situated here. A Natural History Society and a hospital are also here. Pop. (1941) 4,017.

Chatham, village, New York, Columbia county, on the Boston and Albany and other railroads; 23 miles southwest of Albany. Manufactures include box boards, ladies and children's dresses, and mattress covers. Pop. (1930) 2,424; (1940) 2,254.

Chatham, WILLIAM PITT, FIRST EARL OF (1708–78), English statesman, was born in Westminster, the younger son of a Cornish squire. Entering Parliament (1735) as member for Old Sarum, he began his parliamentary career as an opponent of Sir Robert Walpole (q. v.) and as a champion of the cause of the Prince of Wales, then in antagonism to his father, and was loud in his advocacy of war with Spain, which Walpole disliked, and into which he was drawn against his better judgment. Though Walpole was defeated, no place was found for Pitt in the new ministry, owing to the dislike cherished towards him by George II. At length, however, through his great debating power and commanding influence in the house, he became Secretary of State (1756), and leader of the House of Commons.

Pitt set himself to revive the glory of Britain, dimmed by recent disasters; and with this end he sought to destroy the power of France in America and India. In 1759 Wolfe and his comrades in arms had subjected Canada, and by 1760 the French power in India was destroyed. With the death of the king and the accession (1760) of George III the great war minister received a check. He resigned in 1761, and retired on a pension of $15,000 a year, while his wife was made a peeress.

In the dispute with the American colonies over the Stamp Act (1765) Pitt played a noble part, denounced the follies of Grenville and secured the repeal of the Act. The Rockingham ministry, which had come into power (1765) on the retirement of Grenville, vainly endeavored to induce Pitt to return, and on the fall of that administration (1766) the king was compelled to ask him to form a ministry. This he did the same year, choosing for himself the office of Privy Seal with a seat in the house of Lords as Viscount Pitt and Earl of Chatham. Ill health prevented him from taking an active part in the ministry and in 1768 he resigned. He spoke strongly against the policy of the government towards the American colonies, and warmly urged an amicable settlement of the differences. When, however, it was proposed to make peace on any terms he vigorously opposed the motion and secured its defeat. He died at Hayes, near Bromley, in Kent, and was buried at Westminster Abbey.

Chatham's personal appearance was dignified and imposing, and his voice, of the most magnificent compass, added greatly to the attractions of his oratory. His upright and irreproachable character and his intense love of his country demanded the admiration of his enemies; but his affectedness and haughtiness not infrequently disgusted his friends.

Consult Thackeray, *History of William Pitt, Earl of Chatham; Chatham, Correspondence* (4 vols.); *Chatham's Letters to his Nephew.*

Chatham Chest. The 'Chest at Chatham,' later the 'Greenwich Chest,' was a fund established, on the recommendation of Sir Francis Drake and Sir John Hawkins, in 1590, for the relief of sick and wounded British seamen. Any overplus of money was placed in 'a strong chest with five locks,' of which the keys were to be kept by the principal officers of the chest. In Charles II's reign the chest was presented by the crown with 12 acres of land, and in 1688 it was granted the fines imposed by courts-martial. In 1803 the chest was moved to Greenwich.

Chatham Islands, a small group of islands in the Pacific Ocean, belonging to New Zealand; about 536 miles east of Lyttelton (N. Z.). It includes three islands, of which Chatham Island is the largest, and several rocky islets. The total area of the group is about 375 square miles (38 miles long and 25 miles wide). The soil is fertile and wheat, tobacco, potatoes, and other vegetables are raised. Sheep raising and seal fishing are the chief industries. At the time of the discovery of the islands by Lieutenant Broughton, in 1791, they were inhabited by Morioris, a race akin to the Maoris, by whom they were in time largely supplanted. Pop. 562, of which 268 were Europeans.

Chatillon-sur-Seine, shȧ'tē'yôn'sur-sȧn', town, France, department Côte d'Or, is situated on the Seine; 42 miles southeast of Troyes. Only traces of the ancient chateau from which the town derives its name remain; other places of interest are the Hospice St. Pierre, the Gothic Church of St. Nicholas, the Chateau Marmont, and the Hôtel de Ville. There is a good trade in colonial products. Pop. (1931) 4,417. In 1814 a congress of the Allied Powers was held here in a vain attempt to come to terms with Napoleon.

Chats'worth, village, Derbyshire, England, seat of the Dukes of Devonshire. The magnificent park, 9 miles in circumference, is unsurpassed in England. The present mansion, a large quadrangular building in the Palladian style, was erected in 1687–1706, with a north wing added about 1820, from a design by Sir J. Wyatville. The large collections of pictures and sculptures include many of the works of the great masters, and there are exquisite wood-carvings. At various times from 1570 to 1581 the old mansion was the place of detention of Mary Queen of Scots.

Chattahoo'chee, river, rising in the northern part of Georgia, flowing southwest and then south, forming the boundary between Georgia and Alabama, and uniting with Flint River to form the Appalachicola, which empties into the Gulf of Mexico. It is 500 miles long, and is navigable up to Columbus (200 miles).

Chattanooga, chat-*a*-nōō'g*a*, city, Tennessee, county seat of Hamilton county, on the Tennessee River and the Central of Georgia, the Nashville, Chattanooga and St. Louis, the Southern, and the Tennessee, Alabama and Georgia railroads; 4 miles north of the boundary of Georgia. It is picturesquely situated near the base of Lookout Mountain (q. v.), and has fine civic buildings, a public library, museum, and opera house. It is the seat of the University of Chattanooga, the Chattanooga College of Law, a number of private schools, and four large hospitals. The important industries are food and bakery products, iron and steel products, hosiery, textiles, machinery, furniture and woodworking, chemicals, ceramics, paper products, printing and publishing, clothing, beverages. Mattresses, agricultural implements, boxes, brick and tile, coffins, and leather products are also manufactured.

In the fall of 1863 Chattanooga became an active military theater of the Civil War and five battles of importance were fought here—the three-day Battle of Chickamauga; Battle of Orchard Knob; Battle of Lookout Mountain, known as 'The Battle Above the Clouds'; Battle of Wauhatchie, and Battle of Missionary Ridge. The National Cemetery is within the city limits, and Chickamauga and Chattanooga National Military Park is four miles south. Chattanooga has the commission form of government adopted in 1911. Pop. (1930) 119,798; (1940) 128,163.

Chattanooga, Battle of, an important battle of the American Civil War, fought near Chattanooga, Tenn., on Nov. 23–25, 1863, between a Federal army of about 60,000 under General Grant and a Confederate army of about 40,000 under General Bragg, the latter being defeated.

The battle consisted of three more or less distinct engagements. At the opening of the battle the Confederate line extended for a distance of about 12 miles, the right occupying the north end of Missionary Ridge, the center lying across Chattanooga Valley, and the left occupying Lookout Mountain. Grant planned to make his principal attack, which he entrusted to Sherman, on the Confederate right, the Federals, after capturing the north end of Missionary Ridge, being ordered to pass along that ridge so as to take the Confederate center in flank; meanwhile the Confederate center and left were to be held in place by the attacks of the Federal center and right under Thomas and Hooker respectively, and Thomas' left was to connect with Sherman's right.

On Nov. 23 Thomas made a reconnaissance in force, driving the Confederate center from its first line; on the 24th Sherman vigorously but unsuccessfully assailed the north end of Missionary Ridge; and on the same day Hooker, after passing around the end of Lookout Mountain, attacked and gained possession of that part of the Confederate line, this part of the battle, fought in the mist and rain, being known as the 'battle above the clouds.' On the 25th Sherman again attacked the Confederate right, but with little success, and in the middle of the afternoon Thomas was ordered to attack the center. The troops carried the first line of rifle pits and then without orders rushed impetuously up Missionary Ridge and soon overcame and drove away the Confederates, in one of the most spectacular and remarkable feats of arms during the war. This success placed Thomas on the flank of the Confederates opposing Sherman; they were thus forced to withdraw, and Bragg soon afterward was in full retreat. The Federal losses were placed at 5,815; Confederate, 6,687.

Consult Johnson and Buel, *Battles and Leaders of the Civil War* (4 vols.); Cist, *The Army of the Cumberland; War of the Rebellion Records* (vols xxx and xxxi).

Chattanooga, University of, a privately controlled and endowed coeducational institution in Chattanooga, Tenn., founded in 1886 by the Methodist Church. The College of Arts and Sciences and the Music Conservatory offer standard degrees in Arts, Science, Business, and Music. Pre-professional work is given in Engineering, Medicine, Nursing, and Law. The University also awards the Associate in Arts degree (Junior College), and offers two-year certificate programs in Secretarial Science and Home Economics. Through its Industrial Research Institute the University trains research workers and investigates the applied and fundamental problems of industry. All curricula are fully accredited.

Chat'tel Interest (in land), a leasehold which is personal, as distinct from real property. In the absence of statutes a lease always remains but a chattel interest, no matter for how long a term it may run.

Chattel Mortgage, an assignment or transfer of personal property as security for a loan or other obligation. As in the case of the mortgage of real property, a chattel mortgage, as distinguished from a pledge or lien, operates to vest the legal title to the property in the mortgagee, and this is the case even in the so-called equity jurisdictions in which the real property mortgage has come to be regarded as no more than a lien. Ordinarily any act which will operate to transfer title to a chattel, as a manual delivery thereof, will suffice to create a mortgage, though it is usual to employ a bill of sale or even a more formal written instrument to effect that purpose. As in the case of the real mortgage, also, equity permits the redemption of mortgaged chattels even after default in the payment of the mortgage debt. Though the process of strict foreclosure may be resorted to for the purpose of cutting off the chattel mortgagor's equity of redemption, the more usual method of accomplishing that object is a sale of the mortgaged chattels, which must, however, be conducted in strict conformity with the statutes which have generally been enacted to govern the proceeding. It is not unusual for the mortgagee to have possession of mortgaged chattels, as he is entitled to have. Where this is not the case it is usually provided by statute that the mortgage must be in writing and filed or recorded in the office of the county clerk or other proper official in order to give it priority over the claims of creditors or subsequent transferees of the mortgaged property. See MORTGAGE.

Chattels, in law, all movable goods and all property or estate not amounting to a freehold. The term covers chattels real, or personal property connected with real-estate, such as a lease; and chattels personal, which include all kinds of movable property, such as animals, money, jewels, furniture, or clothing. See CHOSE IN ACTION.

Chatterer, a name applied to a genus of tropical birds, known also as Cotinga (q. v.), and less properly, to the Waxwing (q. v.), *Ampelis garrulus.*

Chatterton, THOMAS (1752-70) English poet, was born in Bristol, the posthumous son of a poor schoolmaster. As a boy he was an insatiable reader, pouring over all the parchments upon which he could lay his hands. He was sent at the age of eight to Colston's school at Bristol and before he was fifteen was apprenticed to John Lambert, a Bristol attorney.

At this time he began to talk about a mysterious Rowley, the supposed friend and confessor of the Bristol merchant Canynge in the 15th century, and to read to friends poems which he attributed to him. In 1768 the new Bristol Bridge was opened; and the account which Chatterton sent, under the signature 'Dunelmus-Bristoliensis,' to Felix Farley's *Bristol Journal*, of the 'Mayor's first passing over the Old Bridge,' was his first published forgery. In the same year he tried unsuccessfully to get Dodsley to publish *Rowley*, and early next year (March 25) sent some specimens of old English poetry, including writings by 'Rowley,' to Horace Walpole. The first instalment was most encouragingly acknowledged, and Chatterton sent further MSS., with a statement of his circumstances, and an appeal for Walpole's interest for a place. Walpole submitted the documents to Gray and Mason, who pronounced them forgeries; whereupon he advised Chatterton to stick to his profession, intimated his doubts, but did not return the copies. Chatterton in reply asserted the genuineness of the manuscripts and twice applied for their return, but without response. Upon a further letter of July 24, Walpole, on August 4, returned both these and the boy's letters.

In 1770 Chatterton went to London, an inexperienced lad of genius, sanguine, yet cynical, too proud to acknowledge his privations, concealing them from his mother and sister by sending them handsome presents while he was starving. He lodged first with a relative in Shoreditch; next in Brooke Street, Holborn. Four months of labor brought him less than five pounds. The lad had learned something of medicine at Bristol, and now tried in vain for a post as surgeon's mate. On August 24, 1770, after destroying his papers he took arsenic and died next day. After more or less controversy on the subject it is now established that Chatterton was the sole author of the Rowley poems, many of them possessing great imaginative beauty, and it is for them that he is chiefly remembered. Consult *Lives* by Gregory, Davis, Dix, Martin, Sir Daniel Wilson, Masson, and Theodore Watts, in vol. iii. of *Ward's English Poets*, also Masson, *Chatterton*, and Ingram, *The True Chatterton*.

Geoffrey Chaucer

Chau'cer, GEOFFREY, English

poet (?1340–1400). The exact date of Chaucer's birth is unknown, but biographers assign it to 1340. Geoffrey was appointed at seventeen page to Elizabeth de Burgh, wife of Lionel, Edward III.'s third son. We next find him serving under Edward III. in the French campaign (1359), where he was taken prisoner at Retiers, in Brittany, but was released next year under the treaty of Bretigny. In 1367 he received a life pension of 20 marks (£13 6s. 8d.), as one of the 'valets' of the king's chamber. He was frequently employed abroad, travelling in Italy thrice—in 1369, in 1372 (when negotiating a commercial arrangement with Genoa), and again in 1378—while he did secret-service work in Flanders and elsewhere in 1376 and 1377. He treated with France for peace (1377), also regarding the marriage of King Richard II. (1378)—this period of his life being marked by signs of great prosperity, and for about ten years from 1374 on he held offices in the customs. John of Gaunt, to whose party the poet attached himself, granted him a pension of £10. In addition to his official income, the poet had his share of the frequent dues occurring under the feudal system. In 1386 he sat, as knight of the shire for Kent, in the Parliament held at Westminster. But misfortune now fell on him. Whether owing to genuine dissatisfaction with his work, or to the accession to power of Gloucester, the rival of John of Gaunt, Chaucer was deprived of his offices in December, 1386, and was reduced to raising money on the security of his pensions. These were also taken from him (1388), and next year he asked and received the appointment of clerk of king's works at Westminster, receiving a similar position at Windsor in 1390, besides being made one of a commission charged with the repair of the Thames banks. But he was again superseded (1391). An annual pension of £20, granted him in 1394, left him still in difficulties, and four years later he received letters of protection against arrest for debt. The accession of Henry IV., son of his old protector John of Gaunt, brought him some relief; for in October, 1399, in addition to the former grant of £20 annually from Richard, he received a new pension of 40 marks.

In dealing with Chaucer's literary production, the main fact to be remembered is that he was above all things a conscious literary artist. He strove to discover a fit measure for his verse, and to embody his thoughts in that medium, paying due regard to assonance and scansion. And his prose works, the translation of *Boethius* and the *Treatise on the Astrolabe*, show that his intellectual interest was not confined to poetry. The earliest of his poetical works whose date can be exactly fixed is the *Book of the Duchess*, written in 1369 on the death of Blanche, wife of John of Gaunt. To this early period may also be ascribed the translation of the *Romaunt of the Rose*, which we know Chaucer made, but which is not to be wholly identified with the version that has come down to us. The second period of the poet's life (1369–86) is credited with the *Parliament of Birds*, the *House of Fame*, the *Legend of Good Women*, the first draft of the *Knight's Tale*, and other works afterward incorporated in the *Canterbury Tales*, such as the Clerk's tale (*Griselda*), the Second Nun's tale (*St. Cecilia*), and the Monk's tale (*De Hugolino Comite Pise*)—all of which show the strong and direct influence exercised on Chaucer by the Italian poets. The plan of the *Canterbury Tales*, and the execution of many of them (including the writing of the wonderful Prologue), were the work of the poet's final and most troubled period. The most noticeable feature of Chaucer's genius is its strong dramatic turn, which anticipates the spirit, though not the distinctive form, of the Elizabethan epoch. Chaucer, like Cervantes, had ample experience of life; and the result is that the *Canterbury Tales*, like *Don Quixote*, are not merely a work of genius, but the embodiment of an epoch. See the Chaucer Society publications, especially the six-text edition of the *Canterbury Tales* by Furnivall. Tyrwhitt's edition of the *Tales* (1775–8) is valuable for its 'Introductory Discourse.' See also Godwin's *Life of Chaucer* (2d ed. 1804); Nicolas's *Life of Chaucer*, in the 'Aldine Edition' (1866); Todd's *Illustrations of Gower and Chaucer* (1810); Browne's *Chaucer's England* (1869); Ward's *Chaucer*, in 'English Men of Letters' (1879); Lounsbury's *Studies in Chaucer* (1892); Pollard's *Chaucer* (1893); and Skeat's *The Chaucer Canon* (1900).

Chauci, a powerful German people who dwelt on the shores of the German Ocean, between the Ems and the Elbe. Tacitus mentions them as the most noble German nation. After their invasion of Gaul, in the 3d century A.D., they are not mentioned.

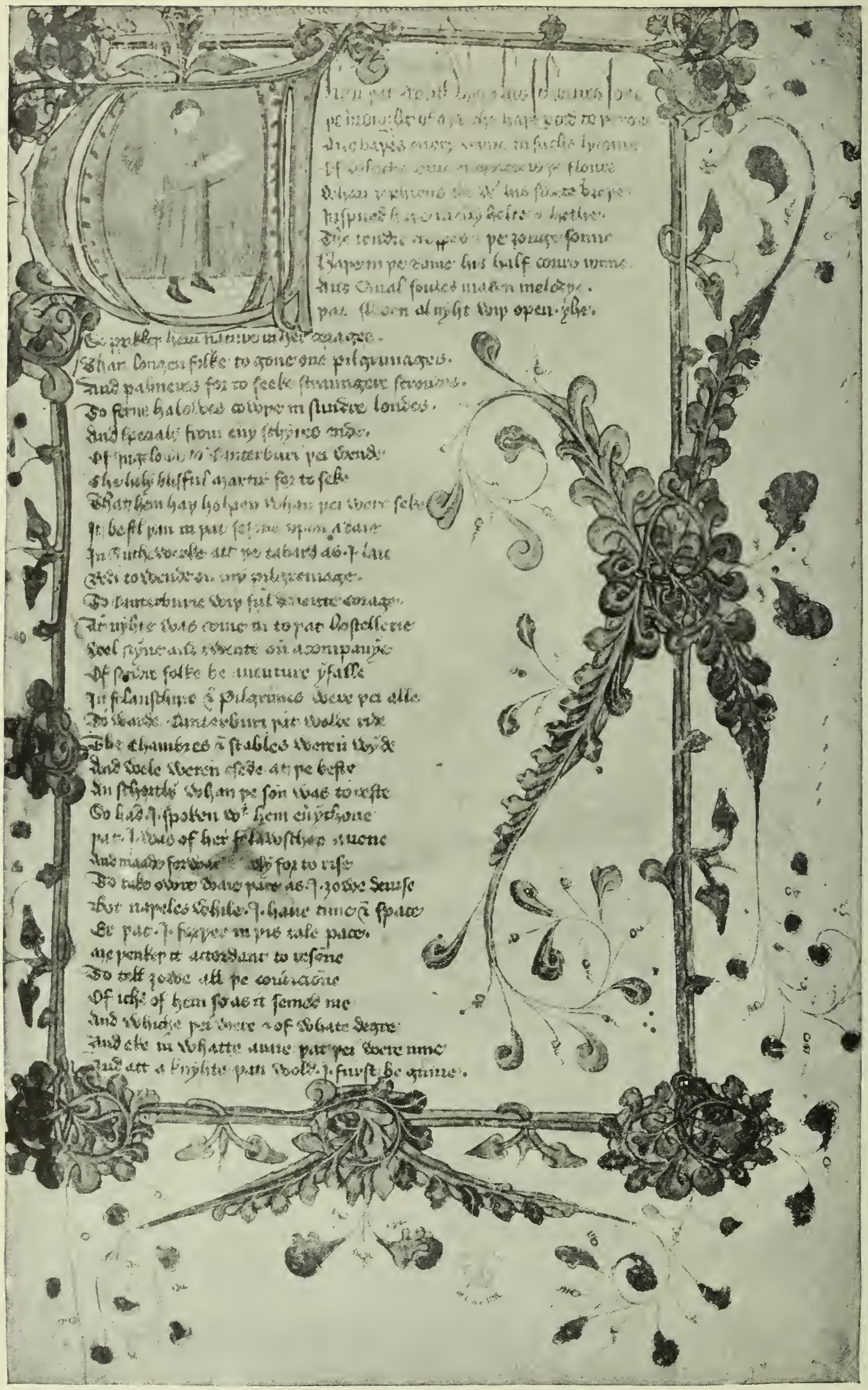
Chaudet, Antoine Denis (1763–1810), French sculptor, born in Paris. After winning the *grand prix* he went to Rome (1784), where, influenced by the prevailing enthusiasm for the antique under Canova, he produced his best-known works, *Peace*, *Paul and Virginia*, *Love* (all in the Louvre), *Œdipus*, and the bas-relief *Fine Arts* (Musée Napoléon). The original of his bust of Napoleon, which stood in the Place Vendôme till 1814, is now in the Arras museum. His work was imposing and subtle.

Chaudière. (**1.**) River, Quebec, Canada, rises near the borders of Maine, U. S., and after expanding into Lake Megantic, flows mainly N.W. to join the St. Lawrence 7 m. above the town of Quebec; 2½ m. from its mouth are the Chaudière Falls. (**2.**) Lake, an expansion of the Ottawa, Canada. It is 18 m. long and 5 m. broad, and terminates at its E. end, at the town of Ottawa, in the Great and Little Chaudière Falls.

Chaudoc, arrondissement of Cochin-China, on the lower arm of the Mekong. Area, 1,560 sq. m. Mountainous in the W., and elsewhere marshy, the country forms the plateau of Thatson, 1,300 to 1,600 ft. Produces rice, vegetables, maize, and indigo. Pop. (1894) 91,320 (Tsiams, Malays, Chinese, Cambodians, and Annamites).

Chaumette, Pierre Gaspard (1763–94), French revolutionist, born at Nevers; attached himself to Camille Desmoulins; assumed the name of Anaxagoras in place of Pierre, as the latter had the taint of religious associations. He shared a loaf of bread with Louis XVI. at his trial, but voted for his execution. He was appointed procureur of Paris, and encouraged a carmagnole dance in honor of the goddess of Reason. After excess of zeal in suspecting others he became himself suspect, and was one of Robespierre's victims.

Chaumonot, Pierre Marie Joseph (1611–93), French Jesuit missionary among the Canadian Indians, born of humble origin, near Chatillon-sur-Seine, France. Having stolen a trifling sum from his uncle, a priest (by whom he was being educated at Chatillon) to enable him to go to Beaune for the study of music under the Fathers of the Oratory there, stung with remorse and afraid of being posted as a thief should he return to his home, he undertook a pilgrimage to Rome, taught in an Italian Jesuit school, became a Jesuit himself, and fired by a *Relation* of the Canadian mission, was sent, at his own request, to Canada, arriving among the Hurons late in 1639. He thereafter worked among these Indians, living a life thoroughly characteristic of that of the Jesuits in Canada, and, after the dispersal of the Hurons by the Iroquois in 1650, lived with one remnant at Old Lorette, near Quebec. Chaumonot was the founder (1663) of the association at Quebec known as the 'Sainte Famille,'



CHAUCER'S 'CANTERBURY TALES'—PROLOGUE, PAGE 1. FROM THE MS. EDITION, BRITISH MUSEUM. THE INITIAL LETTER CONTAINS ONE OF THE FEW AUTHENTIC PORTRAITS OF CHAUCER.

the members of which, all women, bound themselves by vow to relate to each other each week all that they had learned during the week, whether good or evil, concerning other people. Chaumonot compiled a grammar of the Huron language, published by the Lit. and Hist. Soc. of Quebec (1835). His autobiography appeared in 1688; repub. 1858.

Chaumont - en - Bassigny (anc. *Calvus Mons*), cap. of dep. Haute Marne, France, 57 m. N. of Dijon, on the Marne. Here was concluded the coalition (March, 1814) between Austria, Britain, Prussia, and Russia against Napoleon—a pact which ultimately developed into the Holy Alliance. Pop. (1926) 12,892.

Chauncy, Charles (1592–1672), American educator, was born in England, and graduated (1613) at Cambridge, where he became professor of Hebrew, and later of Greek. He held various churches in England until 1637, when he was silenced by Archbishop Laud, who had been displeased with his puritanical attitude for several years. He made a recantation, which he afterward regretted. He emigrated to Plymouth, Mass., in 1638, and became minister at Scituate in 1641. He was about to return to England in 1654, when he was offered and accepted the presidency of Harvard, in succession to Dr. Dunster, the first president, a position he filled with great satisfaction until his death. Among his publications is a volume of *Twenty-six Sermons on Justification* (1659). See Mather's *Magnolia* (1702) and Fowler's *Memorials of the Chaunceys* (1858).

Chauny, industrial tn., dep. Aisne, France, 22 m. w. of Laon, on the River Oise. It manufactures chemicals and glass. Pop. (1926) 9,000.

Chaus, or Jungle Cat, an Asiatic wildcat (*Felis Chaus*), yellowish gray, little or not at all spotted, save upon the inside of the legs, and common all over India and Ceylon, where it feeds upon the small mammals and birds. It is bold and fierce, and seems rarely if ever to have been tamed.

Chausses, Fr., originally thickly padded clothing for the legs, but later that part of the mail armor which covered the legs and feet. In the 16th century the word was used to designate hose.

Chautauqua, a lake of glacial origin in the w. extremity of New York. It is 18 m. long and 2 m. wide, extending N.W. and S.E. from Mayville, 8 m. from Lake Erie, to Jamestown, at its outlet, which drains into the Ohio R. Its shores are the site of the Chautauqua Institution (*q.v.*)

Chautaqua Institution. A system of popular education inaugurated in 1874 by Lewis Miller and Rev. John H. Vincent as the Sunday-school Assembly. The place chosen was on the shores of Chautauqua Lake, in western New York. The first meeting, lasting two weeks, was well attended, and comprised courses of biblical study, a normal department, lectures, and recreation. A novel feature was a relief map of Palestine, 300 feet in length, laid out by the lake. In the following years the development was rapid, sessions were lengthened to two months and courses of study were provided in a large variety of subjects. As now organized, the institution has schools of English, modern languages, classics, mathematics and science, social sciences, pedagogy, religious teaching, library training, music, fine arts, expression, physical education, domestic science, practical arts, and arts and crafts. The institution yearly attracts a large body of teachers and adult students. The buildings include residence cottages, gymnasium, and concert and lecture halls of large capacity. The cost of the courses is low and various forms of entertainment are free to all in attendance, who pay a fee on entering the community. The class work of the summer sessions is supplemented by the Chautauqua Literary and Scientific Circle, a system which consists of the enrolment of readers for a four years' course of home study controlled by a committee of the institution. The course includes reading in specified fields in which books, in part prepared for this special purpose, are recommended, and the preparation of written analyses of the work done. Guidance is afforded in the monthly *Chautauquan*. Some 200 assemblies, modelled on Chautauqua, exist in the United States.

Chauvenet, William (1820–70), American mathematician, was born at Milford, Pa., and graduated (1840) at Yale. He was appointed professor of mathematics in the U. S. Navy (1841), and in 1842 was appointed to the same position at the naval asylum in Philadelphia. Chauvenet took part in the establishment of the U. S. Naval Academy at Annapolis, Md., and filled mathematical and astronomical professorships there until obliged by ill-health to resign in 1869. He devised many original methods of solving mathematical problems, which were embodied in his recitations at Yale. His text-books include *Treatise on Plane and Spherical Trigonometry* (1850), *Manual of Spherical and Practical Astronomy* (1863). See Memoir in Biographical *Memoirs of the Academy* (1877).

Chauvinism, exaggerated patriotism, corresponding in France to English and American 'jingoism.' Nicolas Chauvin was a veteran of the republic and the first empire, whose name became a synonym for the blind idolatry formed by Frenchmen for the first Napoleon and his *régime*. Chauvin was introduced as a patriotic character on the stage by several writers—by Bayard and Dumanoir in *Les Aides-de-Camp* (1847), by Scribe in *Le Soldat Laboureur*, and especially as the principal character in T. and H. Cogniard's vaudeville *La Cocarde Tricolore* (1831).

Chaux de Fonds, La, tn. (alt. 3,245 ft.), canton, Neuchâtel, Switzerland, 19 m. by rail N.W. of Neuchâtel. Its rise and prosperity are due to the watchmaking industry. Pop. about 36,300.

Chayote, cha-yō'teh (*Chayota edulis*), an edible perennial vegetable growing on vines, allied to the cucumber, introduced originally from Central America and Mexico, and now cultivated in many warm parts of the world including the southern United States and California.

Chayotes differ much in size, general appearance and color. They vary from a few ounces to several pounds in weight; in hue, from ivory-white to dark green; and as to surface, from perfectly smooth to prickly and corrugated. But all have a single soft, edible seed running lengthwise through the fruit. This seed often begins to sprout soon after picking, but the sprouting does not affect the edible quality of the fruit.

Many dishes are prepared from chayotes. They are used in salads or as pickles, or they may be fried, creamed, stuffed or baked with cheese, etc.

Chayotes are planted in spring after the last frost. They grow in any well-ploughed and fertilized soil but thrive best in a rich, well-drained, sandy loam. They need a great deal of room and should be planted twelve feet apart. Some sort of support should be furnished for the vines. A tree, fence or out building may serve for raising chayotes on a small scale; otherwise large T trellises will be found essential. See bulletin of the United States Department of Agriculture. Bureau of Plant Industry, Office of Foreign Seed and Plant Introduction, *the Chayote* (1919).

Chazy, a thick black or gray limestone, is a member of the Ordovician (Lower Silurian) of N. America, and succeeds the Calciferous, or Beekmantown, and is itself overlain by the Trenton. It is full of fossil shells, and when polished is often used as an ornamental stone. Often it is magnesian. In Canada it covers considerable areas around Ottawa and Montreal, and it occurs also in New York, and its equivalents occur in the Mississippi Valley and the Rocky Mountains. Its principal fossil is *Maclurea magna*.

Cheadle. (1) Parish and township, Cheshire, England, near the Mersey, 3 m. s.w. of Stockport; has bleaching and printing works. Pop. (1921), with Gatley, 8,860. (2) Parish and markt. tn., Staffordshire, England, 13 m. N.E. of Stafford, with collieries, silk-mills, and a large tape factory, manufactures of brass, copper, and tin. Pop. (1921) 6,178.

Cheapside, a street in London, England, extending between St. Paul's Cathedral and the Poultry. It was originally known as the Cheap or West Cheap, and in the 14th century jousts and tournaments were held there. Edward III., in 1327, in the foundation charter of the Goldsmiths' Company, ordered them to keep their shops in the High Street of Chepe. In the middle of the street stood the standard, which in the 16th and 17th centuries was the usual place of punishment for great offences, and for the burning of seditious books.

Cheating. See FRAUD.

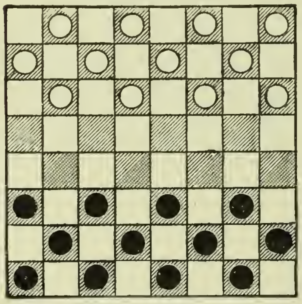
Cheboygan, city, Mich., co. seat of Cheboygan co., 15 m. S.E. of Mackinaw, on L. Huron, on the Cheboygan R., and on the Mich. Cent. and the Det. and Mack. R. Rs., and several steamboat lines. It has some manufactures and a considerable fish industry. Pop. (1920) 5,642; (1930) 4,923.

Check, 'a bill of exchange drawn on a bank, payable on demand,' and the rules as to such bills apply generally to checks. If the bank on which it is drawn has funds in hand belonging to the drawer it is bound to honor it, unless the check is stopped by the drawer, or the bank receives notice of the drawer's death, or that he has committed an act of bankruptcy. Payment by a bank of a check in good faith and in the ordinary course of business exempts it from liability should it subsequently appear that the indorsement of the payee or any subsequent indorsement was forged. It is not, however, protected when it pays a check on which the drawer's signature is forged, as a bank is presumed to know its customer's signature. Checks are payable in order of their presentment, and an unreasonable delay in the presentment of a check will relieve the drawer of liability if the bank in the meantime suspends payment, provided the depositor had sufficient funds in the bank to pay the check if it had been reasonably presented and he has suffered by the negligence of the holder. A reasonable time is a question of fact in each case. A check must contain an order to pay a fixed and definite sum of money and the words of negotiability which are *to order or to bearer*. A check is conditional payment only. See BANK.

Checkers, or DRAUGHTS, one of the most ancient forms of recreation. Rameses III., as depicted on the walls of Thebes in Egypt, is playing checkers with a lady; and the British Museum has many specimens of ancient Egyptian draughtmen and draught boards.

The game of draughts is a contest between two parties, each having twelve pieces or men, those of one side being dark and those of the other light in color. The game is played on a chessboard—*i.e.* a square board divided into sixty-four square spaces, colored alternately dark and light—and the men are placed on squares of one color only; but the double-corner of the color played on must be at the players' right. The men are thus arranged when the game begins:

WHITE PLAYER.



BLACK PLAYER.

The players cast lots for the choice of men, black making the first move; and for each succeeding game the players change colors, the blacks always making the first move.

The object of the game is to capture all the adversary's men, or to fix them so that they cannot move. Each player in turn moves one of his men one square forward on the same color, that is, diagonally. If two opposing men meet (*i.e.* occupy adjoining squares), neither can advance against the other; but if either has an empty square behind him, then the opponent at his next move jumps over the man, who is thereby captured and removed from the board, and the victor occupies the empty square behind him, thus advancing two squares. If there are two or more of the opponent's men in front, each with a vacant space behind him, all can be captured at once and the capturer occupies the square behind the last man taken. When a man has been advanced to the last row in the enemy's camp (*i.e.* to the farthest end of the board) he becomes a 'king,' and his rank is marked by 'crowning' him with another piece of the same color. The player who has the power of capturing is bound to do so; if he does not, his adversary has a choice of three penalties before making his own move—he can either remove from the board (*huff*) the hostile man that could have captured, or he can insist on his enemy revoking the move he has made, and taking the man or men who were liable to capture, or he can allow the enemy's wrong move to stand. A king is like other men in all respects, except in his power of moving backward and forward; he is equally liable to capture; and captures in the same way, except that he can also capture backward. If a player about to move touches a piece, he must play that piece if it is possible. There are, however, several other varieties of the game. In France the Polish game is almost universal. In this the board has a hundred squares, and each player has twenty men. In Germany a game is frequently played, when the ordinary men can move one space backward or forward (like our kings), while the kinds can move any distance backward or forward. See Sturges, *Guide to the Game of Draughts;* Denvir's *Traps and Shots* (Chicago 1905); Atwell's *Scientific Draughts*, and *Spalding's Home Library*.

Checquy, CHECQUI, or CHECKY, in heraldry, signifies small squares of different tinctures, composing the field or the charge of a shield or escutcheon. The word also survives in our term 'check,' a cloth pattern, and is supposed to have originated not only the word 'exchequer,' but 'Chequers' as the sign of a public-house.

Chedorlaomer, King of Elam, chief of the four kings in their victorious campaign against the five rebel Canaanite princes (Gen. 14). The victors captured Lot, but he was rescued in a night attack by Abraham (Abram). Chedorlaomer is Kudur-Lagamar —*i.e.* 'servant of Lagamar,' an Elamite god—and while the whole narrative has fallen under the suspicion of the higher criticism, the name Kudur-la-ukh-gamar has been read on a tablet of Hammurabi, king of Babylon.

Cheduba, or MAN-AUNG, a fertile and wooded island on the E. coast of the Bay of Bengal, near Arakan, British Burma. Area, 240 sq. m. Rice and tobacco are the chief crops. Petroleum is also found. Pop. about 24,000.

Cheera. See Chira.

Cheese, a food product obtained by coagulating the caseine of milk and incorporating a large proportion of the fat. It has been known from early times. Its use has been noted among the Jews, Romans, Greeks, and the nomadic tribes of Asia and Africa and it was a common food material long before butter was known.

There are many kinds of cheese, depending upon the kind of milk used and the treatment it is subjected to in the process of making and curing the product. Some kinds are hard, while others are soft or midway between; and in flavor there is great variation. In the common Cheddar cheese of the United States and England the milk is curdled with rennet extract, a soluble ferment found in the fourth stomach of calves, the curd separating from the watery whey and holding mechanically a large proportion of the fat. The milk must be free from taint or odor, or undesirable fermentations will develop in the subsequent operations. It is 'ripened,' or allowed to develop a certain degree of acidity, which assists the action of the rennet. The latter is due to an enzyme (pepsin) which has the property of throwing the caseine out of the state of semi-solution in which it occurs in milk. From 10 to 15 minutes is required to curdle the milk, and the curd is then cut into small pieces by curd knives, the object being to allow the whey to separate; the cubes of curd contract and thus expel the whey, the latter process being accelerated by heating and stirring to develop more acid. Much skill is required at this stage to retain the fat, which is only held mechanically, and may be lost in the whey. During this heating a definite chemical compound is formed by the union of the caseine and the lactic acid developed, and this process must not be allowed to go too far.

The cheese-maker judges the progress by a simple test—namely the stringing of the curd when touched to a hot iron. When the consistency of the curd becomes right the whey is drawn off and the curd collected in the bottom of the vat, where it mats together. The mass is cut into blocks and turned to keep the heat uniform, and when the threads, drawn out by touching to a hot iron, are 2½ to 3 inches long, the curd is milled to break it up and salted. The salt helps to harden the curd and checks the development of acid. The mass is then wrapped in cloths and pressed to remove the remaining whey.

After the first pressing it is usually placed in moulds or hoops and pressed again. It is then placed on shelves in the curing room and allowed to 'ripen,' a process requiring several weeks, and often months. During the process the flavor is developed and the tough curd is 'broken down' or digested through the action of the pepsin in the rennet and probably also that of a natural ferment of the milk, known as galactose. A temperature of 40–45° F. is recommended for what is known as cold curing, although temperatures considerably below freezing have been employed. Much cheese is marketed very green, but is rubbery, lacking in flavor and not considered as digestible. Cheese making was formerly carried on by 'rule-of-thumb' methods, but in recent times the processes have been thoroughly worked out by the various experiment stations, so that the underlying principles and the conditions affecting the operations are well understood. In making cottage cheese, or 'smierkase,' the milk is curdled by allowing it to sour, or by the addition of an acid to fresh milk, and the cheese is salted and eaten fresh.

The principal English cheeses are Cheddar, Stilton, Cheshire, Gloucester, Dorset (blue), Wensleydale, and Cotherston. The most popular foreign cheeses are Schweitzer or Emmenthaler(also known as Gruyère), Roquefort, Edam Gouda, Gorgonzola, Parmesan, Neuchâtel, Camembert, Limburger and Brie. The last four are soft cheeses, and Roquefort is a semi-soft variety. The characteristic flavors of the foreign cheeses are due largely to the bacteria or moulds which are active in ripening and in some cases goats' milk is employed. Various fancy brands of cheese such as 'Club House,' 'Canadian Club,' 'Snappy' and other brands put up in jars in the United States and Canada, are made by grinding Cheddar cheese with the addition of cream or butter, and some flavoring materials. Soft cheeses are made by allowing the curd to drain, without pressure, upon inclined mats of straw. Many of the foreign cheeses such as Edam, Schweitzer, Neuchâtel and Roquefort are now made in the United States, but most of the cheese made there is Cheddar, and it is made largely in cheese factories rather than at farm dairies, the milk being hauled to the factory from the farms of its patrons. There are now more than 3,000 cheese factories in the United States. Different grades of cheese are recognized, according to the kind of milk used—whether whole milk or skim milk. These grades have been fixed by State and Federal laws.

Cheddar cheese made from whole milk contains about 34.38 per cent. of water, 32.71 per cent. of fat, 26.38 per cent. of protein and 6.53 per cent. of sugar and ash. This is a general average from which there may be considerable variation, according as more or less water is incorporated or left in the cheese. It will be seen that the fat is considerably in excess of the protein. In skim cheese the water runs considerably higher, and the fat drops to 15-17 per cent. The production of cheese in the United States in 1925 was 443,514,000 pounds not including cottage and pot cheese, New York and Wisconsin being the two principal cheese-making States. In 1926, 62,412,016 pounds of cheese were imported chiefly from the Netherlands and Switzerland.

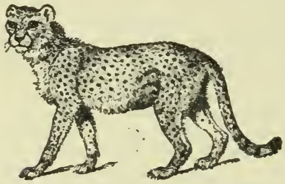
Food Value. As a food cheese is highly nutritious and a valuable source of energy. It is highly concentrated and therefore should not be taken in large quantities, particularly by persons of sedentary habits, but experiments have shown that 95 per cent. of its fat and 92 per cent. of its protein is ultimately digested and that well cured cheese is more readily digested than 'green' cheese. Cheese has considerable value when used in combination with other foods such as bread, toast, macaroni, and rice, and as a dessert has an undoubted value in stimulating the secretion of the digestive juices.

Consult Decker's *Cheese Making;* Wing's *Milk and Its Products;* Bailey's *Food Products; Their Source, Chemistry and Use* (1921); U. S. Department of Agriculture, *Farmers' Bulletins 413, 487, and 960.*

Cheese-hopper, the larva or maggot of the cheese-fly (*Piophila casei*), which lays its eggs on cheese and ham. The maggots jump by bringing the ends of the body together and releasing them like a spring, moving in this way 3 or 4 inches. They are very destructive to cheeses and smoked hams.

Cheese-mite (*Tyroglyphus siro*), an arachnid which lives on cheese and dried fruits, where it forms a white crust of shed skins. See Mites.

Chee'ta, or Hunting Leopard (*Cynælurus jubatus*), a carnivore resembling the cat family in shape of head, number of the teeth, and other points, but like the dog family in the long limbs, the shape of some of the teeth, the imperfectly-retractile and therefore blunt claws. It resembles the dogs in being readily tamed, and does not display the savageness of the cats. It varies in color from a tawny to a reddish fawn tint, covered with black spots distributed everywhere except on the chin and throat. It is about 7 feet long including the tail. Widely distributed in Asia and Africa, the cheeta has long been trained for hunting purposes, and is so used at the present time in India.


Cheeta, or Hunting Leopard

Cheever, George Barrell (1807–90), American clergyman and author, was born in Hallowell, Me. He was graduated (1825) from Bowdoin College and studied divinity at Andover, being ordained pastor of a Congregational church at Salem in 1832. In 1835 he contributed to a Salem newspaper his famous temperance allegory, 'Inquire at Deacon Giles' Distillery,' for which he was imprisoned for thirty days on a charge of libel. He resigned his pastorate, travelled abroad, and contributed letters to the *Observer*. Returning to the United States, he was pastor of various New York churches. He was a zealous advocate of the anti-slavery cause. His books include *Studies in Poetry* (1830), *Lectures on the Pilgrim's Progress* (1843), *Wanderings of a Pilgrim in Switzerland* (1846), *God against Slavery* (1857).

Chefoo, chē'fo͞o', city, China, in the province of Shantung, at the entrance of the Gulf of Pe-chi-li. It has a comparatively mild climate and modern sanitary arrangements in the foreigners' quarters, by whom it is much frequented as a health resort in summer. The harbor never freezes but men-of-war and vessels of deep draught cannot approach within six miles and landing is made by means of sampans. The chief exports are silk, straw-braid, vermicelli, beans, groundnuts, and bean-cake. The port was open to foreign trade in 1862. It played a considerable part in the Russo-Japanese War; and before the fall of Port Arthur many steamers ran the blockade between Chefoo and the Russian garrison. It is a coaling station for foreign navies. Pop. (1921) 83,300.

Cheilanthes, kī-lan'thēz, a genus of small ferns of the subdivision Polypodiaceæ, which have the sori terminal on the veins, and the indusia roundish and not continuous. The species are mostly half hardy, and easy of cultivation under glass. They are, however, intolerant of water about the fronds. Among the more interesting are *C. Clevelandi*, *C. Fendleri*, *C. tomentosa*, *C. gracillima*, the lace fern, which does well in the open air, and *C. farinosa*, a native of Luzon, P. I., with black stems and dark green fronds having pure white on the under sides.

Cheiranthus, kī-ran'thus, or Wallflower, a genus of hardy and half-hardy cruciferous plants, characterized by their long flattened pods, or siliquas, that open by two valves, by their stigmas being composed of two spreading lobes, and by their calyx being erect. The lovely, fragrant flowers are borne in long racemes. The biennial or perennial *C. cheiri*, the European wallflower, is the best known species.

Cheiromancy. See Palmistry.

Cheke, Sir John (1514–57), English renaissance scholar, was born in Cambridge. He was educated at Cambridge University and in 1540 was elected first regius professor of Greek there. He introduced into England a new pronunciation of Greek, which held sway until comparatively recent years, when what is known as the Continental system came into vogue. He also advocated a phonetic system of English spelling. He was secretary of state during the brief reign of Lady Jane Grey; obtained Mary's pardon, and permission to go abroad. But in 1556 he was treacherously seized on the Continent and brought back to England to make a public recantation of his Protestantism, dying a few months later a broken hearted man.

Chekhy. See Bohemia.

Chekhov, che'kof, Anton Pavlovitch (1860–1904), Russian dramatist and short story writer, was born in Taganrog. He was educated for the medical profession but decided to follow a literary career. His earliest work was a series of humorous sketches under the pseudonym 'Chekhonte,' but he soon devoted himself to more serious writings and attained an extraordinary popularity among his countrymen and in England. In 1890 he went to Sakhalin to visit the Siberian prison, an experience which made a lasting impression on him. His death at the comparatively early age of 44 cut short a most promising career.

His writings include more than 100 short stories, several plays and a novel. Most of them have been translated into French and German and a few into English, notably, *Philosophy at Home*, *Sorrow*, *In Exile*, *Darling*, *Terrible Night*, *The Black Monk and Other Stories*, *The Sea Gull*, *The Cherry Orchard*, *The Swan Song*, *The Three Sisters* and *Uncle Vanya*. His work is characterized by strict realism, a delicate sense of humor, and a shade of pessimism. His plays have only the slenderest of plots, being rather more character studies and depending upon dialogue for the development of the theme. By some English critics he has been acclaimed as the greatest short story writer of modern times.

Che-kiang, chē-kē-äng', or Cheh-kiang, maritime province of China, in the eastern part includes many islands lying off its coast; area about 36,600 square miles. It is hilly throughout and traversed from southwest to northeast by the Nan-shan range, which runs in parallel ridges intersected at right angles by the rivers. Before the Taiping rebellion it was one of the richest and most thickly populated provinces in China. It is still the centre of the silk trade, but its capital (Hang-chou) and chief towns—Shao-hing, Lanki, and Hu-chou (with important silk industries, tea trade, and coal mines)—have never fully recovered from the destructive effects of that rising. In 1842 the population was estimated at over 30,000,000, and in 1925 at about 13,950,000. Poor in minerals (though coal exists in the north and iron ore in the south), the province produces silk, green tea, rice, wheat and other grains, and valuable trees, including the varnish, white wax, and bamboo. It has also rich fisheries off the coast, that of the cuttle-fish, from which sepia is manufactured, being noteworthy. Off the coast of Che-kiang is the Buddhist sacred island, called Puto.

Chelan, shē-lañ', lake of glacial origin, situated at an altitude of 1,080 feet, on the eastern slope of the Cascade Range in Washington. It is about 50 miles long, with an average breadth of about 2 miles, and is walled in by steep and high mountains. Its shores are lined with summer resorts and there is good fishing in its waters.

Chelmsford, market town, England, in Essex, 29 miles northeast of London. The leading industries are the manufacture of agricultural implements, iron foundries, engineering works, flour mills, breweries, and malt works. There is also an active trade in grain. Pop. (1921) 20,761.

Chelmsford, town, Massachusetts, in Middlesex County, on the New York, New Haven and Hartford and the Boston and Maine Railroads; 4 miles southwest of Lowell. It has box-making and woollen and worsted industries. Pop. (1910) 5,010; (1920) 6,573.

Chelmsford, Frederic Augustus Thesiger, second Lord (1827–1905), British general, who succeeded to the title Lord Chelmsford in 1878. He served in Crimea, Indian mutiny, and Abyssinian campaigns, and attained the rank of general in

1888. In January 1878, he became commander of the forces and lieutenant governor of Cape Colony, in which capacity he subjugated Kafraria. He was in chief command during the Zulu War of 1879, and on July 4 he decisively defeated the Zulus at Ulundi. For his services he received the Grand Cross of the Bath, and in 1884 was appointed lieutenant governor of the Tower of London. He retired in 1893.

Chelsea, chel'si, a residential section of London, on the north bank of the Thames. The embankment, a fine promenade opened in 1874, stretches from Chelsea Bridge to Battersea Bridge, a distance of over a mile. Noteworthy features are Chelsea Royal Hospital, built by Wren (1682–92), a refuge for old and disabled soldiers, Victoria Hospital for Children, Cheyne Hospital for Sick and Incurable Children; Chelsea Old Church, probably founded in the middle of the 12th century; Crosby Hall, a magnificent mansion built in Bishopsgate in 1466, and brought to Chelsea in 1910; and Cheyne Walk, an attractive row of red-brick Georgian houses, several of which were at one time occupied by such famous personages as George Eliot, Thomas Carlyle, Leigh Hunt, and William de Morgan. Chelsea has been the home of artists and literary people from the sixteenth century to the present day. Here lived Sir Thomas More, Queen Elizabeth (then Princess), Anne of Cleves, Sir Hans Sloane, Turner, Whistler, Rossetti, Henry Fielding, and other celebrities. Ranelagh Gardens, once famous as a fashionable resort, now form part of Chelsea Hospital gardens. Pop. (1938) 56,050.

Chelsea, city, Massachusetts, Suffolk county, on the Boston and Albany, and the Boston and Maine railroads; 2 miles north of the State House in Boston, and between Charlestown and East Boston, connected with the former by a bridge and with Boston by ferries. Important institutions and buildings include a U. S. Marine Hospital, Naval Hospital, Soldiers' Home, the Masonic Temple, Odd Fellows' Hall, and Chelsea Public Library; also an Elks' and Knights of Columbus' Building.

Manufactures include furnaces, stoves, pottery, cotton, woolen and rubber goods, hardware, leather, and shoes. The place was settled in 1626. Pop. (1930) 45,816; (1940) 41,259.

Cheltenham, chelt'n*a*m, municipal and parliamentary borough and health resort, England, in Gloucestershire; 8 miles northeast of Gloucester. The town, which owes its importance to its mineral springs, discovered by accident in 1716, is situated on a plain, sheltered by the Cotswold Hills. Features of interest are the well shaded promenade; the ancient Gothic church of St. Mary; Cheltenham College; Cheltenham Ladies' College; two normal training colleges; and the museum and art gallery. The principal spas are the Old Wells (discovered 1716), the Montpellier Spa (1818), the Pittville (1830) and Chambray. Cheltenham is a favorite residential town for Anglo-Indians and retired civil servants, whence it is sometimes known as 'Asia Minor.' Pop. (1937) 51,420.

Cheltenham College, an English public school in Cheltenham, founded in 1841, and incorporated by Act of Parliament, 1894. It occupies extensive and handsome buildings, including numerous boarding houses. The popular 'Cricket Week' in August is held here.

Chelyuskin, chel-yo͞os'kin, NORTHEAST CAPE, or CAPE SEVERO, the most northerly point of Siberia and of Asia, a low promontory in 77° 41′ N. lat., on the west arm of the East Taimur Peninsula.

Chemical Energy is the energy involved in the union or disunion of atoms to form molecules. Every chemical change involves an amount of energy depending upon the nature and extent of the change in condition of the atoms involved, but chemical energy must not be confused with the energy of the disintegration of the atom itself, such as that evolved from radium (q. v.); it is rather the energy absorbed or released when two or more atoms unite or separate. In any chemical reaction, energy is either evolved or absorbed, taking the form of heat, light, or electricity. The union of two atoms of hydrogen with one atom of oxygen, for example, yields a vast amount of heat: if a kilogram of hydrogen is burned in the appropriate amount of oxygen, 34,462 calories are evolved. If, on the other hand, one undertakes to separate hydrogen from oxygen, after they have combined to form water, a corresponding amount of energy must be expended, usually in the form of electricity, to effect the disunion. Thus some reactions, as the combination of hydrogen with oxygen to form water, are *exothermic,* giving off energy, while others, as the separation of water into hydrogen and oxygen, are *endothermic,* absorbing energy.

It is possible to store up energy as chemical energy in various compounds so that it may later be released. The endothermic reaction which goes on in green leaves is a particularly good example of the conversion of radiant energy from the sun into chemical energy which can be converted into more convenient forms for use. Carbon dioxide of the air is absorbed and the carbon made to combine with water to form cellulose and other carbohydrates, releasing oxygen. This reaction is the only practicable way now known of storing the energy of the sun for the use of man, and it is a definite example of the storing of chemical energy. See CHEMISTRY; ELECTROCHEMISTRY; THERMOCHEMISTRY.

Chemical Engineering, a branch of the engineering profession, is largely responsible for the development, design and operation of plants wherein materials undergo physical and chemical changes. The development of chemical engineering as a distinct profession has been comparatively recent. Although the first curriculum called chemical engineering was established at Massachusetts Institute of Technology in 1888, as late as 1905 there were only some five colleges offering instruction on the subject. The professional society of chemical engineering, the American Institute of Chemical Engineers, was not organized until 1908.

The First World War gave a great stimulus to chemical engineering because of the great importance of explosives, gas, and other munitions that could be manufactured on a large scale only with the aid of the chemical engineer. This stimulus carried over into the post-war years resulting in the development of our large synthetic organic chemical industry. In the United States Chemical Engineering is recognized as coördinate with the older branches of Civil, Mechanical, Electrical, and Mining Engineering.

Field of Chemical Engineering.—The industries in the following groups use the services of chemical engineers; I. Heavy chemicals, such as sulphuric, nitric, hydrochloric and phosphoric acids; caustic soda, soda ash, lime and ammonia; technical salts such as salt cake, niter cake, Epsom salt, Glauber's salt, nitrates, phosphates, alum, and others. II. Fine chemicals, such as synthetic pharmaceuticals, dyes and their intermediates. III. Pulp, paper, cellulose, rayon, cellophane, artificial leather, explosives. IV. Petroleum, gas, coke, charcoal, coal tar. V. Rubber and allied products. VI. Paints, varnishes, lacquers and other protective coatings. VII. Food products such as sugar, starch, salt, and processed foods. VIII. Fertilizers. IX. Glass, refractories, enamelled products, clay products; cement and other nonmetallic building materials. X. Leather, glue, gelatin. XI. Metals and alloys. XII. Fermentation products, alcohol, solvents. XIII. Textiles. XIV. Electrochemical industries.

Representative accomplishments, many of them recent, of chemical engineering include: synthetic ammonia and nitric acid, which remove forever the threat of a nitrate fertilizer shortage; development of domestic sources of potassium salts; extraction of magnesium from sea water, giving an almost inexhaustible source of a structural metal, which is very important since reserves of metal ores are definitely limited; rayon, nylon, and other new textiles that are eliminating dependence on imported silk; high octane gasoline and other petroleum products, which have been synthesized from crude oil, making possible the development of the automobile and aircraft industry. Plastics, which are new materials of construction, are now being prepared in ever increasing numbers; synthetic resins, coupled with the development of quick-drying lacquers, responsible for revolutionizing the protective coating practice; the development of rubber technology, both natural and synthetic, including accelerators for the vulcanization process and improvements in rubber compounding, which have made available inexpensive, durable automobile tires, and with the recent great advances in the technology of synthetic rubber the United States is no longer wholly dependent on foreign sources of this very important commodity; the synthetic production of many organic compounds from coal tar and crude oil such as methyl alcohol and other solvents; the electrochemical processes including the alkali-chlorine industry, organic preparations, fused salt electrolysis for the production of light metals such as Al, Mg, Na, etc., electric furnace products such as calcium carbide, silicon carbide, fused alumina and alloy steels, and high speed continuous strip and wide electroplating.

Relation to Other Professions.—Modern chemical engineering is based on three fundamental subjects: physics, chemistry and mathematics. The chemical engineer in his work is in intimate touch with mechanical engineering, economics, and in some cases, electrical engineering. The development of the profession has been largely through chemistry. The earlier chemical engineers usually received their preliminary professional training as chemists and accumulated engineering experience in practice. Courses in Industrial Chemistry formed the accepted educational background of the chemical engineer during the pre-war period. The point of view of chemical engineering was from that of the various industries and processes; an engineer skilled in the technology of sulphuric acid, for example, had little in common, technically, with another engineer working with petroleum. There was little unity in the field; methods of design were almost entirely empirical, and the literature of the profession qualitative rather than quantitative. That such a viewpoint was not entirely without merit, however, is shown by the fact that significant and important developments, owing largely to the skillful use of chemistry in the solution of industrial problems, date from this era.

Modern Chemical Engineering—The Unit Operations.—As a result of the great stimulation of the chemical industries during the First World War, which demanded pioneering work on the engineering side of chemical engineering, it was recognized that the purely chemical approach was not adequate. A reëxamination of the problem of chemical engineering education was made, and as a result of this analysis, the conception of the 'unit operation' was adopted and has since met with widespread acceptance. This brings an entirely different viewpoint to chemical engineering, and one that has greatly modified the training of chemical engineers and brought about a considerable change in chemical engineering literature. Instead of viewing chemical engineering as a group of different isolated processes and industries, the unit operation method is based on the fact that, no matter how diverse are these processes with respect to raw materials, chemical reactions, methods of control, details of operation, economic characteristics, and finished products, they are all built of a relatively small number of fundamental unit operations. Thus evaporation, or the boiling off of water from solutions, is not only an important operation in the manufacture of common salt from brine, but is used to concentrate sugar juices before crystallizing the sugar, to concentrate pulp mill liquors, and in many other apparently unrelated industries. Distillation, or the separation of the individual materials of a mixture of volatile liquids, is an essential operation in the refining of petroleum, the manufacture of alcohol and other solvents, the separation of benzine, toluene, and xylene from the light oil obtained in coke manufacture, and many other cases. The conveying of solids is a necessary operation in many of the chemical industries, while drying is a feature of many others.

A representative list of unit operations is: Flow of Fluids; Transportation of Solids; Flow of Heat; Evaporation; Humidification and Related Operations; Drying; Distillation; Gas Absorption; Crystallization; Extraction; Filtration; Mixing; Crushing and Grinding, and Mechanical Separation.

The concept of a particular unit operation includes the basic scientific information pertinent to it, the theoretical developments that have grown up around it, the apparatus and equipment that are available to carry out the operation, the economics involved, the materials of construction used in the equipment, and the accessory devices and controls needed in its practical operation.

The Unit Processes.—Since the unit operations deal only with physical changes, either in state or in position, it has been found advantageous to adopt the idea of the unit process for the classification of chemical changes. The unit processes are the fundamental steps that are carried out in any chemical process. In any one unit process many unit operations may be involved, for example, in the nitration of cotton for the production of nitrocellulose, among others the following unit operations are employed: fluid flow, transportation of solids, mixing, heat transfer, filtration, washing, and drying. The chemical engineer by classifying chemical changes that are similar in operation but involving various starting compounds and products, has been able to unify his thought and bring advances made in one industry directly into another.

The following is an illustrative list of unit processes: nitration, amination by reduction, amination by ammonolysis; halogenation, sulfonation, oxidation, reduction, hydrolysis, esterification, diazotization and polymerization.

By classifying the problems of chemical engineering into a list of unit operations and unit processes such as above, a considerable simplification results and a hitherto unknown unity is obtained.

Chemical Technology and Chemical Engineering Economics.—Although modern chemical engineering is built around the unit operation idea, a knowledge of the unit operations alone is not enough for a broadly trained chemical engineer. The chemical industries as a whole form a closely-knit economic whole; a significant development in the technology of one of the industries usually exerts an important influence on the economic position of others; the perfection of processes for manufacturing nitrates for explosives and fertilizers from the nitrogen in the air has resulted in losses to the Chilean industry of extracting nitrates from natural deposits and decreases in the revenue to gas plants from the sale of their by-product ammonia; the great expansion of the Kraft paper industry to provide wrapping paper and pasteboard for packaging resulted in profound changes in the economic situation of sulphate of soda, which is required for the manufacture of Kraft paper; many other examples could be given. Many chemical engineers are in managerial positions and must be thoroughly conversant with broad economic principles, cost accounting, and other business subjects.

Nor is the older method of studying the individual chemical industries abandoned. Instead, however, of emphasizing the qualitative description of the industry and its processes, each industry is analyzed from the points of view of the fundamental chemistry involved, of the application of the unit operations represented in it, and of its economic interrelationship with the other chemical industries.

Theoretical Basis of Chemical Engineering.—The basic theory of Chemical Engineering is drawn largely from Physical Chemistry and Physics. The laws of the conservation of mass, of the rates of chemical reactions and physical changes, the thermodynamics of such processes, the laws covering the behavior of gases, liquids, and solids, are used freely in the study of the unit operations, and in the methods of control of industrial processes. Even when the process is purely chemical, it can be controlled only by attending to purely physical conditions such as temperature, pressure, vigor of mixing, and concentration of the substances involved.

Chemical Engineering Research and Development.—Owing, perhaps, to the fact that modern chemical engineering is still in the formative state and perhaps to the close historical association with the science of chemistry, research is stressed in chemical engineering to a considerably greater extent than in other branches of engineering. Since research has been directed along the lines of the unit operations, chemical engineers have carried out very significant fundamental investigations on such subjects as heat transmission, physical properties of such technical materials as petroleum and high pressure gases, flow of fluids, the physics of the interaction of liquids and gases and many other subjects which are at first sight more closely allied to technical physics than to chemical engineering. The chemist's habit of thinking in terms of ultimate particles and things unseen has given a characteristic viewpoint to chemical engineering investigation that is not usually found in corresponding work in other branches of engineering.

Closely allied to research is the procedure usually described as development. In converting a small scale theoretical or laboratory process to complete plant operation it is far more efficient to carry out the development in steps rather than to attempt the change from small to large scale in one step. The intermediate stages of constantly increasing scale are stages in the development, and many chemical engineers are engaged in such work. Neglect of the step-wise method in an impatience to reach the final plant usually results in unnecessarily high costs without usually saving time.

Chemical Engineering Education.—The education of chemical engineers was the subject of much discussion, considerable controversy, and rapid change during the years after the First World War. The American Institute of Chemical Engineers did important service in bringing these discussions to a head, and as a result a reasonably normal distribution of subjects of the four-year curriculum has been established as follows: Non-technical, including English, 15%; Mathematics, 12%; Physics, 8%; Mechanics, 6%; Chemistry, 28%; Chemical Engineering 12%; other Engineering, 14%; other Science, 2%; Elective, 3%.

A considerable proportion of chemical engineering graduates supplements undergraduate training by one or more years of graduate study, with emphasis given to research. The chemical industries place a premium on such work, and as a result the number of men going on to Master's and Doctor's degrees is unusual for a technical field. There is very much less training of graduates by the industries than is the case with other branches of engineering.

Consult Walker, Lewis, McAdams and Gilliland, *Principles of Chemical Engineering* (1937); Perry, *Chemical Engineers' Handbook* (1941); Read, *Industrial Chemistry* (1943); Tyler, *Chemical Engineering Economics* (1938); Fairchild, Furniss, and Buck, *Elementary Economics* (vols. I and II); McNair and Miriam, *Problems in Business* (1941).

Chemical Industry, SOCIETY OF, an international association of chemists and scientists interested in the development of industrial chemistry and the branches of industry dependent on chemical principles. The parent association, founded in London in 1881, has twenty sections: The American section, the Canadian section, the Chemical Engineering group, the Fuel section, and sections in Birmingham, Bristol, Edinburgh, Glasgow, Liverpool, London, Manchester, Newcastle, Nottingham, south Wales, Sydney, N. S. W., and Yorkshire. The American section, founded in 1894, includes all the American members. The total membership is about 7,000; the American members number about 600. The American section holds six meetings annually including three held jointly with the American Chemical Society, the American Electrochemical Society, and the Société de Chimie Industrielle, which are held in New York City. The meetings of the whole society are generally held abroad, but occasionally in America. The American Society awards the *Perkin Medal* annually for the most valuable work in applied chemistry, and the *Chemical Industry Medal* for a valuable application of chemical research to industry. The parent society awards two medals to those who have attained eminence in applied chemistry. It publishes a monthly journal *Chemistry and Industry,* the *British Chemical Abstracts* (with the Chemical Society), and the *Annual Reports on the Progress of Applied Chemistry.*

Chemical Society, AMERICAN, a society founded in 1876 in the interest of chemical and allied subjects, is now one of the largest organizations of scientists in the world, having about 42,000 members, including prominent chemists in America and foreign countries. It is organized in eighteen subject divisions and 106 local sections in various parts of the country. Headquarters is in Washington, D. C. It publishes the *Journal of the American Chemical Society; Industrial and Engineering Chemistry; Chemical and Engineering News; Chemical Abstracts; Chemical Reviews; American Chemical Society Monographs* (2 series); *Journal of Chemical Education; Journal of Physical Chemistry* (in cooperation with British societies).

Chemin des Dames, shmin de däm, a celebrated shaded road, constructed by Louis xv along the heights north of the Aisne, the scene of desperate fighting in the First World War. It was captured by the French in May 1917, and in July and August withstood fierce attacks by the German forces, who abandoned it in November. In the third battle of the Aisne, June 1918, the Germans carried the whole line of the Chemin des Dames, but in October were forced to evacuate. See AISNE, BATTLES OF.

Chemistry is the science of matter; it embraces within the scope of its investigations the entire material universe and all phenomena involving matter or its changes. The phenomena of nature it seeks to understand, explain, and classify, for by careful observation many of the fundamental laws of matter have been adduced—laws which through manifold applications have proved of greatest benefit to the human race.

The fundamental conception of chemistry, as of all science, is that we live in an ordered universe where nothing 'just happens' without relation to anything else, but where cause produces effect and similar effects may be expected from similar causes. So it is that chemists are continually searching behind observed effects for their probable causes, reproducing those causes as nearly as may be, and codifying the observed results in the hope that from them conclusions of general application may be drawn. To investigate the entire universe is a huge task; it must be divided and subdivided to make it possible for a single individual to comprehend, and add ever so little to, any of its subdivisions. It is with the various generalized parts which go to make up the science of chemistry that this discussion will deal. Before going into them, however, it will be well to consider some of the fundamental conceptions of the science and some of the great generalizations about matter, which have been so fully proved that they have been dignified by the name of laws.

When man first began to observe the world into which he was born, the evanescence of most of the things he saw overawed him. Everywhere the cycle of growth, maturity, and decay was present. Even the mountains, which of all the things he could see, most nearly approached permanence, were subject to change by volcanoes, lightning, frost, and flood. So it was that the ancient philosophers —Aristotle particularly—sought the fundamental essences of things which might conceivably be the units of matter, remaining permanent themselves and undergoing change only by union and disunion with one another. Thus it was that fire, water, earth, and air came to be regarded as the essences of matter, and of these all matter was believed to be made up. A piece of wood, for instance, when burned, was apparently separated into these four elements, fire, smoke that appeared to be air, ashes or earth, and water that oozed from the end of the stick as its middle portion was consumed. Other materials were conceived to be composed similarly of two or more of these first principles. It is interesting to note that, with the exception of the element fire, Aristotle's elements represent the three physical states of matter now recognized, solid (earth), liquid (water), and gas (air).

Many centuries passed before anything of importance was added to Aristotle's conceptions of matter, and even longer before systematic observation was introduced into the picture as an invaluable aid to mere philosophic contemplation. Aristotle had already reached, by purely mental processes, a kind of molecular hypothesis which supposed all matter to be made up of almost inconceivably minute but discrete particles. Stahl (q. v.) in the early years of the 18th century added to these ideas the conception of phlogiston (q. v.) to assist in explaining the phenomena of fire, and Robert Boyle (q. v.) gave a more definite conception to the term element, which he defined as a simple substance incapable of being taken apart into simpler ones. While the speculative theory of phlogiston served merely to stimulate interest in the relationship of energy and matter, too great importance can not be attached to Boyle's idea of elements as the fundamental building bricks of matter. Later Priestley and Scheele discovered the true nature of oxygen and gave to Lavoisier the background for the first and perhaps the greatest of the general laws of matter, that of its indestructibility.

Lavoisier was the first to apply accurate weighing to chemical experimentation; he found that whatever he might do to it, the quantity of matter involved in any experiment always remained precisely the same at the end as at the beginning. His classic experiments marked the beginning of a definitely new era in chemical thought, for the idea of weight as a definite and final criterion as to the progress of change seems entirely to have escaped his predecessors, so closely were they tied down by the heritage of purely philosophical methods left them by Aristotle and his successors.

In order to explain Lavoisier's experiments in the light of their own preconceived ideas, the phlogistonists, who held that combustion was the result of a separation rather than a union of different kinds of matter, went to the length of supposing that phlogiston, the prototype of the ancient element fire, possessed a negative weight; thus they supposed a body to gain weight when its phlogiston was separated from it in burning. Lavoisier was able to show, by heating mercury in a vessel of air, that it gained weight to precisely the extent that the air lost weight. In this process the mercury was converted from a silvery liquid to a red, powdery solid. If, now, he heated the red powder, not only did he regain the precise amount of mercury originally used, but he also recovered precisely the amount (both weight and volume) of gas represented by the diminution in the volume of air previously noted. This experiment was typical of many conducted by Lavoisier, on which he based the arguments leading to the final overthrow of the phlogiston theory and the establishment of the science of chemistry as it is now known.

As even the most precise chemical measurements have failed to reveal any facts at variance with Lavoisier's conception, it is now known as the Law of the Conservation of Matter. It is stated: *Matter can neither be created nor destroyed,* whatever other changes it may undergo. A similar law formulated by von Helmholtz, on the basis of experiments by Rumford, Joule, and others, states that energy is similarly permanent and can not be destroyed or created. However Einstein, in his theory of relativity, has proposed the idea of the equivalence of mass and energy and relates the two by means of the equation $E = mc^2$ where E is energy in ergs, m is mass in grams and c is the velocity of light expressed in centimeters per second. According to this equation when any reaction involving an energy change occurs, there is also an attendant change in mass, which may be evaluated by dividing the amount of the energy change by the velocity of light. While the principle of the equivalence of mass and energy has received ample verification in recent experiments on nuclear disintegration, the energies involved in ordinary chemical reactions are of such magnitudes that the resulting changes in mass are too small to be detected by present experimental methods and apparatus.

Considering the various materials to be essentially indestructible, we proceed to a consideration of the changes which they undergo and the laws describing these transformations. Excluding the possibility of changes occurring in the core or nucleus of the atom, we have two kinds of changes: those involving internal transformations of one kind of matter into another essentially different and those in which there is a mere alteration of external characteristics without a change of character. These two types of change may be illustrated by a simple tallow candle. If the candle be burned in the air in a closed vessel, it appears to vanish, and instead of air, tallow, and string, the vessel contains the remnant of the air (nitrogen), a gas (carbon dioxide), a liquid (water), and mineral residue in the form of ash. If, however, the vessel be weighed before and after, its weight will not have changed, although there has been a fundamental change in the very nature of the materials in it. This is called a *chemical* change, for there has been a complete transformation of the materials involved into others essentially different. If, on the other hand, the candle be simply heated without being allowed to ignite, the tallow composing it becomes a liquid instead of a solid, and it is no longer a candle. The liquid tallow, however, is different merely in appearance from the original solid, and the air in the vessel surrounding it is quite the same as before. The liquid tallow will burn quite readily on a wick, and the air about it will support its combustion, as was not true after burning the candle, as above. This change of form without change of nature is a *physical* change.

It must be borne in mind that the distinction between chemical and physical changes is not always as clearly defined as in the case cited, and that, on that account, the two sciences of physics and chemistry merge by imperceptible stages in a region as closely related to one as to the other.

Argument and disagreement frequently lead one most quickly to the truth, and thus it was that a bitter debate between two chemists of the early 19th century, Proust and Berthollet, led the former to what is now known as Proust's law, or the Law of Definite Composition. Berthollet contended that the composition of a chemical compound was not necessarily a fixed thing, but depended upon the proportions of its constituents present at its formation. Mercury, for instance, combines with oxygen to form mercuric oxide. Berthollet believed that if mercury were present in greater relative abundance at its formation the oxide would contain a relatively higher proportion of that element and if the reverse were true oxygen would predominate in the product. Proust vigorously disagreed with this view and contended that the relative proportions were of no importance, but that the one less abundant would satisfy itself by combining with the proper amount of the other, leaving a residue of the more plentiful element. In a long series of brilliant experiments he succeeded in showing the truth of this view, demonstrating, for instance, that 16 parts of oxygen and 200 parts of mercury (by weight) would form mercuric oxide and that no other ratio would serve to form that particular compound. Many other compounds were investigated, and since no instance of a true chemical compound has ever been found whose composition is not fixed, Proust's law is stated: *Any chemical compound always is made up of precisely the same proportion by weight of its constituent elements.*

John Dalton, having before him the idea of indestructible matter and Proust's law of definite composition, investigated the nature of many compounds formed by chemical change from the standpoint of their component parts (elements in the sense of the term used by Boyle) and reached a fundamental generalization of great importance. Already Aristotle's purely philosophical conception of the corpuscular nature of matter has been mentioned. He believed that there must be a final limit to any process of subdivision of matter and he called the infinitesimally minute particles, which could not be further divided, atoms. Since he was thinking in purely physical terms, the ultimate particles of matter as he conceived them are now considered to be those which can not be subdivided *without altering the nature of the substance* and they are now called *molecules*. Dalton's researches are responsible for the present idea of molecules, the ultimate physical particles, as made up of atoms, the ultimate chemical particles, and to these smaller atoms he assigned the ability to enter and effect chemical changes. Subsequent investigations have materially altered the ideas formerly held of the ultimate particle, but in general the idea of the molecule as the unit in physical change and of the atom as the chemical unit still holds.

Dalton was led to the theory of atoms by quantitative investigations of the formation of chemical compounds. He reached the conclusion that individual chemical compounds always have a definite composition and that where more than one compound of two elements exist there is a simple numerical ratio between the proportions in them. The compound of carbon and oxygen known as carbon dioxide, for instance, always has a definite proportion of carbon and oxygen in its makeup, 12 parts by weight of carbon to 32 parts by weight of oxygen. There is also a compound of carbon and oxygen containing 12 parts of the former to 16 of the latter, called carbon monoxide. Investigation of methane and ethylene led Dalton to the conclusion that 12 parts of carbon were combined in the former with 4 parts of hydrogen and in the latter with 2 parts of hydrogen. If these four, which are typical of many, be set down together, the conclusion drawn by Dalton will be clear.

	Carbon (parts)	*Oxygen* (parts)
Carbon monoxide contains	12	16(16x1)
Carbon dioxide contains . .	12	32(16x2)

		Hydrogen (parts)
Ethylene contains	12	2(2x1)
Methane contains	12	4(4x1)

In other words, a fixed amount of carbon combines with a definite amount of oxygen (or hydrogen) as in carbon monoxide (or ethylene), or with precisely twice that amount, as in carbon dioxide (or methane). The Law of Multiple Proportions is stated: *When two elements unite to form more than one compound the weights of one uniting with a fixed weight of the other stand to each other in a simple numerical ratio expressible by simple whole numbers.*

Dalton reasoned even beyond this important conclusion and sought a reason for its being so. In so doing he postulated the atomic theory which he stated briefly as follows:

'(1) Every element is made up of extremely small indivisible particles called atoms.

'(2) The atoms of different elements possess different masses, but all those of the same element possess the same mass.

'(3) Chemical compounds are formed by the union of atoms in simple numerical proportions.'

Dalton's theory has contributed greatly to progress in science. One can understand Proust's law of definite composition and the law of Multiple Proportions if one considers reactions to take place on an atomic basis. Chemical reactions, according to Dalton's theory, consist in a grouping or regrouping of atoms with an attendant change in properties of the substances involved. The advance of science has, however, necessitated a modification of the second postulate. It has been definitely established that the atoms of some elements possess different masses. These atomic species of the same element are called isotopes. Their existence, however, in no way invalidates the laws of definite and multiple proportions.

No one has ever seen an atom, nor has a single atom—or for that matter a single molecule made up of many atoms—been isolated; yet the relative weights of these infinitesimally minute particles are known with far greater accuracy than that with which it is ordinarily possible to determine the weight of a man. The reality of the atom can no more be doubted than the reality of any material thing. In every field of chemistry the atom is the fundamental unit, better understood now than in Dalton's time, but essentially the same. The disintegration of radium atoms, giving off relatively huge quantities of energy and in the process becoming atoms of other kinds, and the more recent discoveries of isotopes, *i.e.*, atoms of the same kinds but of slightly different masses, have had a tendency to alter some of the conclusions drawn by the application of the original atomic theory, but its value to the chemist has not been seriously impaired.

The next important additions to chemical theory were made by Gay-Lussac and by Avogadro. Gay-Lussac showed that *chemical reactions between gases occur always between volumes* (*under the same conditions of temperature and pressure*) *bearing simple numerical ratios to each other and to the volume of the resulting product, if it be gaseous.* In other words, two volumes of hydrogen combine with one volume of oxygen to form two volumes of steam (water in the gaseous state). From this he concluded that equal volumes of gases of elements contain equal numbers of atoms. Avogadro went a step further by adding the conception of molecules, advancing the theory that *equal volumes of all gases under the same conditions of temperature and pressure contain the same number of molecules.* The molecules he believed to be the ultimate physical particles formed by the union of atoms, whether they be of the same or different kinds.

The adoption of this molecular hypothesis results in a number of important deductions, a few of which can be merely touched on here. One of the most immediate of these concerns the molecules of elementary gases. As has been pointed out, a given volume of oxygen unites with twice its volume of hydrogen to form twice its volume of steam. According to the molecular theory, therefore, a certain number (n) of molecules of oxygen unite with twice that number ($2n$) of molecules of hydrogen to form twice that number ($2n$) of molecules of steam, so that *one* molecule of oxygen goes to produce *two* molecules of steam. The molecule of oxygen, therefore, can not consist of a single atom, which is indivisible, but must be composed of an even number of atoms—two at least. No facts with which we are acquainted require the assumption of more than two atoms in each molecule of ordinary oxygen gas; consequently that number is adopted, as being probably the correct one. Similar observations lead to the same conclusions in the case of the great majority of elements which can be obtained in the state of gas or vapor, but not in all. The molecule of phosphorus must contain at least four atoms, because phosphorus vapor, uniting with six times its volume of chlorine, produces four times its volume of the compound called phosphorus chloride. On the other hand, there are certain elements which do not give any evidence of containing more than one atom in the gaseous molecule, for example, mercury and the rare gases. Certainly elements have different molecules under different conditions; thus, assuming that ordinary oxygen gas has two atoms in each molecule, ozone is composed of molecules containing three similar atoms. The conclusions derived from the molecular theory are of the greatest importance in deducing which of the possible values of the combining weights of the various elements (as obtained by direct experiment) should be adopted as the relative atomic weights of these elements.

Avogadro arrived at his conclusions from consideration of Gay-Lussac's law and of the physical laws of gases already formulated by Boyle and by Charles. While the last two deal with relations between purely physical quantities, volume, pressure, and temperature, their connection with chemical phenomena is so intimate, and the insight they give into the character of gases (and of dilute solutions, as we shall see later) is so deep that they must be considered here.

Boyle discovered that *the volume of any mass of a perfect gas varies inversely as the pressure upon it,* provided its temperature be unchanged. Thus, if a certain amount of gas occupies a volume of 100 liters under a pressure of one atmosphere (1033.2 grams per square centimeter or 14.696 pounds per square inch), it will occupy a volume of 50 liters if the pressure be increased to 2 atmospheres. Mathematically, Boyle's law may be expressed in either of two convenient ways: $\frac{P_1}{P_2} = \frac{V_2}{V_1}$, or $pv = \text{constant}$, for any given mass of a perfect gas at constant temperature.

Charles observed the effect of temperature on the volume of gases at constant pressure and found that the volume of a given mass of gas at 0° c. was increased by 1/273 of itself for each degree (centigrade) of rise of temperature and that each degree of reduction of temperature caused an equal diminution of volume. In other words, if one measures a volume of 273 cubic centimeters of a gas as 0° c., and at any convenient pressure, and then raises the temperature of the gas to 10° c., its volume will then be found to be 283 c. c. If, on the contrary, the temperature be lowered to −10° c., the volume will be found to have decreased to 263 c. c.

It would thus appear that gas volume would completely disappear if so low a temperature as −273° c. could be reached. Because of this relation between volume and temperature of gases, the temperature of −273° c. has been called absolute zero; no cold so far produced has reached this low value. Even helium, the most difficult of all known gases to liquefy, is a solid at the lowest temperature yet reached (within a fraction of one degree of the theoretical absolute zero), and hence it has been impossible to obtain definite experimental proof of the absence of gas volume at absolute zero. However, by constructing a temperature scale based upon this known behavior of gases, it is possible to state Charles' law mathematically. This scale of temperature, known as the Absolute or Kelvin (from Lord Kelvin who first proposed it) scale, is obtained by adding 273° to temperatures expressed on the centigrade scale. Thus the freezing point of water is 273° A., and its boiling point 373° A. Expressing temperature by this absolute scale, Charles' law becomes: $\frac{V_1}{V_2} = \frac{T_1}{T_2}$, or $\frac{V}{T}$ = constant, for any given mass of a perfect gas at constant pressure. It may also be stated: *At constant pressure, the volume of any mass of gas varies directly as its absolute temperature.*

The general law of perfect gases combines these two in a single equation, $PV = RT$, in which P represents pressure, V volume per gram molecular weight of gas, T absolute temperature, and R a constant dependent upon the mass of gas under consideration and the units used to express the volume and pressure. This expression has great significance in all problems involving gases and dilute solutions, whose behavior is in many respects similar. It must be noted, however, that it is predicated upon a *perfect* gas. Various modifications have been proposed to make it precisely applicable to actual gases (notably the equation of van der Waals), but except where the utmost accuracy is required, a condition seldom met, these are unnecessary. All gases well above their critical temperatures —the critical temperature of a gas is that above which it can not be liquefied by increased pressure —closely follow the gas laws.

With this variability of gas volumes in mind, it is obvious that three factors are necessary to define a quantity of gas: volume, pressure, and temperature. Weight alone would, of course, serve the same purpose, but the weighing of gases is not an easy task, while the measurement of volume is comparatively simple. To avoid the necessity of either cumbersome weighings or the statement of all the factors involved in defining volume, it is customary to refer gas volumes to standard temperature and pressure (S.T.P.) or normal temperature and pressure (N.T.P.). These two terms designate a temperature of 0° C. (273° A.) and a pressure of one atmosphere (760 mm. of mercury) and in all calculations involving gas volumes observed values are converted to this basis of comparison by the application of the gas laws given above. Under these standard conditions of temperature and pressure, 22.4 liters of a gas weigh as many grams as there are units in its molecular weight. Thus, 22.4 liters of hydrogen weigh 2.016 grams; the same quantity of oxygen, 32 grams; of carbon monoxide, 28 grams; of carbon dioxide, 44 grams. This volume is called the 'gram-molecular volume' and has been calculated to contain 6.06×10^{23} molecules, a number so huge that a billion people each counting twenty-four hours every day would require nearly 6,500 years to reach it; yet its value has been accurately determined by a variety of methods.

Two other laws respecting gases are important. Dalton's law states that if a mixture of gases which do not combine chemically be confined within a space, each of them exerts a pressure upon the walls of the vessel equal to that which it would exert if it only were present. The partial pressure thus exerted by each component of a mixture is proportional to its fraction of the total number of molecules in the mixture. In other words, the mere act of mixing one gas with another does not affect the validity of the pressure-volume relations. Henry's law has to do with the solubility of gases in liquids and states that, at constant temperature, the weight of gas required to saturate a given volume of a liquid is proportional to the pressure upon it. Thus, if an amount of water will dissolve 5 grams of a gas under one atmosphere of pressure, the same amount of water will dissolve 10 grams under a pressure of two atmospheres.

Matter in solution obeys the same laws, in the same way, as gases; on the basis of this fact, it is believed that materials in solution are in a state very similar to gases; *i.e.,* the distances between the particles of solute (substance present in smaller proportion) are large compared to their diameters. Gases obey the law $Pv = nRT$ over wide ranges of temperature and pressure. Solute particles obey the same law, usually expressed as $P = cRT$, where P is the osmotic pressure of the solution, c is the concentration of solute in moles (molecular weights) per liter. A gas fills any container completely and the molecules bombarding the walls exert a pressure thereon; similarly, the particles of solute diffuse to all regions of the solution creating a pressure on the walls.

Osmotic pressure may be measured as follows: One end of a long tube is closed by a semi-permeable membrane (*i.e.,* a membrane permitting the passage of solvent but preventing the passage of solute). The closed end of the tube is brought into contact with a large portion of solvent, which rises in the tube diluting the solution until finally the level of the liquid in the tube stops rising. The difference between the two levels is a measure of the osmotic pressure of the solution, and the pressure developed in this way may be very large. For example, if one molecular weight of a substance, such as cane sugar or urea (342.24 grams and 60.0 grams respectively), is dissolved in sufficient water to give a volume of 22.4 liters (the gram-molecular volume) the osmotic pressure of the solution will be one atmosphere at 0° C. or 273° A. The above equation shows that the pressure may increase with concentration of solute; therefore, the osmotic pressure of the solution may be increased by dissolving more cane sugar or urea. The solubilities of these substances are such that the osmotic pressure may be more than a hundred atmospheres in the most concentrated solutions. When the solution is diluted, the osmotic pressure decreases; in gases an increase in volume causes the pressure of the gas to decrease, and a change in temperature causes corresponding changes in the osmotic pressure of a solution and the pressure of a gaseous system. The gas laws fail to fit all conditions for gases; they fail similarly for solutions. Gas molecules at high pressure and/or low temperatures influence one another causing deviations from the regular behavior. In concentrated solution the particles of solute may have a marked effect on the activity of their neighbors.

The osmotic pressure, the vapor pressure, the freezing and boiling points of a solution are phenomena dependent on the fundamental behavior of the solution called the escaping tendency, and their measurement provides in many cases a convenient means of measuring the approximate molecular weights of substances. This escaping tendency manifests itself in the vapor pressure above a solution, which for a particular constituent depends on the fraction of that substance present as well as on the absolute temperature. The presence of non-volatile solute causes the vapor pressure of the solution to be lower than that of the pure solvent, and the measurement of the extent of this depression for a particular weight of solute in a definite weight of solvent enables one to calculate the molecular weight of the solute. Since the vapor pressure of the solution is lowered by the presence of solute, the solution must be raised to a higher temperature to cause its vapor pressure to equal that of pure solvent. At the boiling point the vapor pressure is equal to the atmospheric pressure and the temperature elevation is characteristic of the liquid. (For water the value is 0.52° for one molecular weight of solute in 1000 g. of water, for acetic acid 3.07°). The corresponding depressions of the freezing point are 1.86° and 3.9° for water and acetic acid respectively. By carefully measuring the difference between the boiling point of water and a solution with a known percentage of solute, it is possible to calculate the molecular weight of unknown solute. The method is restricted in its application to substances existing as molecules, and remaining undecomposed by temperature or solvent under the conditions of the experiment.

There are many exceptions to the obedience of water solutions to the gas laws, exceptions forming so large a class of substances that they must be specially discussed. Such materials as salt, acetic acid, and concentrated lye are typical of the exceptions, showing values of osmotic pressure varying from just slightly greater than the calculated value in the case of acetic acid to almost twice the theoretical value for salt or lye solutions. Their solutions, furthermore, have the property of conducting electric current, as solutions obeying the law do not. To explain this fact, the existence of ions (electrically charged atoms or groups of atoms chemically combined and acting as units called radicals) in solutions was postulated, and the theory of electrolytic dissociation was formed. According to this theory, now generally accepted, the molecules of an electrolyte (a substance forming an electrically conducting solution) are divided into two or more ions when dissolved in water, each possessing positive or negative electric charges. If an electric current is passed through such a solution, the positive ion migrates to the negative plate and the negative ion to the positive plate, where their charges are neutralized. These ions in very dilute solution (very far apart) affect the osmotic pressure to the same extent as molecules.

The substances exhibiting this peculiarity are acids (proton donors), bases (proton acceptors) and salts, and the solvents which will split them into ions are water, liquid ammonia, liquid sulphur dioxide, certain molten salts, and to a less extent a few other liquids. Non-electrolytes are such substances as sugar, alcohol, glycerine, and organic substances generally. Liquid nonelectrolytes seldom dissolve and never appreciably ionize electrolytes.

The effect of the electric current in causing a migration of ions to oppositely charged plates in the solution and in causing a chemical change to take place at these electrodes is called electrolysis (q. v.) and leads us to the important laws connecting chemical and electrical energy. Michael Faraday (q. v.) found that *the same quantities of electric current passed through different electrolytes liberate at the poles masses of substances which are proportional to their chemical equivalents,* a chemical equivalent being the quantity of an element or combination of elements exactly satisfying or replacing an equivalent of hydrogen (1.008 units). Faraday's law points to the complete equivalence of the elements and offers a method of arriving at the relative weights of their ions and hence of their atoms. A quantity of electricity known as a faraday (92,500 coulombs) is just sufficient to liberate (plate out) one gram equivalent of an element: 1.008 grams of hydrogen, 107.88 grams of silver, 8.00 grams of oxygen, etc. It will be noted that these values are exact gram atomic weights of the elements or exact fractions of them.

Henry's law is not quite so easy as those of Boyle and Charles to apply to the phenomena of solutions, and when it appears as the so-called law of partition between solvents one has at first some difficulty in recognizing it. It may be stated thus: *A given solute (dissolved substance) distributes itself between two immiscible solvents in the exact proportion of its solubilities in them.* Thus, if iodine be dissolved in water to form a saturated solution and this solution be mixed with a quantity of carbon bisulphide, the iodine will distribute itself between the two liquid layers in the exact proportion of its solubilities in each. We do not have here, as we do with gases, an external pressure forcing our solute into a solvent, but rather we have two competing unsaturations, each tending to draw the solute into itself. The unsaturation of the solvent with respect to the solute may be considered a negative pressure proportional to the amount of it which would be dissolved if there were no competition. Henry's law applied to gases predicates a situation in which space and a solvent are unsaturated with respect to a gaseous solute and the balance between these unsaturations is proportional to the external pressure upon the system, while the law of partition covers the case of two liquids, each unsaturated.

The analogous behavior of gases and solutions leads one definitely to the conclusion that there is a fundamental similarity between the two, and that the ultimate particles of each are of the same type. It appears obvious that the properties of matter in either condition are those either of its individual molecules or of those charged particles in solution which we call ions. Consideration of matter in the solid state leads to the conclusion that the properties of solids are based not upon molecules, but rather upon orderly arrangements of the ions or atoms which form the substances. Both the gross and infinitesimal properties of crystals (homogeneous angular solids of definite form and symmetrical internal structure) fit only a theory that conceives the atoms or ions to be in perfectly orderly arrangement with respect to each other in space. The destruction of this arrangement requires the expenditure of work in the form of the latent heat of fusion to break the attraction between particles. The liquid state apparently differs from the solid in lacking any fixed arrangement of particles and in depending upon the kinetic energy of the ions or molecules, which are far enough separated to permit mobility, but are still well within the spheres of influence of each other. In a gas, the molecules not only are completely disordered, but they are so far apart that the influence of one upon the other is almost negligible.

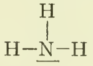
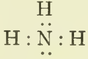
Before Dalton's atomic theory had been carried to its ultimate usefulness, the laws of definite and multiple proportions were well recognized, and early gave rise to a system of chemical equivalents. The unit of equivalence was taken as a unit weight of gaseous hydrogen, the equivalent of any other element being the weight of it which would combine with or replace this unit. These equivalents were variable in various compounds of the same elements, as we have seen in discussing the law of multiple proportions, and it was not until the idea of atoms of fixed weight characteristic of each element and of variable combining power was applied that the difficulty was solved. A further error was introduced by applying these equivalent weights directly to the newly conceived atoms, for they were ultimately based upon the conception of molecules of gaseous elements as made up of single atoms. Gay-Lussac's law of gaseous combination, as we have seen, leads inevitably to the conclusion that these molecules (hydrogen, oxygen, nitrogen, and others) must contain an even number of atoms, most probably two. On that basis the table of chemical equivalents had to be revised to provide gaseous hydrogen with an equivalent of two instead of one and the other values based upon this had to be altered to correspond. This revision made the table of equivalents one of atomic weights.

Since it is difficult to prepare compounds of hydrogen with most of the elements for the sake of determining the equivalent or atomic weight directly, it became necessary in many important instances to compare a new element with oxygen and to calculate its atomic weight from that of oxygen (15.88) obtained by comparing the latter with hydrogen (1). There were two objections to this procedure: it required two determinations, that of the atomic weight of the unknown with respect to oxygen, and of oxygen with respect to hydrogen, thus allowing two possible sources of experimental error; further, atomic weights stated with respect to that of hydrogen as precisely unity were almost without exception not whole numbers but contained fractions which rendered calculations somewhat laborious. Both difficulties were solved by accepting oxygen, with an atomic weight of precisely 16.00, as a basis instead of hydrogen. Values of atomic weights stated on this basis are now universally accepted; with a very few exceptions (notably fluorine and the rare gases of the atmosphere, helium, argon, neon, etc.), all elements form compounds with oxygen, so that accurate values are more easily determined.

Possessing the ideas of indivisible atoms of characteristic weights and of these as the units of chemical activity, chemists developed a system of symbols to shorten and clarify expressions representing chemical compounds and reactions. In this, modern practice follows the lead of the alchemists, but the chemical symbols of today are designed to clarify thought rather than becloud and hide it as appeared to be the alchemists' aim. The symbols adopted consist of the initial letter of the name of the element, and where necessary to prevent confusion, another characteristic letter. The names of the elements selected as the source of their symbols are taken from various languages. For instance, the symbols of elements known to the ancients are derived from their Latin names, as Au, gold (*aurum*); Ag, silver (*argentum*); Fe, iron (*ferrum*); etc. Others are derived from the name of the element in the language of its discoverer, as W, tungsten (German, Wolfram), while others come from names common to many languages, as Br, bromine, H, hydrogen, etc.

The symbol of an element not only defines the element but also the relative quantity of it (represented by the atomic weight) intended. It is thus possible by these symbols to represent not only the kinds but also relative quantities of the matter in a compound. For example, NO represents one molecule (30.01 parts by weight) of a compound of one atom of nitrogen (14.01 parts by weight) with one atom of oxygen (16 parts by weight). If there are two or more atoms of an element in a molecule of a compound, this fact is noted by affixing the appropriate subscript number to its symbol, as H_2O, representing a single molecule of the oxide of hydrogen. Using such symbols the course of any chemical reaction may be represented, together with many facts about it, in a simple equation. For example, $NaOH + HCl = NaCl + H_2O$, signifies that one formula-weight of sodium hydroxide (40.008 parts by weight of a compound of a single atom each of sodium, oxygen, and hydrogen) reacts with one formula-weight of hydrochloric acid (36.468 parts of a compound of hydrogen and chlorine) to yield 58.46 parts of salt (sodium chloride) and 18.016 parts of water.

Since energy changes are always involved in chemical reactions, it is frequent practice to include the amount of this, as heat, absorbed (−) or released (+) on the right hand side of the equation following the appropriate mathematical sign. Thus the reaction above might be written $NaOH + HCl = NaCl + H_2O +$ 14,000 calories, which would indicate that if the materials were present in quantities represented by one gram for each unit of molecular weight, 14,000 calories of heat, or its equivalent, would be generated by the reaction from left to right. Since the quantity of energy involved in a chemical reaction varies with the physical states of the reacting substances, it is usual to specify these in such an equation unless the physical state is the same throughout.

The atoms of each element possess capacities for combining with other atoms of a different kind which are characteristic of the element, but which may be altered by the circumstances surrounding the combination. This capacity of an atom for union with others is called its valence and is dependent upon the peripheral electronic structure of the atom and may be expressed by a simple digit having a value of 4 or less. The nature of the bond depends on the nature of the electronic configuration of the atoms, and may be an electrovalent bond (positive ion attracting a negative ion, the ions resulting from a transfer of an electron from one atom to another as in the case of the transfer of an electron from an atom of sodium to an atom of chlorine producing Na^+Cl^-) or it may be a covalent bond (two atoms share a pair of electrons, each attaining a stable configuration thereby, as in gaseous H−Cl where the dash between *H* and *Cl* represents a pair of electrons). Electrovalence may be positive or negative, and is defined for positive ions in terms of the number of electrons lost by an atom, *i.e.*, the magnesium atom in magnesium oxide has lost two electrons and has an electrovalence of +2, while the oxygen atom in the same compound has gained two electrons and has an electrovalence of −2. Covalence however is measured in terms of the number of pairs of electrons shared; the nitrogen atom in ammonia (NH_3) shares 3 pairs of electrons with the hydrogen atoms, hence a covalence of 3, while in the ammonium ion (NH_4^+) the nitrogen shares 4 pairs of electrons and has a covalence of 4. The electrovalence of an element may be as high as 4 in some elements although it is frequently less; the covalence usually has the same limit although in complex compounds it may be as high as 6, *i.e.*, iron in the ferro-cyanide radical ($Fe(CN)_6^{\equiv}$) shares six pairs of electrons with the surrounding cyanide ions. The same element may show several covalences such as nitrogen in NO, NO_2HNO_3, and HNO_3, in which the covalences for nitrogen are 1, 2, and 3, respectively, and more than one electrovalence may be shown by the same element as FeO, Fe_2O_3 in which the electrovalences are +2 and +3. In covalent compounds chemists represent covalent bonds by dashes between the symbols for the elements in the compound as  $\begin{matrix} & H & \\ & | & \\ H- & \underline{N} & -H \end{matrix}$ or the electrons may be written in as dots thus:  $\begin{matrix} & H & \\ & \ddot{\ } & \\ H: & \underset{..}{N} & :H \end{matrix}$, both systems being in common use. (See also VALENCE).

Before going further with the discussion of chemical reactions, we must consider what is probably the most important of all the laws of matter, the periodic law. This generalization was first reached by a Russian chemist, Mendeléeff, in a form not strictly true but approaching the truth closely enough to be of immense value. Before Mendeléeff's time it had been noticed that the elements could be grouped into families whose members closely resembled one another. Such families as the halogens—fluorine, chlorine, bromine, and iodine—possess distinctive characteristics which vary among the members according to their respective atomic weights. Any property of the family becomes either more or less pronounced as the atomic weight increases or decreases, as the case may be, so that knowing the family properties one may represent any of them by such a series as F > Cl > Br > I or the reverse. Thus, fluorine (at. wt. 19.0) is a gas of very low boiling point, chlorine (at. wt. 35.46) an easily liquefied gas, bromine (at. wt. 79.22) a heavy liquid, and iodine (at. wt. 126.93) a solid. Fluorine forms no compounds containing oxygen, chlorine's compounds with oxygen are unstable and easily decomposed, bromine forms fairly permanent compounds containing oxygen, and the compounds of iodine and oxygen with another element are difficult to decompose.

There are several such chemical families among the elements, and Mendeléeff was able to generalize about them by showing that any property of the elements is a periodic function of its atomic weight, with a few notable exceptions. Thus he constructed a table into which all the known elements fitted and which contained blank spaces scattered through it for undiscovered elements. This tabulation divided all the known elements into eight groups such that if the elements are listed in the order of their atomic weights each eighth element in the series (with certain exceptions) belongs to the same family. At that time (1869), a number of blank spaces were necessarily left in the list, but so confident was Mendeléeff of the accuracy of his law of periodicity that he described elements yet undiscovered and even approximated their atomic weights. Subsequent investigations have proved the correctness of his guess, and now (1945) all vacancies in the entire list of elements have been filled. (See also ELEMENTS).

There was one omission from Mendeléeff's table, of an entire family whose existence was not then suspected, and one or two difficulties which atomic weights alone would not explain. The whole family of the rare gases, possessing no power of chemical combination, and hence zero valence—helium, neon, argon, krypton, xenon, and niton—was unknown until the end of the 19th century, but they have been cared for easily by the mere addition of a zero group to the existing table. When so completed there were still three discrepancies in the classification: argon and potassium, cobalt and nickel, and tellurium and iodine when placed in their proper families were in the reverse order of atomic weight. Also, thirteen elements of the so-called rare earth family, possessing atomic weights very close together and necessarily belonging together, must be crowded into one position in the tabulation. Moseley, a brilliant English physicist, by using a great many of the elements as targets in an x-ray tube, discovered that the characteristic wave length of the x-ray beam emitted decreased as atomic weight increased. From a number of observations using different elements he was able to show that a simple numerical relation existed between the x-ray emission spectra of the elements and from this he calculated a series of numbers, all of them whole numbers, connected with the atoms of the elements in such a way as to express their properties in an exact periodic system. The difficulties with Mendeléeff's system were completely wiped out, and proof was adduced at the same time of the completeness of the system with respect to undiscovered elements. Also the riddle of the 13 rare earth elements was later cleared up, and it is now believed that the similarities in properties of these elements are owing to their having the same or very similar electronic configurations in their outermost orbits, and the slight differences in properties are owing to incompletely filled inner electronic shells which are gradually filled up as one proceeds from lanthanum (atomic number 57) to lutecium (atomic number 71). The correct statement of the periodic law must then relate properties to atomic numbers instead of atomic weights. Thus it becomes: *The properties of atoms, both physical and chemical, are periodic functions of their atomic numbers.* The atomic number of an element corresponds to the number of positive electric charges in the nucleus of its atoms (see ATOM; ELECTRON THEORY).

The comparatively recent discovery of what are called isotopes has added meaning to the atomic numbers of the elements. It appears that many of the elements are really mixtures of several atomic species with chemical properties identical in every way, but with slightly different atomic weights. The atomic numbers of these isotopes are the same. The investigations respecting isotopes are leading directly toward a system in which the weights of all atoms will be expressed as whole numbers.

From consideration of the periodic table it is possible to deduce the properties of any element from those of its neighbors in the system, for all properties vary in a regular way from one family to the next and from one member to another within a family. The general properties of each family require only slight modification to be made to fit any of its members. The widely varying properties of diverse kinds of matter are thus reducible to a comparatively small compass, and a vast amount of apparently unrelated information can be brought within a not too cumbersome system.

It would be quite useless here to go at length into the description of the various groups of elements and their properties, for only comparatively few of them would present interest to the general reader sufficient to justify the repetition of matter to be found at greater length elsewhere in these volumes. See such headings as ELEMENTS, ATOMIC THEORY, MOLECULES, VALENCE, and CHEMICAL AFFINITY, as well as articles dealing with the various individual elements.

Chemical Reactions.—Four types of chemical reactions are recognized: (1) Combination between elements or compounds, as $C + O_2 = CO_2$, representing the combination of carbon with oxygen to form carbon dioxide in burning; (2) decomposition of an existing compound, as $2HgO = 2Hg + O_2$, representing the separation of mercuric oxide into its elements, mercury and oxygen; (3) double decomposition, as $NaNO_3 + KCl = KNO_3 + NaCl$, representing a reaction between sodium nitrate and potassium chloride under certain conditions to form potassium nitrate and sodium chloride; and (4) displacement, as $AgNO_3 + Hg = HgNO_3 + Ag$, where mercury replaces silver in silver nitrate. The first type is called synthesis, for simpler substances combine to build up more complex ones. The second corresponds to analysis, the taking apart of a complex into its simpler constituents. Some authors include a fifth type of reaction in which one element replaces another in a compound and at the same time combines with the atoms replaced as $CH_4 + 2Cl_2 = CH_2Cl_2 + 2HCl$. This they call substitution.

A few generalizations of the greatest practical importance have been reached within the past few decades regarding chemical reactions. By careful study of multitudes of chemical reactions it has been possible to discover much about the factors influencing them and this accumulated experience has enabled chemists to bring about many important reactions not dupli-

PERIODIC CHART OF THE ELEMENTS

Group		I		II		III-B		IV-B		V-B		VI-B		VII-B		VIII-B						I-B		II-B		III		IV		V		VI		VII		VIII	
Type		R_2O		RO		R_2O_3		RO_2		R_2O_5		RO_3		R_2O_7		$RO\text{-}R_2O_3\text{-}RO_2\text{-}RO_3$										R_2O_3		RO_2		R_2O_5		RO_3		R_2O_7			
Series	1	1	1 H 1.008																																	2	2 He 4.003
	2	2 1	3 Li 6.940	2 2	4 Be 9.02																					2 3	5 B 10.82	2 4	6 C 12.010	2 5	7 N 14.008	2 6	8 O 16.000	2 7	9 F 19.00	2 8	10 Ne 20.183
	3	2 8 1	11 Na 22.997	2 8 2	12 Mg 24.32												TRANSITION ELEMENTS									2 8 3	13 Al 26.97	2 8 4	14 Si 28.06	2 8 5	15 P 30.98	2 8 6	16 S 32.06	2 8 7	17 Cl 35.457	2 8 8	18 A 39.944
	4	2 8 8 1	19 K 39.096	2 8 8 2	20 Ca 40.08	2 8 9 2	21 Sc 45.10	2 8 10 2	22 Ti 47.90	2 8 11 2	23 V 50.95	2 8 13 1	24 Cr 52.01	2 8 13 2	25 Mn 54.93	2 8 14 2	26 Fe 55.85	2 8 15 2	27 Co 58.94	2 8 16 2	28 Ni 58.69	2 8 18 1	29 Cu 63.57	2 8 18 2	30 Zn 65.38	2 8 18 3	31 Ga 69.72	2 8 18 4	32 Ge 72.60	2 8 18 5	33 As 74.91	2 8 18 6	34 Se 78.96	2 8 18 7	35 Br 79.916	2 8 18 8	36 Kr 83.7
	5	2 8 18 8 1	37 Rb 85.48	2 8 18 8 2	38 Sr 87.63	2 8 18 9 2	39 Y 88.92	2 8 18 10 2	40 Zr 91.22	2 8 18 12 1	41 Cb 92.91	2 8 18 13 1	42 Mo 95.95	2 8 18 13 2	43 Ma	2 8 18 15 1	44 Ru 101.7	2 8 18 16 1	45 Rh 102.91	2 8 18 18	46 Pd 106.7	2 8 18 18 1	47 Ag 107.880	2 8 18 18 2	48 Cd 112.41	2 8 18 18 3	49 In 114.76	2 8 18 18 4	50 Sn 118.70	2 8 18 18 5	51 Sb 121.76	2 8 18 18 6	52 Te 127.61	2 8 18 18 7	53 I 126.92	2 8 18 18 8	54 Xe 131.3
	6	2 8 18 18 8 1	55 Cs 132.91	2 8 18 18 8 2	56 Ba 137.36	2 8 18 18 9 2	57 La 138.92 58 to 71 See Rare Earth Elem.	2 8 18 32 10 2	72 Hf 178.6	2 8 18 32 11 2	73 Ta 180.88	2 8 18 32 12 2	74 W 183.92	2 8 18 32 13 2	75 Re 186.31	2 8 18 32 14 2	76 Os 190.2	2 8 18 32 17	77 Ir 193.1	2 8 18 32 17 1	78 Pt 195.23	2 8 18 32 18 1	79 Au 197.2	2 8 18 32 18 2	80 Hg 200.61	2 8 18 32 18 3	81 Tl 204.39	2 8 18 32 18 4	82 Pb 207.21	2 8 18 32 18 5	83 Bi 209.00	2 8 18 32 18 6	84 Po	2 8 18 32 18 7	85	2 8 18 32 18 8	86 Rn 222
	7	2 8 18 32 18 8 1	87	2 8 18 32 18 8 2	88 Ra 226.05	2 8 18 32 18 9 2	89 Ac	2 8 18 32 18 10 2	90 Th 232.12	2 8 18 32 18 11 2	91 Pa 231	2 8 18 32 18 12 2	92 U 238.07																								

RARE EARTH ELEMENTS

2 8 18 19 9 2	58 Ce 140.13	2 8 18 20 9 2	59 Pr 140.92	2 8 18 22 8 2	60 Nd 144.27	2 8 18 23 8 2	61 Il	2 8 18 24 8 2	62 Sm 150.43	2 8 18 25 8 2	63 Eu 152.0	2 8 18 25 9 2	64 Gd 156.9	2 8 18 26 9 2	65 Tb 159.2	2 8 18 28 8 2	66 Dy 162.46	2 8 18 29 8 2	67 Ho 163.5	2 8 18 30 8 2	68 Er 167.2	2 8 18 31 8 2	69 Tm 169.4	2 8 18 32 8 2	70 Yb 173.04	2 8 18 32 9 2	71 Lu 174.99

NOTE: This tabulation of the elements shows their symbols, their atomic numbers (above the symbol), their atomic weights (below the symbols) and the number and distribution of electrons (the column to the left of each symbol).

cated in nature and to prepare substances in the form of compounds which are actual improvements of those naturally occurring.

The principal factors influencing chemical action are: (1) Contact between reacting substances; (2) energy condition of the system; (3) relative masses of reacting substances; (4) temperature; (5) pressure; (6) catalysts. These are of unequal weight and are independent of the nature of the materials undergoing change.

Contact between reacting substances is of the utmost importance in any chemical reaction. Between gases and between substances in solution, the activity of the moving molecules and the forces of diffusion tend to secure perfect mixing, and contact approaches the ideal. We have the picture of rapidly moving molecules in either a gas or a solution colliding with each other at a prodigious rate so that any change involving two or more molecules has the greatest probability of happening quickly. In solutions of electrolytes, the existence of charged ions which are avidly seeking to neutralize their charges, provides an even greater probability of the desired contact. Thus, if the chemist seeks to secure a particular reaction as quickly as possible, he aims to bring it to pass between gases or between materials in solution. Failing that, the next best thing is to reduce his reacting substances to the finest possible state of subdivision so as to secure the greatest possible surface of contact between them. Reactions between solids and gases, or between solids and liquids in which they are completely insoluble, may frequently be brought about readily by the interposition of a mutual solvent. Often, however, this is impossible and one must resort to fine grinding and not infrequently to melting of the solid to secure the desired reaction.

The condition of the system must always be such that energy is degraded (in the thermodynamic sense) during its progress before a reaction will occur. There are two types of reactions generally recognized, those which release heat and those which absorb it. The first kind occur readily enough; indeed, sometimes too readily, as in the premature explosion of a charge of dynamite. The second type is only to be forced by supplying energy to it in one form or another. The reaction between metallic sodium and gaseous chlorine will serve to illustrate the point. The change is represented by the following equation: $2Na + Cl_2 = 2NaCl + 185{,}800$ calories. With such a huge amount of heat liberated, this reaction occurs readily, but its converse, $2NaCl = 2Na + Cl_2 - 185{,}800$ calories requires the expenditure upon it of enormous amounts of electrical energy to be converted into chemical energy. It is possible only at very high temperatures to cause the second reaction to go by heat alone, and the same is true of many other endo-thermic (heat absorbing) reactions, so that the chemist must be prepared to supply energy to his systems in a variety of forms to secure the results desired.

The concentrations of the substances present (expressed in molecular weights per unit volume or relative number of molecular weights) influence the chances of collision of reactive particles and hence the course of the reaction. Most chemical reactions have been found to be reversible, *i.e.,* capable of proceeding in either direction, and such reactions reach a point of equilibrium depending upon the concentrations of the materials present. For instance, metallic iron reacts with steam to form an oxide of iron and hydrogen, and hydrogen reacts with iron oxide to form iron and steam. Reactions of this type are ordinarily represented thus: $3Fe + 4H_2O \rightleftarrows Fe_3O_4 + 4H_2$, arrows being used to replace the equality sign. Careful investigation has shown that all four of these substances exist together, and that the reaction is occurring in both directions at once. An equilibrium is reached when the speed in one direction is exactly equal to that in the other, and the speed in either direction depends primarily upon the concentrations of the reacting substances. The speed toward the right in the case cited may be increased by increasing the concentration (partial pressure) of steam to the system or by removing hydrogen as formed. Conversely, adding hydrogen or removing steam will force the equilibrium farther toward the left. This fact is expressed as the law of mass action: *The speed of chemical reaction is proportional to the molecular concentrations of reacting substances.* Thus, the speed of reaction is equal to the products of the molecular concentrations of reacting substances multiplied by a constant applicable to the particular reaction. At equilibrium the speed in one direction is equal to that in the other and by equating the two expressions for speed we arrive at a constant for the particular reaction.

For simplicity's sake—the reaction between iron and steam involves cubes and fourth powers in its solution—we may consider the reaction between chlorine and water: $Cl_2 + H_2O \underset{k}{\overset{k}{\rightleftarrows}} HCl + HClO$. If we represent the molecular concentration of each substance present by its symbol within parentheses, the speed to the right may be expressed $(Cl_2) \times (H_2O) \times k$, and that to the left $(HCl) \times (HClO) \times k'$. At the equilibrium point, these two speeds are equal and by equating them we obtain an expression like this:

$$\frac{[HCl]\ [HClO]}{[Cl_2]\ [H_2O]} = \frac{k}{k^1} = K.$$

This is called the equilibrium constant and, since K is a constant unrelated to concentration but typical of other factors involved, an increase or decrease in the molecular concentrations of any one of the four substances changes the concentrations of two others. If any one of the products of a reaction is removed from the system so completely that its molecular concentration is virtually zero, the reaction will proceed to completion. This occurs if one product is insoluble, either a gas or a solid. This law of mass action is universal in its application.

Changes of temperature affect the value of K in the equation just given by affecting in different ways the reactions k and k' so that one may be slowed up while the other is accelerated, thus causing the equilibrium at a higher temperature to produce in greater concentrations the products whose formation absorbs energy. The higher the temperature the faster the reaction absorbing energy and the slower the reaction releasing energy. This effect causes many equilibria to go practically to completion as a result of temperature changes. For instance, below 20° c. colorless nitrogen tetraoxide (N_2O_4) exists; as the temperature rises it changes gradually into brown nitrogen dioxide (NO_2), until at 154° c. the tetraoxide is completely converted to dioxide. As the temperature is lowered the reverse occurs.

The effect of pressure on reactions between gases is of great importance. If the products of a particular reaction occupy less volume than the substances from which they are formed, an increase of pressure favors the reaction. If the products of the reaction occupy greater volume than the original substances, a reduction of pressure favors the reaction. Thus when one volume of nitrogen (N_2) is made to unite with three volumes of hydrogen ($3H_2$) to form two volumes of ammonia ($2NH_3$), the reaction is favored by increased pressure, whereas the decomposition of ammonia into hydrogen and nitrogen is favored by reduced pressure.

The effect of catalysts on the course of chemical reactions is not well understood. The word catalyst is used to designate a substance whose presence affects the rate of a reaction into which it does not apparently enter. A little pure finely divided iron greatly increases the rate of formation of ammonia from hydrogen and nitrogen, but at the end the iron remains quite the same as it was at the beginning. A great number of materials thus affect the course of various chemical reactions, but why and how they do it no one can say with certainty. Many reactions which could not be made to take place otherwise have become of immense industrial importance when a proper catalyst has been found. The synthesis of ammonia, the manufacture of nitric acid from ammonia, the manufacture of sulphuric acid, the conversion of cottonseed oil into solid fat by making it combine with hydrogen, and hosts of other commercial processes, which are today profoundly affecting international trade, are based upon the little understood effect of these chemical bystanders.

The study of the fundamental principles of chemical reaction such as those mentioned above comprises the particular field of *physical chemistry*. The application of these and other less general principles to the elements, except carbon, to the behavior of specific substances, and to their preparation and use, constitutes the field of *inorganic chemistry*. The study of the compounds of carbon, formerly believed to be produced only by the intervention of vital force, their preparation, and use, form the field of *organic chemistry*. These three principal divisions of the science of chemistry are merely convenient designations for the same kind of work carried out by the use of different kinds of tools. There is much more difference between the methods and apparatus employed in the several divisions than in the method of thought or type of problems attacked.

Inorganic chemistry may be said to be founded upon the chemistry of mineral substances in the broad sense of the term as distinct from substances of animal or vegetable origin. All of the elements come within its scope, and its foundations are those already covered in this article. The periodic table is necessarily the *vade mecum* of the inorganic chemist, for by its use he is able to correlate his findings, and those of others.

The compounds coming under the eye of the inorganic chemist comprise practically all of those whose solutions in water are conductors of the electric current, the electrolytes. Electrolytes, substances existing as ions in solution, are divided into three classes, acids, bases, and salts. Acids (proton donors) are substances capable of giving a proton (H^+) to molecules of solvent forming in aqueous solutions the hydronium ion (H_3^+O) or in a solution of ethyl alcohol the ethylonium ion $(C_2H_5OH_2)^+$. In general these solutions have a sour taste and are capable of causing color changes in organic compounds called indicators. Bases (proton acceptors) are substances capable of accepting protons and forming acids. Most familiar are hydroxyl ions (OH^-) from alkali metal hydroxides; however, such ions as carbonate ($CO_3^{=}$) and phosphate ($PO_4^{\equiv}$) are also strong bases. In general, basic solutions have a flat taste and are capable of reversing changes in indicators caused by acids. When solutions of an acid and a base are mixed, the hydronium ions react with the base to produce water or water and the conjugate acid of the base used thus:

$$\underset{\text{base 1}}{CO_3^{=}} + \underset{\text{acid 1}}{H_3^{+}O} \rightleftarrows \underset{\text{base 2}}{H_2O} + \underset{\text{acid 2}}{HCO_3^{-}}$$

Substances capable of acting as either an acid or base are called ampholytes (HCO_3^-, H_2O, $HPO_4^{=}$). Salts are compounds of an ionic nature resulting from the combination of a metal ion with a base, for example:

$$Na^+Cl^-,\ K^+NO_3^-,\ Cs^{++}SO_4^{=}.$$

Each ion composing a salt may be either an element or a combination of elements (called radicals) capable of going through chemical reactions unchanged. Ordinarily the element forming the positive ion is a metal, or it may be a radical acting as a metal. The negative ion is either a non-metal, as a halogen or sulphur, or a radical containing and capable of acting as a non-metal. Many elements are capable of acting in either way, as chromium, molybdenum, and tungsten. In general the elements to the left of the periodic table form strongly positive ions and those to the right tend to act as feebly positive ions, or strongly negative ions or parts of negative radicals.

A large part of the inorganic chemist's attention must be devoted to analysis, for, as a rule, inorganic compounds are readily prepared when once their composition is known. There are two methods of analysis ordinarily pursued: the first (qualitative analysis) reveals the kinds of constituents in a mixture or compound; the second (quantitative analysis) determines the quantities of the various constituents present. The methods of qualitative analysis consist in producing a variety of conditions in the presence of the unknown which will yield characteristic reactions through changes of color or odor, or the formation of gases or insoluble precipitates of known composition whose characteristics are easily recognized. Quantitative analysis attempts to produce an insoluble precipitate of definite composition containing a single constituent of the mixture to be analyzed which may be weighed and its quantity thus determined indirectly. For the sake of speed, it is often possible to determine the quantity of a constituent of a mixture by causing a weighed quantity of the unknown to react with a solution of known strength; by measuring accurately the volume of solution required, the quantity of the unknown may be estimated. The method of weighing is called gravimetric analysis and that of measuring volumes of solutions volumetric analysis. Methods of quantitative analysis also include the measurement of the intensity of the color of characteristically colored compounds, *i.e.*, colorimetry.

Organic Chemistry.—Just as the inorganic chemist depends upon the periodic table, the organic chemist depends upon what are called homologous series of compounds to bring his results in various fields of work into their proper relations with one another. Carbon atoms, possessing four valence electrons, are capable of combining with each other to form long chains (a distinguishing characteristic not possessed by other atoms to nearly so great a degree) and with other elements almost indiscriminately. An enormous number of permutations and combinations are thus possible, and since carbon compounds are so closely related to living matter many of these are of great importance. A few of the numerous types of homologous series will be discussed here to show the relations which exist in this vast field and which make it more easily comprehensible. Since some 200,000 compounds containing carbon are known, a knowledge of such relations is essential to understanding the subject.

We may begin by considering the simplest compound of carbon and hydrogen, methane, CH_4, and having traced it through some of its more obvious reactions we may say that other similar compounds, hydrocarbons, behave in much the same manner. If we oxidize methane, the first oxidation product is methanol (methyl alcohol), CH_3OH, if that be further oxidized, formaldehyde, CH_2O, formic acid, $HCOOH$, and ultimately carbon dioxide and water. If instead of methane we begin with ethane, C_2H_6, materials are obtained whose relation to ethane is the same as that of methanol, formaldehyle, and formic acid to methane, namely, ethyl alcohol, C_2H_5OH, acetaldehyde, CH_3CHO, acetic acid, CH_3COOH, and CO_2 and water. Now there is a long series of hydrocarbons exhibiting just the same behavior as these two and differing from one another in the number of carbon atoms in each molecule. The series consists of an indefinitely large number of members, each having a molecule larger, by the addition of CH_2, than the one preceding it. Having determined the behavior of a representative member of such a series, it is possible to surmise very accurately the properties of any other member by knowing the effect of each added carbon atom. To this series belong the fats; hence it is called the aliphatic series.

Carbon atoms combine in such a way that each may share one, two or three pairs of electrons with another, and this gives rise to other homologous series. Ethylene, C_2H_4, contains two carbon atoms in its molecule, each satisfying two of the four valence bonds of the other, and acetylene, C_2H_2, contains a triple bond between the two carbon atoms. On each of these types of compounds are based homologous series of indefinite length. Similarly, carbon atoms form rings as well as chains in which there may be one or several double or triple bonds and in which there may be almost any number of carbon atoms.

The hydrocarbon, benzene, and its derivatives form a huge class of compounds whose development has been carried to a point of great benefit to man. The series is known by the generic term, aromatic compounds, on account of the fact that most of its members possess pleasant odors, and to distinguish them from the aliphatic series based upon methane and ethane.

The principal sources of organic compounds are living matter of one kind or another and its fossil remains, coal and petroleum. From wood and other plant fibers, cellulose, the basis of paper, artificial silk (rayon), smokeless powder, nitro-cellulose lacquers, celluloid, etc., is derived. From coal, the whole group of aromatic compounds forming the bases of huge industries is obtained by the method of destructive distillation. A similar method decomposes wood into compounds of the aliphatic series. Petroleum supplies a great variety of aliphatic hydrocarbons which may serve as starting points for the synthesis of their valuable derivatives. Natural gas is a prolific source of still others.

The methods of organic chemistry are similar to those of inorganic chemistry in involving analysis and synthesis, but the importance of things of little weight to the former complicate the synthetic as well as the analytical procedures of organic chemistry. The arrangement of the atoms in an inorganic molecule is rather definitely fixed by their very nature, but carbon atoms are capable of combining with others in such a variety of different ways that analysis and synthesis must go far beyond the mere determination of the kinds and numbers of atoms present in the molecule of the compound. Formaldehyde (CH_2O), a deadly poison, contains the same relative numbers of the same atoms as dextrose ($C_6H_{12}O_6$), a valuable food, and it is only by careful consideration of the differences in the internal arrangement that the characters of the two may be differentiated.

Industrial Chemistry.—There is probably no better example of the value of applied science than the field of industrial chemistry.

The applications of chemistry to practical problems are so diverse that many specialists in almost every line of human endeavor are required to carry it through. One finds chemists who have specialized in the application of chemistry to agriculture, to food, to biology, to the cellulose industries (paper, textiles, rayon, etc.), to dyes and dyeing, to fertilizers, to fuels, to leather and gelatin, to medicinal products, to paint and varnish, to petroleum, to rubber, to sanitation, to explosives, to plastics, and to almost every type of industry involving chemical changes of any kind. This includes, with very few exceptions, every industry, for all involve materials of one kind or another and these can be properly handled only by the application of a knowledge of their chemical characteristics and the effect of these on their physical properties. The field of electrochemistry (q. v.), dealing with the changes of composition of substances under the influence of the electric current, has developed with startling rapidity during recent years as our vast water powers have been put to work producing cheap electric current; thermochemistry, whose study is heat changes, has similarly advanced, and an almost independent profession of chemical engineering has come into being for the study of industrial chemical problems involving both chemistry and engineering, but distinct from either.

In carrying out chemical reactions on a large scale, problems arise which require the application of principles of mathematics, physics (particularly thermodynamics and electricity), engineering, and the natural sciences, such as biology and bacteriology, in addition to purely chemical considerations. The chemical industry today ranks among the first five American industries in value of products. It includes the manufacture of chemicals, coal tar products, coke, salt, druggists' preparations, patent medicines, cosmetics and perfumes, essential oils, explosives, fertilizers, manufactured gas, dyestuffs, paints and varnishes, soap, turpentine, and resin, plastics, as well as petroleum refining and wood distillation.

Physiological Chemistry, or *Biochemistry,* is the division of applied chemistry in which are considered the chemical transformations occurring in the vital phenomena of animals and plants. The scope of physiological chemistry embraces the study of the constitution of foodstuffs; the manner in which digestive processes render them assimilable; the elaboration from the products of digestion of those complex substances characteristic of the living organism, and their subsequent resolution and elimination, the whole cycle forming the animal or vegetable 'metabolism' (q. v.). In these changes an important rôle is that of the enzymes, or unorganized ferments, secreted by the cells of the digestive organs, which act as catalysts, but are distinguished by specificity—*i.e.,* by acting only on particular compounds, or by achieving a partial decomposition, as distinguished from inorganic catalysts, which produce a given type of reaction irrespective of the class of compound acted upon; thus pepsin, the enzyme of gastric juice, acts upon proteins (albumin), and not on sugar or starch, whereas hydrochloric acid acts indifferently on each. Chemical compounds called vitamins (food factors, or food hormones) play an essential rôle in the assimilation of food, absences of which give rise to deficiency diseases such as beriberi, scurvy and under-developed growth.

Knowledge of the physicochemical action of drugs and poisons renders medicine, so far as it is concerned with the administration of drugs, more rational and less empirical. The application of the principles of physical chemistry in the study of the passage of dissolved substances through cell membranes, a characteristic of many vital processes, is a valued aid in interpreting the processes of metabolism. Studies of the blood from a physicochemical standpoint have resulted in greatly improved methods of treating shock and have made possible the isolation from blood of adhesives for plastic and neural surgery and agents active in the clotting of blood, as well as a number of other substances.

The fields of pharmacology, the study of the effects of drugs, and of chemotherapy, the application of chemical compounds to the cure of diseases, have shown marked progress in the recent past. Salvarsan, for the cure of syphilis, was one of the first triumphs of chemotherapy. Recently several antibacterial drugs have been developed, such as the sulfa drugs (q. v.), penicillin and gramicidin. Notable success has been achieved in the preparation and isolation of such hormones (chemical messengers) as insulin, adrenalin, thyropine and others.

Agricultural Chemistry.—The problem of increasing agricultural yields from arable areas to keep pace with increasing population and of getting the greatest good from the products of agriculture, whether in the form of food or otherwise, is the object of study of agricultural chemistry. Recent developments have produced more efficient fertilizers, made possible the soil-less growth of plants by employing solutions, or porous materials saturated with solutions, containing all chemical compounds necessary to plant growth, and have produced a number of compounds which influence various aspects of plant growth such as indole butyric acid and naphtholene acetic acid, both of which stimulate the formation and growth of roots. Numerous chemical weed and grass killers have also been prepared. (See FERTILIZERS).

Sanitary Chemistry.—See DISINFECTANT; DISINFECTION; FOODS, PRESERVED; ADULTERATION; REFUSE COLLECTION AND DISPOSAL; SEWERAGE AND SEWAGE DISPOSAL; VENTILATION; WATER WORKS; WATER PURIFICATION.

Chemical Warfare, as introduced in the First World War, in violation of international treaties, sought to cause casualties and to reduce the efficiency of military man power by polluting the atmosphere and ground around troops. Several types of such weapons were used, in the forms of gases, liquids, and solids, although they were all grouped under the general term, 'poison gases,' in the popular mind, and few of them were actually lethal poisons as used. The methods of application on the battlefield were the release of gas clouds from cylinders, from shells containing barely enough explosive charge to burst them, and from the burning of candles to produce clouds of vapor.

The defense against gas was accomplished by devising respirators for men and animals exposed to gas which would prevent the entry of these materials into the respiratory system and by equipping troops with clothing to reduce contact of the skin with vesicants. This was accomplished by providing efficient filters for the air to be breathed and by saturating clothing with chemicals which would react readily with the various gases used to render them innocuous.

Both the methods of offense and of defense have been applied to many problems of peace; the former to the eradication of insect and rodent pests, and the latter to the protection of workers exposed to toxic atmospheres, as miners, firemen, etc. The use of di-chloro-diphenyl-trichloroethane (DDT) as an insecticide has been spectacularly successful against a wide variety of insect pests.

History.—There is reason to believe that the study of many chemical processes was considerably advanced in some of the early civilizations—among the Egyptians, for example—centuries before the Christian era. Technical processes which are known to have been in use by some of these peoples presuppose a high degree of knowledge and skill. One of the earliest workers of whom we have definite information was Geber, an Arabian of the eighth century. He was familiar with the preparation and properties of a large number of chemical substances, and the apparatus and methods which he employed in many cases have remained in use, with but slight modification, until recent times. Some of the names still employed, even that of the science itself, are of Arabic origin. The Greeks and Romans evidently derived a considerable amount of their chemical knowledge from the countries of the neighboring continents, but much of this was lost with the overthrow and decadence of their empires.

After the Dark Ages in Europe a new era began to dawn with Robert Boyle (1627–91), Becher (1635–82), and Stahl (1660–1734). To Boyle we owe the modern conception of an element; the four elements of the ancients—fire, earth, air, water—had a different significance, and were used to denote the elementary properties of matter rather than composition. Becher and Stahl established the 'phlogiston' theory of combustion, according to which combustible matters were compounds of the products of their combustion with the principle of combustibility—phlogiston—and the process of combustion was a decomposition, with liberation of the phlogiston. This erroneous view was largely owing to the scant attention that was paid to the use of the balance, to the slight value attached to the results obtained from it, and, very largely, to the ignorance as to gases and their properties which prevailed until Priestley (1733–1804) made his brilliant discoveries.

The discovery of oxygen by Scheele (1742–86) and Priestley, and the use made of it by Lavoisier (1743–94) to explain the true nature of combustion, mark the starting-point of the modern science of chemistry. From that time on progress was rapid. The period covering the latter part of the eighteenth century and the early part of the nineteenth century was rendered memorable by the work of such men as Priestley, Scheele, Lavoisier, Davy (1778–1829), Berthollet (1749–1822), Gay-Lussac (1778–1850), Thénard (1774–1857), Berzelius (1779–1848), Dalton (1766–1844), and Avogadro (1776–1856).

These chemists worked chiefly in the domain of *mineral* or *inorganic* chemistry, but a certain amount of work was also being carried out in connection with *organic* chemistry—that branch dealing with substances produced by living organisms, whether animal or vegetable. In 1828 a great impetus was given to development in this department by the first synthesis of an organic compound. Up to that date it had been quite generally assumed that the typical organic compounds were essentially different from the inorganic ones, and could not be prepared artificially in the laboratory, but required the intervention of a special 'vital force' existent only in living organisms. Wöhler (1800–82), however, then showed that urea—a typical organic compound—could be prepared in the laboratory from what were considered purely inorganic substances, and, therefore, from the elements themselves. The names which are most prominent in connection with the earlier development of organic chemistry are those of Dumas (1800–84), Liebig (1803–73), Laurent (1807–53), Gerhardt (1816–56), and, somewhat later, Hofmann (1818–92), Kekulé (1829–96), Wurtz (1817–84), Kolbe (1818–84), Frankland (1825–99), Williamson (1816–95), and Baeyer (1835–1917).

Probably the best-known consequence of the development of organic chemistry during the middle and latter part of the nineteenth century is the modern 'coal-tar color' industry. Immense numbers of coloring matters (some of which are identical with those extracted from plants, though the great majority are entirely new products) are now prepared on a large scale in manufacturing laboratories from benzene and similar compounds obtained from coal tar. The first of these to be produced was magenta or mauveine, obtained by W. H. Perkin in 1856.

The closing part of the nineteenth century was marked by the rise of what now ranks, along with organic and inorganic chemistry, as a third great division of the science—*physical* or theoretical chemistry. This branch deals not so much with individual substances themselves as with the general nature of the changes which they undergo, and with the laws governing chemical changes. Hence it is not so much the subject matter as the method of treating it, and the extent to which it has been developed, which have led to the establishment of this as a comparatively new division of the science.

A field of research which has undergone considerable development is that dealing with changes of state—*i.e.*, from solid to liquid or liquid to gas, and *vice versâ.* Such changes lie on the very border-land between chemistry and physics. Within recent years the most striking results have been obtained in connection with the liquefaction of what used to be called the permanent gases, by compressing and cooling them. One of the first investigators to study the liquefaction of gases in a systematic manner was Faraday (1791–1867), who achieved considerable success, as also did Thilorier. Very important generalizations concerning the connection between the liquid and gaseous states were arrived at by Andrews (1813–85), and later by Van der Waals. Apparatus has been brought to such a degree of perfection that the liquefaction of air on a large scale is now carried out quite easily.

Recent rapid strides in the study of matter have been made by the application of the methods of x-ray spectography developed originally by Laue, Bragg, and Davey and Hull. The dimensions between the planes formed by the atoms in crystals are of the same order of magnitude as the wave lengths of x-rays and hence it has been possible to use crystals as diffraction gratings to form spectra of x-rays just as a finely ruled grating will form spectra of visible light passed through it. By the use of these it has been possible to determine with greatest exactness the distances between and the sizes of atoms in crystalline compounds.

The positive ray method used by Mosley has been mentioned in the discussion of the periodic table. He succeeded in determining accurately the number of positive charges in the nucleus of an atom and from these he was able to rearrange the elements into an accurate periodic arrangement.

Electrical measurements and the development of the electron theory of the atom, particularly the work of Bohr in Denmark, and Millikan, Langmuir, and G. N. Lewis in America, have resulted in a clearer understanding of the nature of matter and of many of its properties. The practical results of these researches have been in the rapid development of the art of radio communication and of long distance telephony within the past few years, and more recently has come also the release of atomic energy (energy stored in the nucleus of the atom as mass) with its application to warfare in the form of the powerful atomic bomb and its possible application in times of peace as a new and potent source of energy.

Bibliography.—Darrow, *Story of Chemistry* (new ed. 1930) ; Moore, *History of Chemistry* (1931) ; Jaffe, *Crucibles: Lives and Achievements of the Great Chemists* (1930) ; Holmyard, *Makers of Chemistry* (1931) ; Howe, *Chemistry in the World's Work* (1926) ; Findlay, *Chemistry in the Service of Man* (1931) ; Harrow, *Eminent Chemists of Our Time* (1921) ; Beery, *Stuff: The Story of Materials in the Service of Man* (1930) ; Howe and Turner, *Chemistry in the Home* (1927) ; Slosson, *Creative Chemistry* (rev. ed. 1930) ; Sadtler, *Chemistry of Familiar Things* (6th ed. 1930) ; Weidlein & Harmor, *Science in Action* (1931) ; Mercer, *Alchemy* (1921) ; Stieglitz, *Chemistry in Medicine* (1928).

Elementary.—Black & Conant, *Practical Chemistry* (1930) ; Brownlee and others, *First Principles of Chemistry* (1930) ; McPherson and others, *Chemistry for To-day* (1931) ; Holmes, *Introductory College Chemistry* (1931) ; *General Chemistry* (1930) ; *Laboratory Manual of General Chemistry* (3rd ed. 1930) ; Hale & Smeaton, *Laboratory Manual of General Chemistry* (rev. ed. 1930) ; Rideal, *Introduction to Surface Chemistry* (rev. ed. 1930).

Advanced.—Riegel, *Industrial Chemistry* (1934) ; Chittenden, *Development of Physiological Chemistry in the U. S.* (1931) ; Timm, *Introduction to Chemistry* (1930) ; Kendall, *General Chemistry* (1927) ; Haynes, *The Chemical Age: The Miracle of Man-made Materials* (1942).

Among the leading periodicals in America devoted to the subject of chemistry are *The Journal of the American Chemical Society,* devoted to pure science ; *Industrial and Engineering Chemistry,* devoted to applied science ; *Chemical Abstracts, a* survey of world literature in chemistry ; *Chemical Reviews,* a quarterly of pure chemistry ; *Journal of Chemical Education* and *Chemistry Leaflet; Journal of Physical Chemistry,* and two series of monographs, all publications of the American Chemical Society.

Chemistry, Bureau of Agricultural and Industrial, a research organization in the Department of Agriculture engaged in investigations and experiments in the fields of chemistry, physics, and other physical sciences relating to agricultural products and to the development of new and wider industrial and food uses for agricultural products. The Bureau consists of administrative offices ; four regional research laboratories, namely, Northern Laboratory, Peoria, Ill., Southern Laboratory, New Orleans, La., Eastern Laboratory, Philadelphia, and Western Laboratory, Albany, Calif. ; and the following independent research divisions or laboratories: Agricultural Chemical Research, Allergen Research, Enzyme and Phytochemistry Research, Microbiology Research, Naval Stores Research, Pharmacological Research, Emergency Rubber Investigations, Biologically Active Chemical Compounds, and Synthetic Liquid Fuels Project.

Chemnitz, kem'nits, town, Germany, in the district of Zwickau, Saxony, 50 miles by rail southwest of Dresden. Notable public buildings include the Church of St. James (fifteenth century) ; the new City Hall ; Church of St. Peter, old Rathaus, Royal Technical Schools, Post Office, King Albert Museum, Central Railway Sta-

The applications of electricity to chemistry are twofold. First, as a means of obtaining temperatures far transcending those obtainable by any process of combustion. This is effected by employing the principle of the arc light on a very large scale, the bed of the electric furnace lying between carbon poles, in the middle of which a powerful current is passed. Such furnaces are now employed for some special purposes—*e.g.*, in the preparation of calcium carbide—where high temperature alone is necessary. In other cases, as in the production of aluminum, a second effect becomes the chief one—that of direct decomposition of the fused mass by the electric current, the process of *Electrolysis*, as it is called. This process has been employed at ordinary temperatures, and especially in connection with solutions, for a long time. Davy was the pioneer in its early use, and by means of it performed some of his most brilliant work—the decomposition of the alkalis into their elements. Faraday established the fundamental laws to which the process is subject—laws which have received their most satisfactory generalization in the ionization hypothesis mentioned above.

The process of electrolysis is now looked upon as consisting essentially in the discharge of the ions at the poles or electrodes. When this has taken place, the free atoms or radicals which are thus produced act in accordance with their chemical character, and may give rise to the formation of free elements, or of new compounds, by uniting with one another or acting upon the solution or the electrodes. (See ELECTROLYSIS.)

Electrical processes are now largely in use for the refining of metals, the manufacture of soda, chlorine, and many other substances; and the growth of these technical applications is shifting the site of many chemical manufactures from the present centres (the neighborhood of coal fields) to places where electrical energy is most cheaply obtainable—*i.e.*, to the neighborhood of large waterfalls, as at Niagara, at Sarpsfos in Norway, at Foyers in Scotland, in Bavaria, Switzerland, etc.

Another branch of chemistry which has an important bearing not only on the purely scientific aspect of the subject, but also on its technical application, is that of *Thermo-Chemistry*, dealing with the heat effects connected with chemical changes. The results of laboratory experiments are often of the greatest importance in determining the relative value of different processes from the point of view of economic efficiency. (See THERMO-CHEMISTRY.)

Physiological Chemistry, or *Biochemistry*, is the division of applied chemistry in which are considered the chemical transformations occurring in the vital phenomena of animals and plants. The scope of physiological chemistry embraces the study of the constitution of foodstuffs; the manner in which digestive processes render them assimilable; the elaboration from the products of digestion of those complex substances characteristic of the living organism, and their subsequent resolution and elimination, the whole cycle forming the animal or vegetable 'metabolism.' In these changes an important rôle is that of the enzymes, or unorganized ferments, secreted by the cells of the digestive organs, which act as catalysts, but are distinguished by specificity—*i.e.*, by acting only on particular compounds, or by achieving a partial decomposition, as distinguished from inorganic catalysts, which produce a given type of reaction irrespective of the class of compound acted upon; thus pepsin, the enzyme of gastric juice, acts upon proteins (albumin), and not on sugar or starch, whereas hydrochloric acid acts indifferently on each.

Knowledge of the physico-chemical action of drugs and poisons renders medicine, so far as it is concerned with the administration of drugs, more rational and less empirical. The application of the principles of physical chemistry in the study of the passage of dissolved substances through cell membranes, a characteristic of many vital processes, is a valued aid in interpreting the processes of metabolism.

Some of the problems of this branch of science which are being studied and solved—many of them with brilliant success, resulting in untold benefit to humanity—are the following: (1) The dynamic action of food—that is, studies of the energy derivable from food, carried out with the aid of the bomb and respiration calorimeters, expressed ordinarily in heat units (calories). For example, a pound of butter is found to yield 3,605 cal., while a pound of oysters, as purchased, yields but 335 cal. Respiration calorimeters have been constructed large enough to contain a man, thus enabling studies of energy changes to be made under varying conditions, as while sleeping, exercising, etc. About 2,500 cal. are required from the daily food of a man having a sedentary occupation; while the activity of a farmer's life, for example, calls for 3,500 cal. With the aid of the same apparatus it has been established that the law of conservation of energy operates within the body in precisely the same manner as it does outside. (2) The balance of energy in health and disease—that is, the comparison of energy theoretically derivable from the food ingested with that actually measured. (3) Food analysis, the determination of the percentage of refuse (fibre, bone, etc.), water, protein, fat, carbohydrates, and mineral constituents. Valuable data on this subject are available in the publications of the U. S. Bureau of Chemistry and of the Agricultural Experiment Stations, many of which are to be had free. (4) Dietetics, the division of hygiene in which the effects of different foods are studied, and food regimens are worked out, suitable for various conditions of health and disease. A balanced ration is a food allowance containing the proper proportions of carbohydrates, fat, protein, and mineral matter; *e.g.*, for a day, bread 454 gm., cocoa 28 gm., milk 113 gm., sugar 28 gm., butter 14 gm., broth 454 gm., oysters 227 gm., meat 227 gm. (5) The isolation of important compounds found in animal tissues, as enzymes, nucleic acid, etc. (6) Intermediary metabolism, as in diabetes, in which there is inability to oxidize sugar, or the incomplete oxidation of fat, as in severe diabetes; purine metabolism, as in gout. (7) Synthetic preparation of substances of physiological importance, as the proteins, sugars, etc. (8) Immunity (immuno-chemistry); and the preparation of antitoxins, as that for diphtheria, etc.

Agricultural Chemistry. — The importance of this division of applied chemistry is apparent when it is considered that the maintenance of life depends mainly upon the food supply obtained by soil cultivation, and a fertile soil is necessary not only for the growth of foodstuffs, but also for the production of a large part of the raw materials used in manufactures—for example, cotton and wool. Owing to the fact that the population increases more rapidly than the area under cultivation, to which latter there is also a fixed limit, the gravity of the problem of obtaining a greater yield per unit area is already felt.

It is clear that an organism must receive in its nourishment all the elements of which its tissues are composed. This leads to the study of the atmosphere, water, and soils. In recent years, great advance has been made in knowledge of the constitution and properties of the soil. Extensive soil surveys and mappings are carried out by the National Bureau of Soils, and upon such studies are based the scientific preparation of fertilizers.

To make a satisfactory fertilizer it is necessary to know (1) the substances required by plants, and (2) the composition of the soil. The fertilizer is to supply the lacking constituents. In this connection have arisen two great chemical problems: how to obtain an adequate supply of (1) nitrogenous substances capable of being assimilated by plants, and (2) a cheap source of potassium compounds. The first has been solved in the methods for the fixation of nitrogen (q.v.); while means have been devised for obtaining potassium compounds from rocks, such as feldspar, which occurs in enormous quantities, though the proposed processes are not as yet commercially profitable. Potassium chloride obtained from extensive deposits in Germany is as yet the principal potassium compound employed in fertilizers. Phosphorus is another element essential for plant growth, and may be supplied in phosphates. Plentiful sources of these compounds exist in the deposits of rock phosphates as in Florida, Utah, etc., and other sources are slag, bone, and guano.

The plant is not capable of taking up all compounds of the necessary elements. Thus, tricalcium phosphate is insoluble in water, and is not assimilated by the plant. When left in the soil, however, it undergoes a slow chemical change, and yields a supply of phosphorus for several years. If the phosphate is treated with sulphuric acid it is converted into a soluble acidic phosphate, the so-called 'superphosphate.' Dicalcium phosphate is insoluble in water, but is soluble in the juices secreted by plant roots.

The search for substances suitable to be used in fertilizers has led to the economical utilization of many waste substances, as tankage, city garbage, blast furnace slag, etc. It has been shown recently that some of the elements present in plants in relatively very small quantities (.01 per cent or less) are in fact necessary or beneficial for growth—*e.g.*, manganese in its effect on the cultivation of oats, and boron in the case of corn. Since some of the fundamental chemical transformations take place in the leaf only under the influence of light, new interest is being evidenced in the subject of *photochemistry.*

Knowledge of the chemical processes involved in the department of animal husbandry has been of great service. Studies of animal nutrition and determination of digestible nutrients in the ingredients used for cattle feeds make their scientific preparation possible. The Pure Food and Drugs Act (q.v.) provides for the establishment of food standards and the supervision of the market, making adulteration (q.v.) more difficult, and thus insuring satisfactory cattle feeds.

The numerous Agricultural Experiment Stations (q.v.) scattered all over the country have carried on work of incalculable value in investigations in agricultural chemistry, dealing with the problems mentioned, and many others. The results are published and are to be had free or for a small price. Related subjects are the chemistry of dairying, the fermentation industries, sugar refining, the manufacture of starch, etc.

In connection with this article should be read the articles ATOM and ATOMIC THEORY; ANALYSIS, CHEMICAL; ANALYSIS, COMMERCIAL; ELECTRO-CHEMISTRY; ELECTROLYSIS; ORGANIC CHEMISTRY; PERIODIC LAW; RADIO-ACTIVITY; STEREO-CHEMISTRY; THERMO-CHEMISTRY. See also separate articles on the several elements, those on the various acids, those on the great chemists, and the following as among the more important of the many chemical articles throughout this work:

Acid.
Adulteration.
Alchemy.
Alcohol.
Alkali.
Alkaloids.
Allotropy.
Amides.
Amines.
Assaying.
Bacteriology.
Boiling.
Carbohydrates.
Carbon.
Catalysis.
Coal Tar.
Compounds.
Critical Temperature.
Diazo-Compounds.
Dissociation.
Distillation.
Electron.
Elements.
Enzyme.
Equations.
Esters.
Ether.
Evaporation.
Fermentation.
Fertilizers.
Gases.
Glycerin.
Hydrocarbons.
Hydrogen.
Immunity.
Isomerism.
Isomorphism.
Ions.
Ketones.
Lime.
Melting.
Metabolism.
Metals.
Molecule.
Oils and Fats.
Oxides.
Oxygen.
Proteids.
Radicals.
Salts.
Serum.
Serum Therapy.
Soap.
Sodium.
Solutions.
Spectrum.
Starch.
Sugar.
Symbols.
Vaccine Therapy.
Valency.
Water.

Bibliography.—For a general introduction to the subject, consult Ostwald's *Introduction to Chemistry* (1911); Remsen's *Introduction to the Study of Chemistry* and *Inorganic Chemistry;* Roscoe's *Lessons in Elementary Chemistry;* Newth's *Inorganic Chemistry* (new ed. 1905); Wurtz' *Elements of Modern Chemistry* (trans. by W. H. Greene); Ostwald's *Inorganic Chemistry* (trans. by A. Findlay; new ed. 1908); Duncan's *Chemical Problems of To-Day* (1911). Works of reference include Roscoe and Schorlemmer's *Treatise on Chemistry,* Watts' *Dictionary of Chemistry,* and Thorpe's *Dictionary of Applied Chemistry* (1913). For Organic Chemistry, consult Perkin and Kipping's (1912), Bernthsen's (Eng. trans. 1912), Von Richter's (Eng. trans.), Cohen's (1907, 1913), and Norris' (1912) text books. The standard works of reference are Beilstein's *Handbuch der Organischen Chemie,* and Meyer and Jacobson's *Lehrbuch.*

For General and Physical Chemistry, consult Dobbin and Walker's *Chemical Theory for Beginners;* Van Deventer's *Physical Chemistry for Beginners* (trans. by R. H. Lehfeldt); Arrhenius' *Theories of Chemistry* (1907); Walker's *Introduction to Physical Chemistry* (new ed. 1910); Van't Hoff's *Lectures on Theoretical and Physical Chemistry;* Ostwald's *Outlines of General Chemistry* (trans. by Taylor; 3d ed. 1912). For Analytical Chemistry, consult the manuals by Fresenius (trans. by A. Vacher), Treadwell (trans. by W. T. Hall, 1903–04), and Sutton's *Volumetric Analysis* (10th ed. 1911). For the History of Chemistry, consult Thomson's (up to 1830 only), Ladenburg's (trans. by L. Dobbin), and Meyers' *Histories;* Kopp's *Geschichte der Chemie;* Thorpe's *Essays in Historical Chemistry* (3d ed. 1911); Smith's *Chemistry in America* (1914). For a Bibliography of Chemistry, consult Bolton's *A Select Bibliography of Chemistry,* with Supplements. The best-known American periodical is the *Journal of the American Chemical Society.*

Chemkend. See CHIMKENT.

Chemnitz, kem'nits, town, district Zwickau, Saxony, lies in a small valley at the north foot of the Erzgebirge (tourist centre for this district); 50 miles by rail southwest of Dresden. Notable public buildings include the Church of St. James (fifteenth century; restored in 1880); the fine new City Hall, dedicated in 1911; the Church of St. Peter, old Rathaus, Royal Technical Schools, Post Office, King Albert Museum, Central Railway Station, Castle, City Theatre, and Imperial Bank. It was one of the principal manufacturing towns of Germany. Its specialties were the production of knit goods, locomotives and machinery, agricultural implements, and tools. It had important manufactures of cotton spinning, hosiery, gloves, dyeing and bleaching, ribbons, paper wares, toys, leather goods, stoneware, chemicals, and brewing. The town is surrounded by a close ring of industrial villages—Gablenz, Alt-Chemnitz (incorporated with Chemnitz in 1894), Kappel, Schönau, and others—and was splendidly equipped with special technical schools. Pop. (1939) 334,563.

Chemnitz, MARTIN (1522–86), the most eminent Lutheran theologian in the second half of the sixteenth century, was born at Treuenbrietzen in Brandenburg, Germany. He was appointed librarian of the ducal library at Königsberg in 1550, and from that time he devoted himself entirely to theology. He then went to Wittenberg (1553), where he delivered lectures on the Loci Communes of Melanchthon. He was appointed a preacher at Brunswick in 1554, and superintendent in 1567. Along with Andrea and Selnecker he induced the Lutherans of Saxony and Swabia to unite in adopting the *Formula Concordiæ*. The chief works of Chemnitz were: *Examen Concilii Tridentini; Corpus Doctrinæ Julium; Corpus Doctrinæ Pruthenicum; De Duabus Naturis in Christo*. Consult his *Life* by Pressel, by Lentz, and by Hachfeld.

Chemosh, kē'mosh, the national deity of the Moabites, called in 1 and 2 Kings 'the abomination of the Moabites.' He was essentially one with the Moloch or Milcom ('king') of the Ammonites, and both were forms of the Canaanite Baal. Chemosh is frequently mentioned in Scripture—Num. (xxi, 29, 1 Kings xi, 33, Jer. xlviii, 13, etc.). On the Moabite Stone (q. v.), King Mesha attributes the Israelite successes over Moab to the wrath of Chemosh, and Moab's deliverance to his assistance. In view of 2 Kings (iii, 27), it is evident that he was sometimes worshipped with human sacrifices. Solomon in his later years consecrated 'high places' to Chemosh in Jerusalem. In Judges (xii, 24), Chemosh is probably used in mistake for Moloch.

Chem'otax'is. See REPRODUCTION.

Chem'other'apy, the treatment of disease by administering chemicals which affect the causative organism unfavorably but do not injure the patient. See DRUGS.

Chemulpo, chē-mul'pō, town, on the west coast of Korea; 25 miles by rail southwest of the capital, Seoul. It is one of the three treaty ports opened in 1883 to foreign commerce. Imports include textiles, silk, metals, railway supplies, and petroleum; exports consist mainly of rice, beans, ginseng, hides, wheat, and paper. At the outset of the Russo-Japanese War the Japanese landed here on Feb. 8, 1904. Here also the first shot of the war was fired. Pop. (1940) 102,473.

Chemung (shē-mung') **Formation,** in geology, belongs to the Upper Devonian rocks of North America, and contains a great series of shales and ripple-marked sandstones, estimated to be 8,000 feet thick in some places in Pennsylvania and New York, but in the Mississippi Valley represented apparently by only a few feet of black shale. The Portage and the Catskill groups are subdivisions of the Chemung. This formation is the chief source of the mineral oil and gas of Pennsylvania. The oil has been derived from the decomposition or alteration of organic remains, but whether in the 'oil sands' or in deeper strata is uncertain (see PETROLEUM). See DEVONIAN.

Chenab, chē-näb', or CHENAUB, chē-nôb', one of the 'five rivers' of the Punjab, India. Rising in the mountains of Kashmir, it flows southwest, forming the boundary between the Sailkot and Gujarat districts of the Punjab. It unites with the Jhelum and the Sutlej, and becomes a tributary of the Indus. Its length is 755 miles. The *Chenab Canal* is the largest and most profitable perennial canal in India. It irrigates 2,500,000 acres of crops in the vast and formerly waterless Rechna Doab, between the Ravi and Chenab Rivers.

Chen-an-fu, city, China, Kwangsi, in lat. 23° 20′ N. and long. 106° 19′ E.

Chen-chou-fu, city, China, Honan, in lat. 33° 46′ N. and long. 115° 3′ E.

Chen-chou-fu, city, China, Hunan, on the Yuan River, in lat. 28° 22′ N. and long. 110° 9′ E.

Chên'ée, village, Belgium, Liége province; 5 miles southwest of Liége. It has large iron and zinc foundries. Pop. 9,906.

Chenery, chen'*er*-i, THOMAS (1826–84), English journalist and Orientalist, was born in Barbados. He was correspondent of the London *Times* at Constantinople during the Crimean War (1854–6), and became its editor in 1877. In 1868–77 he was professor of Arabic at Oxford, and was a member of the revision committee of the Old Testament. He translated the *Six Assemblies of El Harîri* (1867), and edited the Jewish *Machberoth Ithiel* (1872).

Cheney, chē'ni, CHARLES EDWARD (1836–1916), American bishop, born in Canandaigua, N. Y., was graduated from Hobart College (1857). He studied theology at the Virginia Theological Seminary, was ordained in the Protestant Episcopal Church, and in 1860 became rector of Christ Church, Chicago. In 1873 he helped establish the Reformed Episcopal Church, and the same year was consecrated missionary bishop of the Northwest, remaining in charge of Christ Church, from which an ecclesiastical council was unsuccessful in its efforts to remove him by process of law. In 1878 he was made bishop of the synod of Chicago, and in 1905 president of the synod of Reformed Episcopal churches of the Central States. He published: *Twenty-Eight Sermons* (1880); *What Do Reformed Episcopalians Believe?* (1888); *The Enlistment of the Christian Soldier* (1893); *A King of France Unnamed in History* (1902); *The Second Norman Conquest of England* (1907); *A Belated Plantagenet* (1913).

Cheney, EDNA DOW (1824–1904), American author, the second wife of Seth W. Cheney (q. v.) was born (Littlehale) in Boston, Mass., and received instruction from Margaret Fuller. She helped to found the School of Design for Women, and was its secretary in 1851–3. She also took an active interest in the Freedmen's Aid Society and in woman's suffrage. She published: *Handbook for American Citizens; Life, Letters, and Journals of Louisa M. Alcott* (1889); *Stories of the Olden Time* (1890).

Cheney, JOHN VANCE (1848–1922), American poet and librarian, was born in Groveland, N. Y., and was educated at Temple Hill Academy, Geneseo, N. Y. After several years of teaching, he was admitted to the Massachusetts bar, and practiced law in New York for a short time, removing to California in 1876. He was librarian of the San Francisco free public library from 1887 to 1894, and librarian of the Newberry Library in Chicago from 1894 to 1899. He was a member of the National Institute of Arts and Letters. His books of verse include: *At the Silver Gate; Thistle Drift* (1887); *Wood Blooms* (1888); *Queen Helen* (1895); *Out of the Silence* (1897); *Lyr-*

ics (1901); *Poems* (1905); *The Time of Roses* (1908). He also published two volumes of essays, *The Golden Gates* (1892) and *That Dome in Air* (1895). He edited the *Caxton Club Scrap Book* (1904) and Simeon P. Cheney's *Wood Notes Wild.*

Cheney, Seth Wells (1810–56), American artist, was born in South Manchester, Conn., and was educated at the village school. He studied engraving in Boston, and in Paris under Isabey, Paul Delaroche, and others. He established himself at Boston as an artist in black and white (1841), being one of the earliest to practice this art in America, and made many crayon portraits of distinguished people. His works include portraits of *Theodore Parker with His Wife; The President of Harvard, James Walker; William Cullen Bryant; Ephraim Peabody; A Roman Girl.*

Chengalpat, town, India. See Chingleput.

Chengtefu, cheng-te-fo͞o, also known as Jehol, China, in Chi-li; 120 miles northeast of Peking. Lat. 40° 59′ n.; long. 117° 59′ e. Pop. (1931, est.) 50,000.

Cheng-ting-fu, -ting-fo͞o′, city, China, in Chi-li, on the railroad from Hankow to Peking; 160 miles southwest of Peking. Lat. 38° 15′ n.; long. 114° 40′ e.

Chengtu, -to͞o′ (Marco Polo's *Sindafu*), city, China, capital of Szechwan province, in the center of a rich plain, artificially irrigated by branches of the River Min and To; 175 miles northwest of Chung-ching-fu. The Chengtu Plain, 90 miles in length by 45 miles in width, is one of the garden spots of the republic. Chengtu is one of the most prosperous cities of China, with clean streets and canals, and railway, telegraphic, and postal service. It is the seat of a large silk trade, has an up-to-date arsenal, and is an important commercial town. The inhabitants were almost destroyed in 1644 by Chang Hsien-chang, who made himself Emperor of the West. The city suffered during the Chinese Revolution of 1911. Pop. (1931, est.) 700,000.

Cheng-yang-kuan, -yang-kwän′, market town, China, Anhui; an important trade depot and customs station.

Chen-hai, China. See Chinhai.

Chénier, shā-nyā′, André-Marie de (1762–94), French poet, was born in Constantinople, where his father was French consul-general. Among his earliest and most beautiful poems were *L'Aveugle* and *Le Mendiant.* Settling in Paris in 1786, he entered upon more ambitious work, and produced *L'Invention, Suzanne,* and *Hermès.* After a residence of three years in London as secretary to the French Ambassador, he returned to Paris in 1790. Though at first an ardent revolutionist, he deprecated all excesses. His *Avis aux Français sur leurs Véritables Ennemis* (1790), and his subsequent writings, preaching moderation and tolerance, earned for him the hatred of the Jacobins, with the result that he was arrested and thrown into prison. He was sentenced to death by the Revolutionary Tribunal, and guillotined on July 25, 1794, only three days before the execution of Robespierre and the end of the Reign of Terror. Other pieces of Chénier that deserve special mention are *La Jeune Captive, La Jeune Malade,* and *Versailles.* Sainte-Beuve pronounced him one of the great masters of French poetry during the eighteenth century, and the greatest French classic in verse since Boileau and Racine. He was the forerunner of Chateaubriand, Victor Hugo, and Lamartine. A new edition of his *Œuvres Complètes,* edited by Paul Dimoff, appeared in 1908. Consult Heller, *André Chénier;* Faguet, *André Chénier;* Haraszti, *La Poésie d'André Chénier.*

Chénier, Marie-Joseph de (1764–1811), younger brother of the above, was a Jacobin, and a member of every legislative assembly from 1792 to 1802. He was the author of several tragedies (of which *Timoléon* and *Charles IX* were the finest), and of the famous song *Chant du Départ.* Consult Lieby's *Etude sur le Théâtre de Marie-Joseph Chénier.*

Chenille, she-nēl′, a thick, velvety-looking cord of silk or wool, used in ornamental sewing and manufactured trimmings.

Chenonceaux, she-nôṅ′sō′, village, France, department Indre-et-Loire, 19 miles southeast of Tours. It owes its interest to its Renaissance castle, which was built in the time of Francis i. It was subsequently added to and embellished by Diane de Poitiers and Catherine de' Medici. Afterward it was the property of the Condés, the Duc de Bourbon, and Madame Dupin, who was a friend of Buffon, Voltaire, and Rousseau. Consult Miltoun's *Castles and Châteaux of Old Touraine* (1907).

Chenopodiaceae, kē-nō-pō′di-ā′si-ē, an order of apetalous dicotyledons usually regarded as reduced types of Caryophyllaceae, and closely related to Amaranthaceae, with which some include them as Oleraceae. They are herbaceous or half-shrubby plants, with simple, alternate, exstipulate leaves, and inconspicuous, five-parted flowers, hermaphrodite or unisexual, usually wind fertilized. The fruit, a utricle, is enclosed in a five-lobed calyx, which at maturity is often conspicuous, having wings and keels; or is very fleshy, and of bright hues. There are about five hundred species, mostly wood-like, and growing in arid or alkaline soils, and some of them on sea beaches. They are widely diffused over the world, particularly in northern Europe and Asia. Beet and Spinach are among the best known and most useful plants of the order. The genus Atriplex usually grows in saline localities. *Salicornia* is a salad plant, and the Greasewood (*Sarcobatus*) is a fuel plant in desert regions. The Russian thistle (*Salsola*) is a pernicious weed in cultivated ground. A number of shrubby species are fairly common in the alkaline parts of western North America.

Chenopodium, kē-nō-pō′di-um, a genus of plants belonging to the order Chenopodiaceae, characterized by insignificant greenish flowers and leaves which are often scurfy. The fruits are utricles, enclosed by the five lobes of the calyx, which are sometimes fleshy or ridged. Some of the common species, known by the name of Goosefoot, are weeds growing in gardens, on heaps of rubbish, and in waste places. The species are mostly annuals, with entire or toothed leaves, often with a sort of mealy hoariness, and are widely distributed, or becoming naturalized in all climates. *C. olidum* and *C. vulvaria* (Stinking Goosefoot) are in popular repute as antispasmodics and emmenagogues. The leaves of many species are used as a substitute for spinach, particularly those of the Good Harry, Wild Spinach, All Good, or English Mercury (*C. bonus-Henricus*), a common wayside perennial with thick, dark green, arrow-shaped leaves, and compound terminal leafless flower spikes in August. The young shoots have long been eaten after the manner of asparagus in Europe, and it has been sometimes cultivated for the purpose. One of the most important of the species, as affording a leading article of food in the countries of which it is a native, is Quinoa (q. v.). *C. Botrys,* a native of the south of Europe, with pinnatifid leaves resembling those of the oak, and hence called Jerusalem Oak, is in use as an expectorant and anthelmintic. It is agreeably fragrant. The closely allied Wormseed of the United States has a strong and somewhat aromatic odor, and a high reputation as a vermifuge. The 'Wormseed' is *C. anthelminticum;* 'Mexican tea' is the tropical *C. ambrosioides.* For *C. quinoa* see QUINOA.

Chenopodium olidum

1, Flower.

Chen-yuan-fu, chen-yo͞o-än-fo͞o', city, China, in Kweichou province, at the head of navigation of the Yuan River which connects it with Hunan.

Cheops, kē'ops, KHUFU, or CHUFU (3733–3666 B.C., according to Brugsch), king of Memphis in Egypt, being the second monarch of the Fourth Dynasty. He was called Chembeis or Chemmis by Diodorus, Suphis by Manetho and Saophis by Eratosthenes. He built the first, or Great Pyramid, as a sepulchre for himself and left various other monuments bearing his name. Some authorities describe him as a cruel and tyrannical ruler, others as a kind and wise one.

Chephren, kef'ren, or KHEFREN, a king of Egypt about 3666 B.C., who is said to have built the second pyramid. Acording to Egyptian tradition he was either the son or the son-in-law of Cheops, and the Sphinx has been attributed to him by some authorities.

Chequers Court, an official residence of the prime ministers of Great Britain. The estate is near Princes Risborough in Buckinghamshire. It was presented to the nation in 1921 by Lord and Lady Lee of Fareham, and comprises about 1,500 acres, The house dates from the time of Henry II and has been remodelled several times.

Cher, sher, department, central France, bounded on the east by the Loire River. The surface (2,819 square miles) consists for the most part of plains, diversified by low, well-wooded hills in the east and northeast and by a granitic mass in the south. The northwest corner is occupied by the marshy Sologne, and is being gradually improved by pine cultivation. The center is occupied by the Plateau de Bourges (Champagne Berrichonne). Wheat, oats, and the vine are cultivated; but iron-mining is the chief industry, besides coal and manganese mining, paper-making, and tanning. Pop. (1936) 288,695.

Cher, river, France, rises in the department of Creuse, and flows for some 200 miles in a northwesterly direction joining the Loire below Tours. It is navigable for boats from Vierzon.

Cherbourg, sher-bo͞or' (anc. *Coriallum*), important seaport, France, department of Manche, on the English Channel, at the northern extremity of the Cotentin Peninsula, 230 miles northwest of Paris. There are two ports, the commercial and the naval. The roadstead, 4 square miles in area, is strongly protected by forts. The breakwater, 2¼ miles in length, was begun in 1783, and completed in 1858, at a cost of nearly $40,000,000. The commercial port consists of an inner basin (1,311 feet by 650 feet) and a tidal harbor. Besides being a packet station for Havre, Guernsey, and Southampton, Cherbourg is a calling station for many of the transatlantic liners. The exports, especially to Great Britain, include dairy and agricultural produce and stone for road-making. The naval dockyard lies to the northwest of the town, and has three basins hewn out of the solid rock. In 1758 the British destroyed the fortifications, and on June 19, 1864, off the coast, the U. S. S. *Kearsarge* met and destroyed the Confederate cruiser *Alabama.* Pop. (1930) 40,000.

Cherbuliez, sher-bül-yā', family of French writers the most famous of whom is VICTOR (1829–99), son of André Cherbuliez, a professor of classical literature at Geneva, where he was born. His first work was an antiquarian essay, published in 1860; in 1864 he joined the staff of the *Revue des Deux Mondes,* in which his novels appeared, and numerous articles signed 'G. Valbert.' In 1882 he was elected to the Academy. A man of broad culture, his books are always clever, and often brilliant. Among them are *Le comte kostia* (1863), *Le roman d'une honnête femme* (1866), *L'aventure de Ladislas Bolski* (1869), *L'Idée de Jean Têterol* (1878), *La ferme du Choquad* (1883), *Le secret du précepteur* (1893), and *Jacquin Vanese* (1898).

Cherethites, ker'i-thīts, THE, and THE PELETHITES, two tribes in Palestine who formed King David's bodyguard. Gesenius interpreted the names respectively as *executioners* and *messengers,* but it is now believed that they are proper names: thus, Cherethites = Carites = Cretans (Crete = Caphtor, from which the Philistines originally came); Pelethites is an obvious variation of Philistine. Hence the king's bodyguard was a Philistine troop. Consult 2 Sam. xv, 18; *cf.* 1 Sam. xxx, 14.

Cheribon, sher'i-bon, seaport town, Java, capital of the residency of Cheribon, on the north coast; 170 miles southeast of Batavia. The town is divided into two sections, an old and a new, the European living mostly in the new part. The tomb of Gunung Djati, a famous Mohammedan, is a great place of pilgrimage. Rice and sugar are produced. Pop. (1930) 51,732.

Cherimoya, cher-a-moi'*a*, a delicious subtropical fruit borne by an evergreen tree or shrub, *Anona cherimolia,* which is a native of Ecuador and Peru. It has been naturalized in Mexico, Central America, the Mediterranean region and India. The tree, from 15 to 25 feet in height, has drooping branches, and odorous bloom. The fruit is green or yellowish, with a rosy cheek, irregularly round in shape, and its skin is tough and checkered by somewhat raised lines. The interior is a white, juicy, soft pulp, in which black seeds are imbedded. Its flavor is subacid, somewhat similar to a pineapple or banana.

Cherkasi, cher-kä'si, or CHERKASSY, town, Russia, Ukraine, in Kiev government, on the right bank of the Dnieper; 84 miles southeast of Kiev city. It is the center of a large sugar industry and has a distillery and tobacco factories. As a river port it has considerable trade in corn, sugar, salt, wood, and metals. Pop. (1939) 51,693.

Chernigov, cher-nyē'gof, or TCHERNIGOV, Russia, Ukraine; area, 20,233 square miles. The surface is level, broken by higher land, especially towards the Dnieper and the southwest border. The Desna is the chief river. Agriculture and grazing are important; fruit is raised and there is trade in timber, hemp, flax, tobacco, honey, and wax. Manufactures include linen, broadcloth, leather, glass, and beet sugar; the minerals are iron, slate, saltpeter, and alum. Pop. 2,500,000.

Chernigov (Polish *Czernichow*), town, Russia, archiepiscopal see of the Ukraine, capital of government of Chernigov, near the Desna, an affluent of the Dnieper; 80 miles northeast of Kiev. Features of interest are the Cathedral of the Saviour, built in 1034 in Byzantine style and restored by Catherine II after a fire, one of the most famous monuments of East Slavonic church architecture; the town hall, now used as a state bank; the Pushkin monument; and the State Museum, founded in 1925, one of the richest museums in the Ukranian Soviet Republic. The leading industries are trading in timber and flour, and brick making. The neighborhood is rich in antiquities; there were interesting excavations in 1873–7. Pop. 34,359.

Cherokee, cher-ō-ke′, city, Iowa, county seat of Cherokee County, on the Illinois Central Railroad; 48 miles northeast of Sioux City. It is the seat of a State Insane Asylum. The city has foundries, machine shops, and manufacturing interests. Pop. (1930) 6,443; (1940) 7,469.

Cherokee Cases, the name by which two cases concerning the Cherokee Indians, which were decided by the United States Supreme Court in 1831 and 1832, are sometimes known, the actual titles being The Cherokee Nation *vs.* Georgia and Worcester *vs.* Georgia. By the so-called Hopewell treaty of 1785 between the United States and the Cherokees the United States had recognized the latter as a nation, with all the attributes of nationality; and by the Holston treaty of 1791 the United States had guaranteed to the Cherokees the possession of the lands not ceded by them in the former treaty. In 1802 the United States agreed with Georgia to extinguish Indian land-titles in the state as soon as possible, but the Cherokees, who lived in Georgia, refused to part with their lands, and during the administration of President Jackson, Georgia, on the ground that the state was an independent nation, coequal with the United States, refused to be bound by the Hopewell and Holston treaties. President Jackson, in turn, was unwilling to coerce the state. In 1830, Georgia having seized certain Cherokee lands, the Cherokee Nation appealed to the United States Supreme Court, which in 1831 decided that the Cherokees were not an independent but a dependent nation and therefore incapable of maintaining an action in the Supreme Court. This decision seemed to give Georgia a free hand, but in the case of Worcester *vs.* Georgia, decided in the following year, the court held that the United States Indian treaties were paramount to state laws, and that state laws passed in contravention of these treaties were null and void. The decision was not enforced, Georgia successfully defying the Federal Government as represented by the Court.

Cherokees (properly *Tsalaki*) a North American Indian nation, with two main divisions, the Ottaré ('Highlanders') and Ayraté ('Lowlanders'), who originally occupied the Appomattox basin, Virginia. About 1780 they were driven thence south to the Carolinas and Georgia, where they formed a powerful confederacy, with branches extending to Kentucky and Tennessee, and developed a well-organized political system, with national assemblies, and laws based on tribal usages. They abandoned the chase for agriculture, and even turned their attention to letters about 1829, when Sequoya, better known as George Guess, invented a syllabary of seventy-eight signs, which adequately expresses the sounds of the Cherokee language, and is still in use. But the whole nation was removed in 1838 to Indian Territory now Oklahoma. Their numbers have increased from 14,000 in 1864 to about 30,000, all Christians, and fairly well educated. Consult Wardell, *Political History of the Cherokee Nation, 1838–1907* (1938).

Cherry, a small stone-fruit of considerable economic importance, found in almost all parts of the temperate zone. Most of the garden varieties are believed to have been derived from *Prunus avium* and *Prunus cerasus,* both natives of Europe, the cultivated sweet cherries, such as the bigarreaus and hearts, being descended from the first named, and the sour varieties, such as the Morellos and Amarelles, from the latter.

Good varieties of cherry are the Black Tartarian, Napoleon and Dukes, both light and dark in color, and sweet in flavor. The Amarelles, such as the Early Richmond, are light-colored, sour cherries, and the darker-hued Morellos, such as the English Morello, are equally tart and excellent for preserves.

In selecting a site for a cherry plantation, choose a deep, light, loamy soil; an open situation and a southern aspect are usually preferable. After the trees have been planted for a year, cut back each branch to about one foot in length. Afterward cut back, each July and December, all branches that overlap, or overcrowd one another. Encourage surface rooting by top dressings, preferably by artificial manures, in autumn.

The cultivated varieties of the cherry are numerous, and differ in size, color, and flavor. The fruit is largely eaten fresh, and as an ingredient in preserves, and is used for making liqueurs, notably Cherry brandy.

Cherry Blossoms.

There are several native species of cherry which are little used, such as the sand-cherries (*Prunus pumila*), and the wild red, or bird cherry (*P. Pennsylvanica*). The latter when in bloom is one of the most exquisite of our small forest trees. When growing in woods it is slender, and, in spring, is covered with a feathery mass of white petals. The choke-cherry (*P. Virginiana*) adorns rocky ledges, with its spreading bushes. The slender branches bear broadly oval leaves, and numerous racemes of small white flowers. The fruits are small, dark red, translucent, and are decidedly acid and astringent, although, when quite ripe, they have a pleasant flavor.

The most important tree, from an economic standpoint, however, is the wild black cherry, which sometimes reaches a height of nearly 100 ft; and has a trunk sometimes 4 feet in diameter. Its wood is hard and strong, and, when polished, is of a rich red color. When sufficiently abundant it is a favorite wood for cabinet making. The small white flowers grow in elongated, drooping racemes; the fruits are globular, shining black in color, and sweet when ripe in late summer. The whole tree, at that season, looks black with its abundant fruitage. There is much hydrocyanic acid in the wild cherry foliage and kernels, and the foliage, *when wilted*, is apt to poison stock. The bark is rich in tannin, and is used as a tonic, sedative and pectoral.

Cherry-bird. See CEDAR-BIRD.

Cherryvale, city, Montgomery co., Kan., 136 m. s.s.w. of Kansas City, on the A. T. and S. Fe and the St. L. and S. Fran. R. Rs. It has iron and steel works and manufactures of vitrified brick and glass. Pop. (1910) 4,304.

Cherry Valley, vil., Otsego co., N. Y., 42 m. w. of Schenectady, the terminus of the Cherry Valley branch of the Del. and Hud. R. R. It was the scene of the Cherry Valley massacre (q. v.). Pop. (1910) 792.

Cherry Valley Massacre, the massacre, on Nov. 11, 1778, during the American Revolution, by about 800 Tories and Indians under Walter Butler and Joseph Brant, of about 50 of the inhabitants of the village of Cherry Valley in Otsego co., N. Y., the village itself being almost completely destroyed. In addition about 70 prisoners were taken, and these were treated with great cruelty by their captors. The massacre was one of the worst atrocities of the war.

Cherso, long (N.–S. 39 m.) and narrow isl. of Austria, to the E. of the Istrian peninsula. Wine and fruits are the chief products. Sheep are pastured. Area, 127 sq. m. Pop. (1900) 10,333, of whom about one-half are concentrated in the chief (cathedral) town, Cherso, a seaport on the W. coast. Pop. (1900) 8,274.

Chersonesus, a Greek word meaning a peninsula. (**1.**) The THRACIAN CHERSONESE, the narrow strip of land between the Hellespont and the Gulf of Melas in Thrace; the isthmus, about four miles across, was defended by a wall. The elder Miltiades became, in the middle of the 6th century B.C., tyrant of the Chersonese, and afterward it was colonized by the Athenians, and in the 4th century B.C. was dependent on Athens. (**2.**) The TAURIC CHERSONESE, now the Crimea, was colonized at an early date by Greeks from Miletus, and contained three towns—Panticapæum, Tanais, and Heraclea or Chersonesus. (**3.**) CIMBRIC, equivalent to the modern Jutland and Schleswig-Holstein; acquires the name from the Cimbri, who inhabited it down to the 2nd century B.C. (**4.**) GOLDEN, a name given to the Malay Peninsula.

Chert, a mineral very similar to flint, but coarser and less uniform in color and texture, and found principally in association with limestones. In the Carboniferous limestone of Ireland, beds of it are known of the aggregate thickness of several hundred feet. It appears to have resulted from the solution and redeposition of the silica of certain kinds of fossils, particularly of sponges, with the pointed spicules of which it is often filled. Radiolarian chert is a streaky, dark-gray, brown, or reddish rock, which the microscope shows to consist of innumerable shells of Radiolaria, firmly united together by a silicious cementing material. It occurs abundantly in the Palæozoic limestones and dolomites of many districts in the United States, especially in the Devonian limestones of N. Y. and the dolomites of the Mississippi Valley. This material was much used in the manufacture of implements by prehistoric tribes, for which purpose it is a good substitute for true flint.

Chertsey, mrkt. tn. and par. in Surrey, England, 23 m. s.w. of London. The school of handicrafts was founded in 1885 by Dr. Hawksley. A 'cherry' fair, held annually, dates from the time of Henry VI. Pop. (1911) 13,819.

Cherubim, one of four classes of angelic beings pictured as serving the throne of God. Mention occurs in four classes of biblical literature; in the account of the Fall, in early poetry, in apocalyptic prophecy, and in descriptions of furniture and adornments of the temple. (1) In Gen. 3:24 the cherubim guard the entrance to the garden so that man may not re-enter. (2) Ps. 18:10 'cherub' is in parallelism with 'wings of the wind,' and the passage is almost a personification of the storm. (3) Ezek. 1:5–26 is the most noted passage (*cf.* 28:13), while Ezek. 10 is recognized as obscure and difficult to explain. With the cherubim of Ezekiel are to be paralleled the four creatures of Rev. 4:6–8; 5:14; 19:4, evidently referring to the cherubim of the Old Testament. From the descriptions there given, as well as from the pictures given in the Book of Enoch, it is evident that the cherubim were conceived as composite in form, winged, of the nature of light or fire, and exceedingly swift in movement. (4) Two cherubim, facing each other but so placed as to look downward, were set over the ark, shadowing it with their wings. They were of 'wrought gold,' possibly the gold-covered wooden figures. On the veil which separated the Most Holy Place from the Holy Place in the Tabernacle were inwrought figures of cherubim, probably as guardians. In Solomon's temple in the Holy of Holies were colossal figures fifteen feet high and with a spread of wings of fifteen feet. And they were introduced as elements of the adornment of other parts of the temple. From the negative descriptions given the form seems to have been imaginary, not that of man or of any known animal. Composite figures in ethnic belief are often created to express amplitude of power or excellency. The motif was probably found either in Phœnicia or in Assyria; the former had winged griffins, the latter the well-known colossi which guarded the gates of palaces.

In late Jewish theology the cherubim are among the highest of the orders of angels. The early background of the conception is the animism of primitive belief; the development was conditioned by surrounding developments. See Schultz's *O. T. Theology*, ii., 229 f. (1892), and the works of Nowack and Benzinger on Hebrew Archæology.

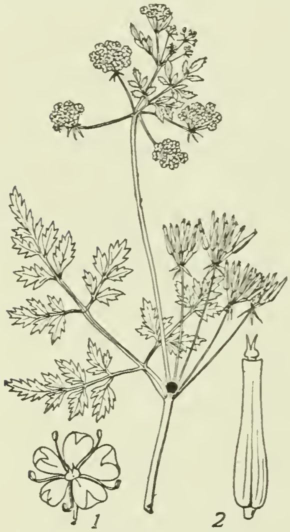
Cherubini, MARIA LUIGI CARLO ZENOBIO SALVATORE (1760–1842), Italian musical composer, born in Florence. He had written a considerable number of sacred compositions before his first opera, *Quinto Fabio*, was produced at Alessandria (1780). He was next invited to London (1784), holding the post of composer to the king till 1785. After visits to Paris and Turin, he finally settled in Paris (1788). Some writers divide Cherubini's work into three periods. The first, from about 1769, consists of motets and masses written after the manner of Palestrina, and light operas in the Neapolitan style. The second or great operatic period, dating from the production of *Démophon* (1788), includes such works of importance as *Lodoiska* (1791), *Elisa* (1792), *Médée* (1797), and his operatic *chef-d'œuvre*, *Les Deux Journées* (1800). His last period, from about 1809, contains his famous sacred compositions, notably the *Requiem in C minor*, his greatest work. Though director of the Paris Conservatoire (from 1822–42), Cherubini's genius had little lasting influence on the French school, the intellectual qualities of his music appealing more to the Germans. Besides his celebrated sacred compositions and numerous operas, Cherubini wrote a great quantity of miscellaneous vocal music, a string quintet, six quartets for strings, and one symphony—over three hundred works altogether. See his *Life* by E. Bellasis (1874); also that by Crowest (1890).

Chéruel, PIERRE ADOLPHE (1809–91), French historian, born at Rouen; was successively professor of history at the college there, and head of the normal school (1849) at Rouen, of the academy at Strassburg (1866), and of the academy of Poitiers (1874).

His principal works, which are trustworthy and full of varied interest, are *Dictionnaire Historique des Institutions, Mœurs, et Coutûmes de la France* (2 vols. 6th ed. 1884); *Histoire de France pendant la Minorité de Louis XIV.* (4 vols. 1878–80); *Histoire de France sous le Ministère de Mazarin* (3 vols. 1882–3); *Mémoires de Fouquet* (1862); and edited the *Lettres du Cardinal Mazarin* (6 vols. 1872–91), *Mémoires de St. Simon* (1873–4).

Cherusci, an ancient German nation who dwelt on both banks of the Weser R., extending to the Harz Mts. and the Elbe R. Under Arminius they definitely checked the Roman conquest of Germany in 9 A.D.

Chervil. Two allied plants, belonging to the order Umbelliferæ, have acquired some culinary reputation. *Chærophyllum bulbosum,* the bulbous-rooted chervil, has sweet, blackish, carrot-like roots, which should be cooked after the manner of parsnips or of salsify. The seed should be sown thinly in drills as soon as ripe, in early autumn. The ground should be rich, but not freshly manured, and should be deeply dug. The garden or salad chervil (*Anthriscus* or *Scandix cerefolium*) is an annual, aromatic plant, easily raised from seed, which should be sown in succession, as only the leaves of the young plants are of use for salads or flavoring. It was used and cultivated by the Greeks, Romans, and ancient Syrians.



Chervil (*Scandix cerefolium*).
1, Flower; 2, fruit.

Cherville, Gaspard Georges, Marquis de (1821–98), collaborator of Dumas *père,* was born at Chartres; wrote independently *Au Village, Légendes et Croquis Rustiques* (1887), *Les Chiens et les Chats* (1888), and a number of books on sport and country life.

Cherwell, riv. trib. of Thames, England; rises in S.W. of Northamptonshire, and after a southerly course of 30 m. through Oxfordshire, joins the main stream on the l. bk. at Oxford.

Chesapeake Bay, a large inlet of the Atlantic Ocean in Virginia and Maryland, reaching N. to lat. 39° 32′ N. The headlands at the entrance, Cape Charles and Cape Henry, of the Virginia coast, are about 12 m. apart. The shores are in many places low and marshy. Many large rivers enter this bay, mostly through broad estuaries—the Susquehanna from Pennsylvania, the Patapsco, Patuxent, Potomac, Rappahannock, York, James, Chester, Choptank, Nanticoke and others. Upon it are situated the cities of Baltimore, Annapolis, Norfolk, Portsmouth, and Newport News, all having excellent harbors. The bay is famous for its oysters and wild fowl. Length, 200 m.; width, 4 m. to 40 m. Here a naval engagement took place on Sept. 5, 1781, during the war of American independence, between a French fleet, under Comte de Grasse, and the British, under Rear-admiral Thomas Graves, the second of that name. The battle was indecisive.

Chesapeake, The, a famous vessel of the U. S. navy, a frigate of 38 guns, built at Norfolk, Va., in 1799, and remembered chiefly because of the so-called '*Chesapeake* outrage' (1807) and the battle with the British ship *Shannon* (1813). In April, 1807, three deserters from the British warship *Melampus*, all colored and all Americans by birth, two of whom had previously been impressed from an American vessel into the British service, were enlisted on board the *Chesapeake*, then in the Washington navy yard. These deserters the U. S. refused to surrender, and on June 22 the *Chesapeake* (Capt. James Barron), soon after sailing from Hampton Roads, was stopped on the high seas by the superior British war-ship *Leopard* (50 guns), whose captain, Humphreys, again demanded the surrender of the deserters. On Barron's refusal, the *Leopard* opened fire and Barron, wholly unprepared for action, was soon forced to haul down his flag, after having fired only one gun (and that without effect) and after having lost 3 men killed and 18 wounded. Humphreys thereupon took the three colored deserters and another who had been found aboard, and the *Chesapeake* returned to Hampton Roads. The outrage caused bitter indignation against England throughout the U. S., and Pres. Jefferson issued a proclamation (July 2) ordering British vessels from American ports, and demanded, but without avail, suitable redress and reparation from the British Government. The affair was the subject of negotiations for two years between the two nations, Great Britain never giving any substantial redress; and it contributed greatly toward bringing on the War of 1812. During this war, on June 1, 1813, the *Chesapeake*, then commanded by Capt. James Lawrence, who was handicapped by having a heterogeneous and ill-trained crew, was captured off Boston, after an engagement lasting only about fifteen minutes, by the slightly superior British frigate *Shannon*, commanded by Capt. Broke. Capt. Lawrence, being mortally wounded, was carried below, crying out, 'Don't give up the ship.' The Americans lost 146 men, the British 84. In 1820 the *Chesapeake* was broken up and sold as old timber. Consult Henry Adams, *History of the United States* (1801–17) (9 v., 1889–91); McMaster, *History of the People of the United States* (1883–); Roosevelt, *The Naval War of* 1812 (1882); and Greaves, *Captain James Lawrence* (1905).

Chesapeake Beds are strata belonging to the Miocene of the Virginia-Maryland region about Chesapeake Bay, where they overlie the Pamunkey formation unconformably. They are sands, clays, marls, and diatomaceous beds, and constitute an important member of the Coastal Plain series both northward and southward of the type locality.

Cheselden, William (1688–1752), English surgeon and anatomist, born at Somersby, Leicestershire, and studied under Cowper, the famous anatomist. He was elected one of the principal surgeons of St. Thomas's Hospital, London, in 1719. In 1723 he published a *Treatise on the High Operation for the Stone*, and in 1727 performed his lateral operation (see Lithotomy), which marks a distinct advance in surgery. He was also the first to attempt the creation of an artificial pupil in certain forms of blindness. His *Anatomy of the Human Body* (1713; 13th ed. 1792) was long a text-book, and his *Osteographia, or the Anatomy of the Bones* (1733), is a splendidly and accurately illustrated work.

Cheshire, maritime co. in the N.W. of England, on the border of Wales. Its length, N.E. and S.W. is about 53 m. The surface is fo the most part level, but towards the borders of Derbyshire and Staffordshire it rises into a broken plateau of moss and moorland, with summits of over 1,000 ft. The central part is known as the Vale Royal, a name sometimes applied to the whole country, from an abbey founded by Edward I. on the banks of the Weaver. The principal rivers are the Mersey and the Dee. Agriculture is a leading industry, special attention being given to dairy-farming and the preparation of cheese. Large numbers of cattle and sheep are reared. Salt and coal are the principal minerals, the former being produced to the extent of over 700,000 tons annually. In the N. and N.E. parts the textile and other industries have sprung up, and there are large shipbuilding yards on the Mersey. The canal systems are of great economic importance. The principal are the Manchester Ship Canal, the Bridgewater, Shropshire Union (including the Chester and Nantwich, Ellesmere, and other canals), the Grand Trunk or Trent and Mersey, the Macclesfield, and the Peak Forest.

Inhabited by the Carnavii or Cornabii at the Roman invasion, the county was in the reign of Egbert annexed to Mercia. Henry III. conferred the earldom on his son Edward. Since then the title of Earl of Chester has usually been borne by the Prince of Wales. The former palatinate jurisdiction was continued, in a somewhat limited form, until the time of William IV. Chief tn. Chester. Area: anc. co. 1,026 sq. m.; admin. co. 1,020 sq. m. Pop. of latter (1911) 676,356. See Ormerod's *Hist. of the County Palatine and City of Chester* (ed. by Helsby, 3 vols. 1875); King's *The Vale Royal of England* (abridged and revised by T. Hughes, 1852).

Cheshire, Joseph Blount (1850), American P. E. prelate, was born at Tarboro', N. C. He graduated (1869) at Trinity College, Hartford; practised law from 1872 to 1878; was ordained priest in 1880, became official historiographer of the N. C. Diocese, and was consecrated Bishop of N. C. in 1893. He published *The Early Conventions of the Episcopal Church in North Carolina* (1882), and edited *Sketches of Church History in North Carolina* (1892). DIED DEC. 21, 1932

Cheshunt, par. and vil., Hertfordshire, England, 14 m. N. of London, on river Lea. Cheshunt Theological College, founded by the Countess of Huntingdon, was established here in 1792. The chief occupations are market-gardening and brick-making. Cardinal Wolsey resided for a time at Cheshunt Great House, and James I. at Theobald's. Richard Cromwell died at Pengelly House in 1712. Pop. (1911) 12,956.

Chesme, Cheshme, or Tcheshme, small seapt., Asia Minor, 40 m. W. of Smyrna, and opposite the Isl. of Scio. Near it are sulphur springs. In 1881 the town suffered severely from earthquake. Pop. 16,300.

Chesney, Charles Cornwallis (1826–76), nephew of the explorer Francis Rawdon Chesney, and professor of military strategy at Sandhurst, acquired fame by his *Waterloo Lectures*, delivered during his tenure of the chair (1861). In 1863 he published *A Military View of Recent Campaigns in Virginia and Maryland*, and in 1874 appeared his *Essays in Modern Military Biography*, including critical estimates of Gens. Grant and Robert E. Lee.

Chesney, Francis Rawdon (1789–1872), British general and explorer, was the son of Alexander Chesney, who emigrated to South Carolina in 1772, where, under Lord Rawdon, he took an active part in the American Revolutionary War, and later returned to Ireland, where, in County Down, Francis was born. He drew up a report on the Isthmus of Suez (1829), which inspired De Lesseps's canal scheme; but his life's dream was to connect India with Europe, by an overland route, *viâ* the Euphrates. In this connection he made three expeditions (1831, 1835, and 1856), and proved the navigability of the Euphrates. French and Russian opposition, however, ruined the scheme. He wrote narratives of his *Expedition to the Euphrates and Tigris*, which appeared in 1850 and 1868. See *Life*, edited by Stanley Lane-Poole (1885).

Chess is played by two persons on a board of 64 squares of alternate black and white, which is so placed between the players that a white square is on the extreme right of each. The 'men' played with number 32—16 black and 16 white. One player takes the black men, the other the white, each arranging his men on the side of the board nearest him in the manner shown in the diagram. They are made up on each side of a king (whose absolute arrest is the object of the game), a queen, 2 rooks or castles, 2 bishops, 2 knights, and 8 pawns. The rooks, at the commencement of the game, are placed on the corner squares; next to them, on each side, is placed a knight; then on each side a bishop; then the king and queen—the queen, if black, being placed on the remaining black square; if white, on the remaining white square. Thus the opposing queens directly face each other, as do the opposing kings. The 8 pawns on each side occupy the 8 squares immediately in front of the pieces. As the white usually has first move it is customary to draw for men.

The king has the power of moving into any vacant square adjacent to the one he is occupying, provided it is not commanded by one of the hostile pieces, but no farther. The queen may also move in any direction—forward, backward, laterally, diagonally—and as far as the player wishes to move her, subject, of course, to the line of her progress not being blocked by intervening pieces. The rook has the same sweeping power as the queen except that he cannot move diagonally. The bishop moves diagonally only, and backward or forward, any distance. The knight's move is a combination of the rook's shortest move, followed by the bishop's shortest move. Its power to move is not hindered by intervening pawns or pieces. The pawn moves forward only, and not farther than 1 square at a time, except on being first moved, when it may be moved 1 or 2 squares as desired. A piece or another pawn directly in front of it stops its progress; but it can capture any piece or pawn in either of the adjacent squares in advance and diagonally to the right or left of it; and by so doing it is moved into the square previously held by the captured piece or pawn. When a pawn reaches an 8th square in the adverse royal line, it may be promoted to any rank the player likes, except, of course, the rank of king—*i.e.* it may become a queen, a rook, a bishop, or a knight, or may remain a pawn.

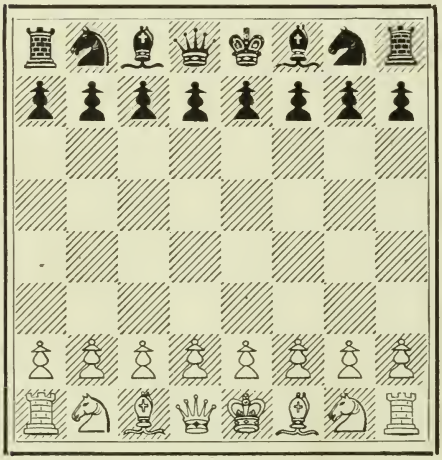
According to chess notation in Britain, the squares of the board are named from the pieces, according to the accompanying diagram.

The abbreviations commonly occurring in chess are K for king; Q for queen; R, rook; B, bishop; Kt, knight; K R, king's rook; Q R, queen's rook; K B, king's bishop; K Kt, king's knight; Q B, queen's bishop; Q Kt, queen's knight; P, pawn; Ch. check; Dis. Ch., discovered check; en pass., *en passant;* sq., square; O–O, castles; O–O–O castles queen's side; !, a good move; ?, a bad move.

The king is never captured; when a piece or pawn attacks him, he is said to be in check, and the opposing player announces this by crying 'check.' The player of the attacked king must free him from check, either by moving him to an adjacent square not commanded by an adverse piece or pawn, or by capturing the attacking piece, or by interposing a piece or pawn, and so screening him from the check. If none of these methods can be adopted, the king is 'checkmated,' and the player whose king he is loses the game. Sometimes it happens that a player has no other move on the board except the moving of the king into check; this is a 'stalemate,' and the game is drawn.

The king is allowed the privilege of 'castling' once in a game, a peculiar move performed in conjunction with either the king's rook or the queen's rook. In each case the rook is moved up to the king, and the king is moved over the rook to the square adjoining it laterally. This privilege is permissible only when neither the king nor the rook has yet been moved, when no piece intervenes between the king and the rook, no square passed over by the king is commanded by a hostile piece, and the king is not in check.

BLACK.



WHITE

Board with Men in Position.

BLACK.

Q R sq. Q R 8	Q Kt sq. Q Kt 8	Q B sq. Q B 8	Q sq. Q 8	K sq. K 8	K B sq. K B 8	K Kt sq. K Kt 8	K R sq. K R 8
Q R 2 Q R 7	Q Kt 2 Q Kt 7	Q B 2 Q B 7	Q 2 Q 7	K 2 K 7	K B 2 K B 7	K Kt 2 K Kt 7	K R 2 K R 7
Q R 3 Q R 6	Q Kt 3 Q Kt 6	Q B 3 Q B 6	Q 3 Q 6	K 3 K 6	K B 3 K B 6	K Kt 3 K Kt 6	K R 3 K R 6
Q R 4 Q R 5	Q Kt 4 Q Kt 5	Q B 4 Q B 5	Q 4 Q 5	K 4 K 5	K B 4 K B 5	K Kt 4 K Kt 5	K R 4 K R 5
Q R 5 Q R 4	Q Kt 5 Q Kt 4	Q B 5 Q B 4	Q 5 Q 4	K 5 K 4	K B 5 K B 4	K Kt 5 K Kt 4	K R 5 K R 4
Q R 6 Q R 3	Q Kt 6 Q Kt 3	Q B 6 Q B 3	Q 6 Q 3	K 6 K 3	K B 6 K B 3	K Kt 6 K Kt 3	K R 6 K R 3
Q R 7 Q R 2	Q Kt 7 Q Kt 2	Q B 7 Q B 2	Q 7 Q 2	K 7 K 2	K B 7 K B 2	K Kt 7 K Kt 2	K R 7 K R 2
Q R 8 Q R sq.	Q Kt 8 Q Kt sq.	Q B 8 Q B sq.	Q 8 Q sq.	K 8 K sq.	K B 8 K B sq.	K Kt 8 K Kt sq.	K R 8 K R sq.

WHITE.

Chess Notation.

A peculiar method of capturing, known as taking *en passant*, attaches to the pawn. If a white pawn, for instance, stands on K 5, and a black pawn be moved from Q 2 to Q 4 or from K B 2 to K B 4, the white pawn can take the black in passing, as it were—the black being dealt with as though it had been moved only to Q 3 or K B 3; and the white pawn, taking it diagonally, occupies the square the captured pawn would have occupied had it been moved only one square. Besides drawn games arising from stalemate, other draws occur, when there is not enough force to effect a mate. When neither side has any pawns left, the player with the weaker force often makes what is called the 50-move call—*i.e.* he calls on his adversary to mate him in 50 moves, failing which the game is drawn; but this he can lawfully do at any time. A *gambit* (Ital. *gambetto*, 'to trip up') is a kind of opening in which a pawn or a piece is sacrificed for the purpose of obtaining an attack. Some of the regular openings—and the opening of a game is all-important—are the king's knight's game, king's bishop's opening, king's gambit, queen's gambit, etc.; to which there are recognized replies, such as, to king's knight's game, Philidor's defence, Petroff's defence.

History. — The weight of authority leans in favor of India as being the birthplace of the game. From India it found its way, according to Sir William Jones, in the 6th century into Persia. The Arabians then acquired it on taking possession of Persia in the 7th century, and through them it came into Europe before the 11th century.

Chess was a favorite game of the ancient Viking races, and ability to play chess was accounted one of the necessary accomplishments of the finished knight of chivalry. Chess exactly as we play it now—for there are great differences between it and the ancient game—dates from the 16th century, when 'castling,' the latest change, was introduced. Then flourished Ruy Lopez de Segura, the first chess analyst, as well as Damiano, Vicenz, Greco, Salvio, and Polerio; and the earliest international tournament took place when the Italian masters visited Spain and defeated the Spanish exponents of the game. In the 18th century appeared Philidor, who was born at Dreux, near Paris (1726), and died in London (1795). He came to London in 1747, and, according to Bird, his ascendancy and popularity 'tended to create an entirely new era in chess.' James Mason, a player and chess writer of the first order, describes Philidor's *Analysis of Chess* (1749) as the chess *magnum opus* of the 18th century.

Though blindfold chess had been practised by Arabian and Persian players, it seems to have been unknown in England until Philidor played two games blindfold at the St. James's Chess Club. Yet Philidor's achievements are nothing to the subsequent achievements of Morphy, Zukertort, Blackburne and Lasker, who could play twenty blindfold games simultaneously. Paul Morphy is regarded as the greatest chess genius that has yet appeared. He was born in 1837 at New Orleans, and at the age of twenty-one won the first prize at the New York tournament of 1858. Thereafter he visited Europe, defeating the strongest players. The modern school of players of the first magnitude includes Blackburne, Winawer, Mason, Tarrasch, Zukertort, Tchigorin, Lasker, Pillsbury, Janowsky, Schlechter, Maroczy, and Marshall.

The leading chess clubs in America are the Manhattan of New York City, the Franklin of Philadelphia, and the Chicago of Chicago, Ill. There are two Intercollegiate Leagues, one made up of Princeton, Yale, Harvard and Columbia, and one composed of Cornell, Pennsylvania and Brown, each of which has annual championship tournaments. There are also two cups played for yearly between teams of the London Chess Club and American players, and between Oxford and Cambridge universities and the American universities.

The first original English treatise on chess of any merit is by Captain Joseph Bertin—*The Noble Game of Chess* (1735). The most concise and, as far as it goes, the most reliable history is to be found in James Mason's *Social Chess* (1900). For students of the game as distinct from its history, there are Howard Staunton's *Chess Player's Handbook*, *Chess Player's Companion*, *Chess Praxis*, and *Chess Theory and Practice*, edited by R. B. Wormald; Wormald's *Chess Openings;* Bird's *Chess Masterpieces;* Gossip's *Chess Player's Manual;* Freeborough and Ranken's *Chess Openings and Chess Endings*; James Mason's masterly treatises, *The Principles of Chess in Theory and Practice*, *Chess Openings*, and the *Art of Chess;* Henry Chadwick's *How to Learn to Play the Game of Chess;* Lee and Gossip's *The Complete Chess Guide* (1910); E. A. Greig's *One Hundred Pitfalls on the Chessboard* (new ed. 1920).

Set of Indian Chessmen in Carved Ivory, and Inlaid Board. (S. Kensington Museum, Indian Section.)

Chest. See THORAX.

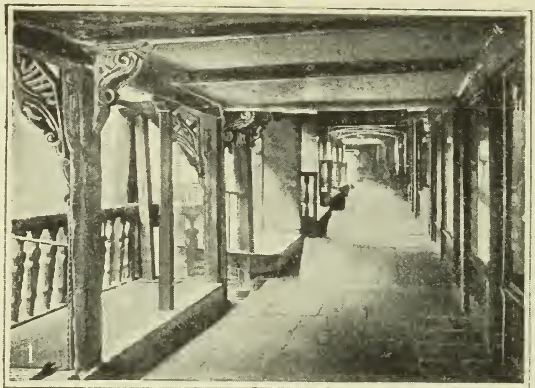
Ches'ter, city and episcopal see, municipal and parliamentary borough, and county town of Cheshire, England, is situated on the right bank of the Dee and on the London and Northwestern and the Great Western Railway; 16 miles south of Liverpool. The city occupies a rocky eminence overlooking the river and is surrounded by ancient walls of red sandstone nearly 2 miles in circumference.

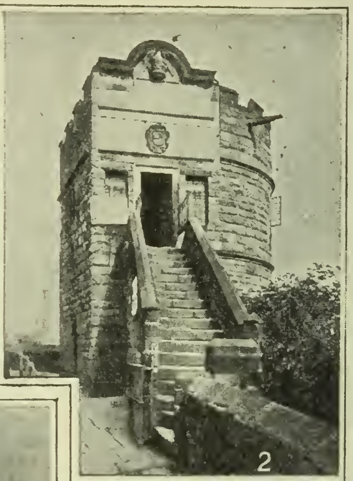
The most unique feature of Chester is the arrangement of the houses on the main streets, forming the 'Rows'. These are covered arcades or galleries formed by the projection of the second stories of the buildings, the fronts of which are left open. The arcades are approached by flights of steps from below. Above them are private dwellings and below are warehouses and the poorer shops, the Rows themselves containing the best shops. North of the river, is Grosvenor Park, of 20 acres, the gift of the Duke of Westminster. The most important building is the Cathedral on a site originally occupied by a convent dedicated to St. Werburgh. The present building, erected in the 16th century and restored in the 19th, contains portions of the old abbey. The Lady Chapel is a beautiful specimen of Early English. The only remainder of the ancient Norman castle is the Julius Caesar Tower, the other buildings having been replaced by a group of classical buildings comprising the assizes, county jail, and barracks. Other interesting features are the bishop's palace; St. John's Church, built about 1075, now practically in ruins; and the Grosvenor Museum, with a good collection of Roman antiquities. Chester is the seat of the cathedral grammar school founded by Henry VIII., the blue-coat school (1700), and the green cap school for girls (1718). There have been many modern improvements in the city but some of the timbered houses of the 16th and 17th centuries remain, and great care has been taken to preserve a mediæval aspect. There are manufactures of lead, paint, leather, shoes, gloves and chemicals and a large trade in Cheshire cheese, for the sale of which a fair is held monthly. There is considerable traffic on the Dee and on the Shropshire Union Canal joining the Dee northwest of the city. Pop. (1911) 39,038; (1921) 40,794.

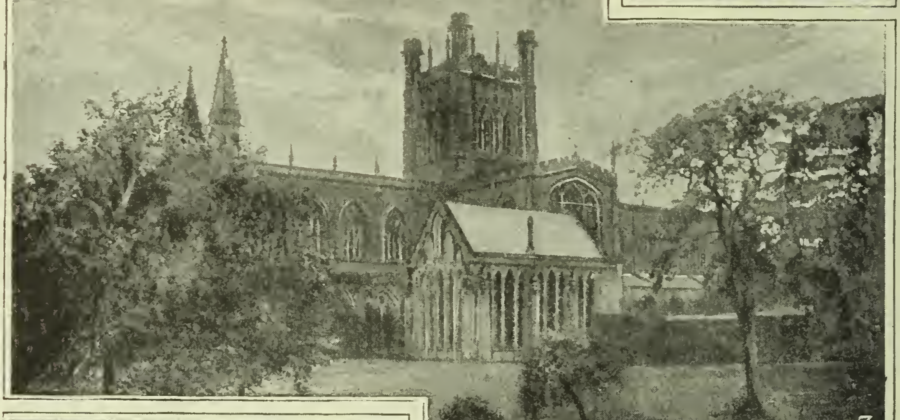
Chester was a Roman station for the 20th Legion, and after its departure, was in the hands of the British, Saxons, and Danes. It was the last English city to yield to William the Conqueror (1070), who granted it to his nephew Hugh Lupus. In 1646, after a long siege, it was taken by the parliamentary forces. Consult Omerod's *Cheshire;* Duckworth's *Chester;* Fenwick's *Rare Old City of Chester and the River Dee.*

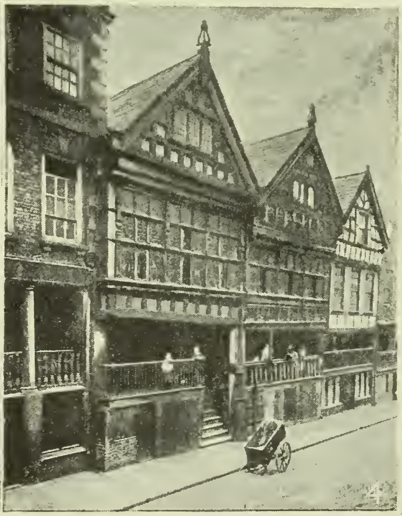
Chester, city, Illinois, county seat of Randolph county, on the Mississippi River, and the Chester, Perryville and St. Genevieve, the Illinois Central, the Missouri Pacific, the Missouri Illinois, and the Wabash, Chester and Western Railroads. It is the seat of the South Illinois Penitentiary and the Asylum for the Criminal Insane, and has a public library. Wagons, hardware, brick, knit goods, and flour are manufactured. Pop. (1910) 2,747; (1920) 2,904.

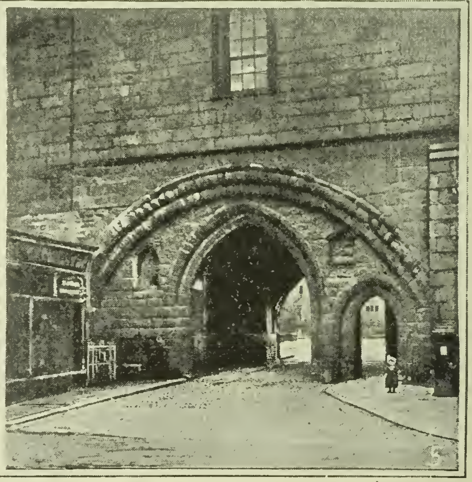
Chester, city, Pennsylvania, Delaware county, on the Baltimore and Ohio, the Pennsylvania, and the Philadelphia and Reading Railroads; 12 miles southwest of Philadelphia. It is the seat of the Pennsylvania Military Academy, and has a number of fine parks and two hospitals. The Crozer Theological Seminary (Bapt.) is at Upland, 2 miles west of the city. The











SCENES IN CHESTER.
1. The Rows at Bishop Lloyd's House. 2. Phœnix Tower, City Wall. 3. Cathedral. 4. Bishop Lloyd's House, Watergate Street. 5. Old Abbey Gate.
(*Photographed for this Encyclopædia by E. Ward, Manchester.*)

City Hall, built in 1724, and the house of William Penn are historically interesting. Chester has great shipyards and extensive manufactures of machinery, lumber, iron and steel, textiles, ice, plaster, cutlery, and cigars.

Chester is the oldest town in Pennsylvania. It was settled by the Swedes in 1643 and was at first known as Upland. It was the base of the Continental Army immediately after the battle of Brandywine. Pop. (1930) 59,164; (1940) 59,285.

Chester, city, South Carolina, county seat of Chester county, on the Lancaster and Chester, the Seaboard Air Line, the Southern, and the Carolina and Northwestern railroads; about 50 miles N.W. of Columbia. Cotton, cottonseed oil, iron, machinery, bottles, lumber, and flour are manufactured. Pop. (1930) 5,528; (1940) 6,392.

Chester, Colby Mitchell (1844–1932), American naval officer, was born in New London, Conn., and was graduated from Annapolis (1863). As an ensign on the *Richmond* he took part in the operations against Mobile and in Farragut's famous battle. He was commandant of cadets at Annapolis in 1891–4, commanded the South Atlantic squadron in 1897–8, and during the Spanish War was in command of the *Cincinnati.* He became a rear-admiral in 1903 and was superintendent of the Naval Observatory from 1902 to 1906, when he retired. In 1917 he became professor of naval science at Yale University, and was commander of the U. S. Naval Unit there until April 1919.

Chester, Joseph Lemuel (1821–82), American genealogist and antiquarian, was born in Norwich, Conn., and was engaged in business and newspaper work in Philadelphia until 1858 when he removed to London, England, and devoted himself to genealogical researches in connection with American families. He was one of the founders of the Harleian Society, and his *Registers of Westminster* (1876) was one of its publications. He edited *Educational Laws of Virginia.* Of his numerous other works, his *Matriculations of the University of Oxford* (1887) and his *Marriage Allegations in the Bishop of London's Register* (1887) were posthumously edited by J. Foster.

Chesterfield, municipal borough and town in Derbyshire, England, on the Midland Railway and connected by canal with the Trent; 24 miles north of Derby. The chief places of interest are the Parish Church (14–15th centuries), with a curiously twisted spire; Trinity Church in which George Stephenson (q. v.) is buried; and Stephenson Memorial Hall, with a library and engineering museum. There are large iron and steel works. Pop. (1931) 64,160; (1937 est.) 64,550.

Chesterfield, Philip Dormer Stanhope, Fourth Earl of (1694–1773), English author, was born in London. Succeeding his father as Earl of Chesterfield (1726), he was sent as ambassador to The Hague (1728), and on his return was made Third High Steward. In 1731 persistent ill health compelled him to apply for leave of absence and the following year he was relieved of office. He was a bitter opponent of Walpole, and his share in the latter's downfall (1742) was large. In 1745 he was appointed lord-lieutenant of Ireland, which office, after a tactful administration of eight months, he exchanged for a secretaryship of state (1746). He practically withdrew from public life in 1748. His tact, wit, and fine manners fascinated his contemporaries, and his political talents were considerable. His literary reputation rests on his *Letters* (1774), whose shrewdness, wit, and purity of style are universally admitted; their moral tone is more disputable; but modern criticism has tended to modify Johnson's severe strictures; and the *Letters to his Son* (Philip Stanhope), published by Lord Carnarvon in 1890, have strengthened the more favorable view. His *Miscellaneous Works* were published in two vols. (1777–8). Consult *Lord Chesterfield's Worldly Wisdom,* by G. Birbeck Hill; William Ernst, *Memoirs with Numerous Letters;* Austin Dobson, *Eighteenth Century Vignettes* (1st series); *Life* by Craig; and *The Letters of Philip Dormer Stanhope, 4th Earl of Chesterfield,* ed. by Bonamy Dobrée (1932).

Chester-le-Street, town, Durham, England, on the left bank of the Wear; 6 miles north of Durham. There are coal mines and iron works in the vicinity. The town was an episcopal see long before the foundation of the Bishopric of Durham, and it was here that the body of St. Cuthbert rested until the see was removed to Durham in 995. Pop. (1931) 16,639.

Chester Plays, a series of twenty-five miracle plays, dealing with the Biblical story from the creation to the redemption, which were acted by guilds of Chester at Whitsuntide of each year. The series dates from about 1400. A complete edition was edited by Wright for the Shakespeare Society in 1843–7, and a partial edition by Deimling for the early English Text Society (1892). See Miracle Play.

Chesterton, Gilbert Keith (1874–1936), English author and critic, was born in London and was educated at St. Paul's. He was notable for his pungent style, unconventional attitude, and acute critical ability. He published critical studies of Browning (1904), Dickens (1906), G. F. Watts (1904), and George Bernard Shaw (1909), as well as *Orthodoxy* (1908); *All Things Considered* (1908); *Tremendous Trifles* (1909); *Alarms and Discursions* (1911); *The Man Who Was Thursday* (1908); *Manalive* (1912); *Magic* (1913), a play; *The Victorian Age in Literature* (1913); *The Flying Inn* (1914); *Irish Impressions* (1919); *Superstition of Divorce* (1919); *The New Jerusalem* (1920); *Uses of Diversity* (1920); *What I Saw in America* (1922); *Ballad of St. Barbara, and Other Poems* (1922); *The Everlasting Man* (1925); *Incredulity of Father Brown* (1926); *The Return of Don Quixote* (1927); *Generally Speaking* (1928); *The Resurrection of Rome* (1930); *Chaucer* (1932); *St. Thomas Aquinas* (1933); *The Scandal of Father Brown* (1935). He became a convert to the Catholic Church in 1922. Consult *Autobiography* (1936) and *Life* by Maisie Ward (1943).

Chestertown, town, Maryland, county seat of Kent county, on the Pennsylvania Railroad; 30 miles S.E. of Baltimore. It is the seat of Washington College. Lumber, phosphate, and canned goods are manufactured. Pop. (1930) 2,809; (1940) 2,760.

Chestnut, a handsome tree of the genus Castanea, belonging to the family Fagaceæ. There are five species of the true chestnut, three of which are American. *Castanea dentata* is the best known and most important of the American species. It is a thick-topped symmetrical tree of rapid growth, reaching from 60 to 100 feet in height and is found from Maine to Michigan, south as far as Delaware and Indiana, and in the mountains of Alabama and Mississippi, chiefly on hillsides and in rocky woods. The leaves are lance-shaped, with sharply serrated edges, and turn yellow in the autumn. The male flowers are borne in long slender catkins, creamy white in color, and slightly fragrant; the fruit consists of two or three thin shelled nuts, encased in a prickly bur, which is burst open by the first frost. The bark is a slaty gray, cut into broad irregular ridges by shallow fissures. *C. pumila,* the Chinquapin, is a chestnut in miniature, found in the southern States. Its fruit is a single nut contained in a small bur. *C. nana,* the Bush Chinquapin, is also a southern species. *C. sativa,* the European species, found in Spain and Italy and in western Asia, has much larger nuts, usually two in a bur, known as 'marrons.' *C. crenata,* the Japanese chestnut, is smaller than either the American or European variety. The so-called Horse Chestnut is not a true chestnut.

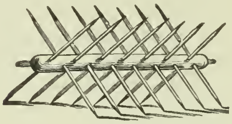
Chestnut trees are of value commercially both for their wood and for their nuts. The wood is light, strong, durable and easily worked, and is used extensively for railroad ties and posts and for woodwork and furniture, being considered nearly as handsome as oak. The nuts have considerable food value, being rich in carbohydrates. In the United States they are eaten raw or roasted, and are used in puddings and in dressings for meat and poultry. In Europe, particularly in Italy and Spain, they form an important part of the peasants' diet, being roasted or boiled and also ground into a flour of which bread and cakes are made. *Marrons glacés,* candied chestnuts, are popular in both Europe and America.

The principal enemy of the American chestnut tree is the *Chestnut Bark Disease,* produced by a parasitic fungus thought to have been introduced from the Orient. Cutting down of infected trees and the destruction of their bark by fire have proved the only practicable means of controlling the blight.

Chesuncook Lake, che-sun'ko͝ok, lake in Piscataquis county, Maine. It is about 18 miles long, irregular and narrow, and is surrounded by about a dozen lakes connected in one drainage system. The west branch of the Penobscot River flows through it.

Chetimaches Lake. See Grand Lake.

Chet'tle, Henry (? d. 1607), English dramatist and pamphleteer. From Henslowe's diary we know that Chettle was the author of thirteen plays, but only one, the *Tragedy of Hoffman,* has come down to us (edited by H. B. L[eonard] in 1851). Of the numerous plays in which he collaborated, the two plays of *Robin Hood* (Chettle and Munday) are in Hablett's *Dodsley* (1874), vol. viii; *Patient Grissill* (Chettle, Dekker, and Haughton) in Shakespeake Society publications (1841); and the *Blind Beggar of Bethnal Green* (Chettle and Day) in A. H. Bullen's edition of *Day* (1880). He edited Greene's *Groat's-worth of Wit* (1592), and for the attack in it on Shakespeare (?) apologized in his *Kind-Hart's Dreame* (?1593). His *Englande's Mourning Garment* (1603) is interesting for its allusion to contemporary poets.



Cheval de Frise.

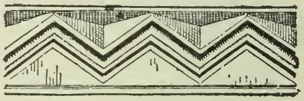
Cheval de Frise, sh*e*-väl' d*e* frēz' (Fr. 'horse of Friesland'), in fortification, a machine composed of a piece of timber pierced and traversed with wooden spikes, pointed with iron, five or six feet long, and used for defending a passage, stopping a breach, or making an intrenchment to stop cavalry. It was called a 'horse of Friesland,' from having been first used by the Prince of Orange in the siege of Groningen, Friesland, in 1594.

Chevalier, shev-*a*-lēr', originally a horseman, a knight, then a member of a knightly order; also the title of younger sons of noble families in France. The name is still used for members of certain foreign orders—*e.g.,* chevalier of the Legion of Honor. The son of James vii and ii was known as 'the Chevalier,' and Prince Charles Edward as 'the Young Chevalier.'

Chevalier au Cygne, she-väl-yā' ō sēn'y', Le, an ancient French romance telling of the adventures of seven children of a queen, all born on the same day. Consult *The Romance of the Chevelere Assigne,* edited for the Early English Text Society by Henry Gibbs (1868).

Cheviot Hills, chē'vi-ut *or* chev'i-ut, a broad range of undulating grassy hills, extending nearly thirty miles along the border between Roxburghshire, Scotland, and Northumberland, England. Cheviot (2,676 ft.), the highest summit, is in Northumberland, 6 miles southwest of Wooler; Cairn Hill (2,545 ft.), Hedgethope Hill (2,348), Cushat Land (2,020), and Peel are next highest. The name is also applied to a range of hills nearly at right angles to the preceding, running north and west, and separating Eskdale and Liddesdale from Teviotdale, with numerous summits between 1,500 and 2,000 ft. in height.

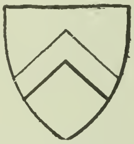
Chevreul, Michel Eugène, (1786–1889), French chemist, was born in Angers. He lectured at the Collège Charlemagne, was in charge of the dyeing department at the Gobelins, and in 1826 took his seat in the Academy of Sciences. In 1830 he became director of the Museum of Natural History. In addition to making valuable studies on colors, he discovered margarine, oleine, and stearine in oils and fats. His published works include *Recherches chimiques sur les corps gras d'origine animale* (1823; new ed. 1899); *Des couleurs et de leurs applications aux arts industriels* (1864; new ed. 1888); *Considérations générales sur les méthodes scientifiques* (1883); *Leçons de chimie appliquée à la teinture* (1828–31).



Chevron (Architecture)

Chev'ron, a form of architectural decoration introduced into England in the 11th century, and consisting of a 'zigzag outline' on the hitherto plain moulding of the Saxon and Early Norman arch. The oldest part of Canterbury Cathedral and the later parts of Durham Cathedral are good examples. It is interesting to note that the chevron is also a common motive in the Zimbabwe ruins, Rhodesia, and in southern Arabia.

In heraldry, chevron is one of the ordinaries, issuing from dexter and sinister base, and meeting at honor point. (See Heraldry).



Chevron (Heraldry)

Chevrons, on military or naval uniforms, are badges to denote rank, worn on either sleeve by non-commissioned officers and men. They are V-shaped and correspond in color to the trimming of the uniform appropriate to the branch of the service and vary from the single stripe of the lance-corporal to the three stripes with cross connecting arcs of the sergeant major. In the United States Army the chevrons are worn with the points up; in the Navy with the points down. Three stripes and a lozenge designate the first sergeant, three stripes the duty sergeants, two stripes a corporal, and one stripe a private first class. Various devices are added for musicians, commissary-sergeants, quartermaster-sergeants, gunners, electricians, saddlers, etc. See Uniform.

Chevrotain, shev'rō-tān, Deerlet, or Mouse Deer (*Tragulidæ*), a name applied to certain small artiodactyle ungulates, found in India and the Malay

Peninsula and Archipelago. They are intermediate in structure between true deer and pigs, and are regarded by naturalists as representing an ancient type of hoofed animals. They are about a foot high, are covered with soft fur, and are hornless.

Chevy Chase, a famous English ballad describing a Border combat between Hotspur, Earl of Northumberland, and the Scottish Earl of Douglas (1388).

Chew, Benjamin (1722–1810), American jurist, son of an influential Maryland Quaker, was born in West River, Anne Arundel County, Md. He studied law with Andrew Hamilton in Philadelphia, and practised in that city, where he filled various legal and legislative offices until his appointment as Chief Justice of Pennsylvania, 1774. He sided against the Americans in the Revolution, and, refusing to give his parole, was imprisoned at Fredericksburg, 1777. His stone house at Germantown, still standing, enabled a small party of British troops to delay the advance of the Americans in the battle of Oct. 4, 1777. After the war he was Chief Justice of the High Court of Errors and Appeals (1790–1806).

Chewing-gum, a masticatory substance consisting either of a natural resin or gum-resin, such as that of the spruce, or, as is more common, of an artificial preparation of paraffine wax, flavoring matter, and other ingredients. Of late years chicle (q. v.) has been made the foundation of most chewing-gum and its manufacture into that commodity, with the addition of sweetening and flavoring, has become a flourishing industry in the United States.

Chewink, chē-wink', or Towhee, a North American finch (*Pipilo erythrophthalmus*), about 8 inches in length, the male of which has a strikingly variegated plumage of chestnut, black and white (the female is duller). Its cry is a sharp *che-wink*. It seeks its food on the ground, usually in woods, and makes a nest among the fallen leaves, concealing it beneath a rude dome of sticks and leaves.

Cheyenne, shī-en', river, South Dakota, branch of the Missouri, about 100 miles long.

Cheyenne, city, Wyoming, capital of the state and county seat of Laramie county, is situated at an elevation of over 6,000 feet, near the foot of the Rocky Mountains, on the Union Pacific, the Chicago, Burlington, and Quincy, and the Colorado and Southern railroads; 100 miles north of Denver. Among the principal buildings are the State Capitol, Public Library, City and County Building, Federal Building, Elks' and Eagles' Homes, Masonic Temple, and County Memorial Hospital. Fort Francis E. Warren, 3 miles north of the city, is an important military post. Cheyenne is the center of an extensive cattle-raising industry. It has shops of the Union Pacific Railroad, the United Air Lines Transport Corp., and of the Inland Air Lines, Inc. It was settled in 1867. Pop. (1930) 17,361; (1940) 22,474.

Cheyennes, a warlike tribe of North American Indians, a branch of the Algonquin family, former allies of the kindred Arapahoes, from whom they separated in the seventeenth century. After forcing their way through hostile Siouan tribes, they crossed the Missouri to the Black Hills of South Dakota, and passed thence into Wyoming and Colorado. So recently as 1850 they still infested the plains watered by the Platte and upper Arkansas rivers. They are now divided into two groups. The northern Cheyennes occupy a large reservation in Montana, in the Tongue River region, while the southern group is located in Oklahoma. They number less than 3,500.

Cheyne, chā'-nē, George (1671–1743), Scottish physician, was born in Methlick in Aberdeenshire and practised in London. He wrote *A New Theory of Fevers* (1702), a defense of Pitcairn's so-called iatromathematical system, and many popular works recommending temperance and vegetarianism, notably *Essay on Health and Long Life* (1724), *The English Malady* (1733)—*i.e.*, hypochondria—highly praised by Dr. Johnson, and *The Natural Method of Curing Diseases* (1742).

Cheyne-Stokes Respiration, so called from the physician who first described it, is a peculiar form of breathing, in which the respirations are at first very shallow, then gradually deeper, then cease entirely for, it may be, as long as half a minute. After the pause comes shallow breathing again, and the cycle is repeated. It is occasionally seen in fatty degeneration of the heart, in meningitis and other brain diseases, and often accompanies a serious condition of nervous exhaustion. On the other hand, it may occasionally be observed in healthy subjects while they sleep.

Chhatisgarh, chut'ēs-gär', an eastern division of the Central Provinces, India, including the districts of Raipur, Bilaspur, and Drug; area, 22,000 square miles; pop. 3,745,745.

Chiabrera, kyä-brä'rä, Gabriello (1552–1637), founder of the Italian Pindaric school of poetry, was born in Savona. He wrote odes, Horatian epistles, and Anacreontic lyrics or canzonetti, the affectations and mythologic allusions of which are a fault of the age in which he wrote. His best productions, *Rime* (lyrical pieces), were published in 3 vols. at Milan (1807).

Chiana, kē-ä'nä, Val di, valley of central Italy, traversed by the river Chiana (ancient Clanis), and stretching from the Arno to the Tiber, a distance of 60 miles. In antiquity it drained into the Tiber; but in course of time it became converted into a system of stagnant marshes. In 1823, by means of extensive engineering works, these marshes were drained, and canals dug both to the Arno and the Tiber and the district is one of the most fertile in Italy.

Chiang Kai-shek (1888–), President of China and generalissimo of the military forces of the Chinese Republic, was born Oct. 31, 1888 at Chikow, Chekiang Province, China. He ran away from school as a boy to join the provincial army. He later studied for a year at the Paoting Military Academy and then enrolled in the Military College at Tokyo where he studied four years. It was while he was in Japan that he met Dr. Sun Yat-sen (then in exile), who in 1909 founded the Chinese Republic. That meeting decided the future course of Chiang Kai-shek's career as a leader in the Nationalist (Kuomintang) cause. He became involved in the First Revolution of 1911, was present at the taking of Shanghai from the Manchu forces, and took part in the Second Revolution in 1913. In 1920 he became head of the Whampoa Military Academy which had been founded by Michael Borodin, the unofficial agent in China of the Soviet Government. The Whampoa cadets became the nucleus and ultimately the main factor in the creation of Dr. Sun Yat-sen's army following the Kuomintang seizure of the government at Canton. After the death of Dr. Sun in March, 1925, Chiang Kai-shek later that year was appointed Commander-in-Chief. By the end of the year he had succeeded in getting control of the provinces of Kwantung and Kwangsi which together became the corner-stone of the Nationalist Government at Canton and later at Wuchang and Nanking.

In 1927, having become uneasy under the growing domination of Soviet influence, he conducted an anti-Communist campaign in central and southern China. His Russian advisers withdrew, and he announced his own retirement. He visited Japan in August and in December married Mayling Soong, one of the three famous Soong sisters, the other two being the widow of Dr. Sun and the wife of Dr. H. H. Kung. He resumed his post at the head of the Nanking army in 1928 and occupied Peking. He was president of the Nationalist Government from 1928 to 1931, being succeeded by Lin Sen. He was premier several times, but he returned to his military duties when the war with Japan began in 1937. He had already composed his differences with the Communists following the curious episode of his kidnapping by one of his aides, Marshall Chang Hseuh-laing, in 1936. He was released after two weeks' detention. This episode was long a matter of speculation but it resulted in China making a united front against Japanese aggression.

On Aug. 1, 1943 President Lin Sen died, and Chiang Kai-shek took over the duties of the office as Acting President. On Sept. 13 he was unanimously elected President by the central executive committee of the Kuomintang and was inducted into office on Oct. 10. During most of that year Madame Chiang Kai-shek was in the United States, her trip being originally planned for her health but which developed into a good-will tour of enormous benefit to her country's cause. She made a visit to Wellesley College where she was educated, addressed Congress in joint session, and traveled up and down the country pleading for a better understanding of China's struggle and for greater material help in that struggle.

Press Association, Inc.

Generalissimo and Mme. Chiang Kai-shek.

Chianti, kyän'ti, mountain group of the Apennines, Upper Tuscany, Italy. The vineyards supply the well known red wine of the same name.

Chiapas, chē-ä'päs, Pacific state, Mexico; area, 28,729 square miles. It is mountainous, especially in the north and the S.E., the chief peaks being the volcanoes Soconusco (7,450 ft.) and the active Tacana (13,940 ft.). The east is an undulating plateau, well wooded and watered. Agriculture (coffee, sugar, cocoa, and tobacco), stock-raising, and fruit-growing flourish in the valleys. Gold, silver, copper, and petroleum occur. The capital is Tuxtla. Pop. (1940) 660,464.

Chiaramonte, kyä-rä-mon'-tā, town, Sicily, in the province of Syracuse, 24 miles east of Terranova. Pop. (1936) 12,324.

Chiari, kyä'rē', town, Italy, in the province of Brescia; 14 miles by rail west of Brescia. It has silk industries. Pop. (1936) 13,880.

Chiaroscuro, kyä-rō-sko͞o'rō, a term used to express the use of light and shade in pictorial art, more especially the light and shade of a composition considered apart from other qualities.

The term chiaroscuro is also applied to a method of printing wood engravings from several blocks, practised in Germany and Italy in the fifteenth and sixteenth centuries.

Chiastolite, kī-as'tō-līt, a variety of andalusite common in slates where they have been altered by the intrusion of a granitic mass or by metamorphism accomplishing complete recrystallization. It occurs in long, narrow gray or white crystals, which contain dark enclosures of regular geometrical form, and are lozenge shaped or cruciform in transverse section.

Chia-ting-fu, kyä-ting-fo͞o', or KIA-TING-FU, town, Sze-chuen, China, on the right bank of the Min at its junction with the Ta-tung River. It is a center of silk culture and silk weaving.

Chiavari, kyä'vä-rē, seaport town, Italy, in the province of Genoa; 24 miles east of Genoa. It lies amidst low hills covered with vines and olive groves, and is famous for its chairs and its lace. Fishing, shipbuilding, and the manufacture of silk are of importance. Pop. (1936) 17,520.

Chiavenna, kyä-ven'nä (anc. *Glavenna*), town, Italy, in the province of Sondrio, 17 miles north of the northern end of Lake Como. It has a notable church, a castle (1620), and ruins of an ancient fortress, and is famous for its wine (stored in the excavations known as *ventorali*) and stoneware (*lavez,* 'ware'). Pop. (1936) 5,379.

Chib'chas, or MUISCAS, a linguistic family of South American Indians, whose domain at the time of the conquest comprised the Cundinamarca plateau and adjacent districts in Colombia. They were constituted into two independent and hostile states—one ruled by the *cipa* (king) of Bacata (Bogotá), the other by the *zaque* (lord) of Ramiriqui and Hunsa (Tunja)—with a total population estimated at over a million. That the Chibchas had reached a high level of culture is evident from their paved highways, suspension bridges, stone temples, statues, hieroglyphs, weights and measures, skilful weaving and dyeing, and especially their highly artistic gold and silver work. The Chibcha states were overthrown in 1538.

Chica, chē'kä, an orange-red pigment prepared from a native plant (*Bignonia chica*) by the Indians of the upper Orinoco and Rio Negro, and used by them to adorn the person. The name is also applied, as an alternative for *pito* or *poso,* to a kind of beer made in South America, brewed mostly from maize malt.

Chicacole, Chikakol, or Srikakulam, municipal town, British India, in Ganjam district, Madras presidency, 30 miles N.E. of Vizianagram. It is noted for its fine muslin. Pop. (1931) 16,588.

Chicago, city, county seat of Cook county, Illinois, second city in the United States in population and commercial importance, is situated on the southwestern shore of Lake Michigan, and on the Chicago and Calumet rivers, the Illinois and Michigan Canal, and the Chicago Drainage Canal, in latitude 41° 53′ N. and longitude 87° 38′ W., and at a mean elevation of 25 feet above Lake Michigan and 582 feet above the sea. The area of Chicago is 212.8 square miles. New York City is distant 912 miles, Boston 1,034, Washington 790, New Orleans 912 and San Francisco 2,274 miles.

Chicago is the largest railroad center in the United States. The principal railroads are the Atchison Topeka and Santa Fé; Baltimore and Ohio; Chicago, Milwaukee and St. Paul; Erie; Grand Trunk; Illinois Central; Pennsylvania; Chicago, Burlington and Quincy; Minneapolis, St. Paul and Sault Ste. Marie; Michigan Central; Chicago and Northwestern; Chicago and Alton; and Chicago, Rock Island and Pacific.

The port of Chicago includes an outer harbor covering 1,300 acres, protected by breakwaters built by the Federal Government. Into this harbor has been constructed by the City of Chicago a municipal pier, known as the Navy Pier (cost $5,000,000), the terminal for all lake passenger boat lines. The eastward end of the pier is devoted to recreation and is equipped with a large auditorium. The north branch of the Chicago River is navigable for masted vessels for about 7 miles from Lake Michigan. The controlling width is approximately 150 feet. The south branch is navigable for masted vessels for 6 miles from Lake Michigan to the entrance of the Chicago Sanitary and Ship Canal. Beyond this point, there is available for barge navigation a channel 9 feet deep connecting with the Illinois and Mississippi rivers. There are in the navigable portions of the Chicago River and its branches 52 miles of wharves and 6 miles of private slips. The controlling width of the south branch is 200 feet between dock lines. The project navigation depth of the harbor and river is 21 feet. Calumet harbor, eleven miles south of Chicago harbor, includes an anchorage area protected by the Federal Government and is navigable for 6 miles to the entrance of Lake Calumet. The minimum width of the channel is 200 feet at 21 foot depth. The Calumet River is joined with the Chicago Sanitary Ship Canal through the Calumet Sag Channel, affording navigation for canal boats to 9 feet of depth, limited to 60 feet of width.

The climate is equable. High temperatures are attained, but the heat is tempered by the lake breezes. The average temperature for the year is about 48° F.; for the three coldest months (December, January, and February), 26°; and for the three warmest months (June, July, and August), 70° F. The annual rainfall averages about 33 inches.

The Chicago River and its branches divide the city into north, west, and south sections. The business center of the city is largely in the southern division, in the section enclosed by the elevated railway 'Loop' between Lake Street on the north and Van Buren Street on the south, and between Wabash Avenue on the east and Wells Street on the west. In common usage, 'the Loop' refers to a somewhat larger territory extending east to Lake Michigan, north and west to the Chicago and its southern branch, and south to Roosevelt Road.

Running south from the Chicago River at the site of old Fort Dearborn are Michigan Avenue and Boulevard, with Grant Park fronting the lake on the east, and the Loop section on the west.

State and La Salle streets, running north and south, are respectively the department store center and the 'Wall Street' of Chicago. State Street between Congress and Lake contains some of the largest retail stores in the world. Banks and insurance companies, fine office buildings, the Stock Exchange, and the Board of Trade are grouped on La Salle Street. Just south of the elevated loop is Chicago's 'Chinatown.' Dearborn and Federal streets and Plymouth Place are known as Printers' Row. The region bounded by Van Buren and Franklin streets from Wells Street west to the south branch of the river is the wholesale clothing and dry goods district.

Most of the principal theatres and hotels are located in this central portion of the city, as are the Federal, county, and municipal buildings, and two of the railroad terminals. South of Roosevelt Road is mainly a residential section with several parks and the buildings of the University of Chicago (q. v.) on the Midway. To the southwest, 5½ miles from the City Hall, are the Union Stock Yards.

The western division of the city is residential, with a developing industrial and wholesale district. On Canal Street are machinery manufactories and two terminal passenger stations. The Chicago 'Ghetto' is located in South Canal, Jefferson, and Maxwell streets. The north side is still more largely residential, and is the fashionable quarter. The most beautiful street is the famous Lake Shore Drive, 30 miles in length, leading to Fort Sheridan.

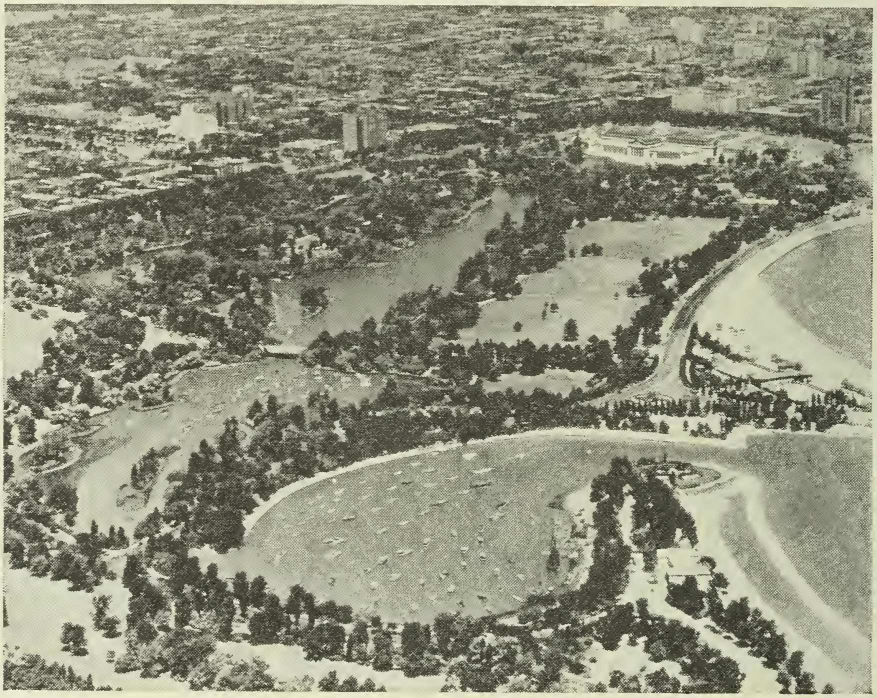
Buildings.—The Cook County Court House and the City Hall, which occupy the square bounded by Clark, Randolph, La Salle, and Washington streets, were completed in 1907 and 1911, respectively, at a total cost, with equipment, of $10,000,000. The Federal Building, a Roman Corinthian structure was completed in 1905 at a cost of $4,757,000. Chicago has stringent ordinances limiting the height of office buildings. The highest building in the city is the Board of Trade Building, on Jackson Boulevard. This building is 605 feet high with an observatory. The handsome University Club, at Monroe Street and Michigan Boulevard, is a Gothic structure of Bedford stone. Farther north on Michigan Avenue is the classic Public Library building, of blue limestone, completed in 1897 at a cost of $2,125,000, with a capacity for 2,000,000 volumes. The interior is of Carrara marble ornamented by designs in colored mosaic.

Among other notable buildings are the Marshall Field office building completed in 1932, the Chicago Motor Club, No. 1 North La Salle Street, the Chicago Stadium, where the 1932 Republican and Democratic National Conventions were held, the Banker's Building, the La Salle-Wacker Building, the Chicago Board of Trade (completed in 1930), the Merchandise Mart, erected by Marshall Field and Co., the American Furniture Mart, State Bank of

Chicago, the Cook County Criminal Court and County Jail, the Post Office at Canal and Van Buren streets (completed in 1932), the *Chicago Daily News* Building, the Morrison Hotel, the Civic Opera House, and the Elks National Memorial Healquarters Building.

Parks.—The extensive park system of Chicago aggregates 5,568 acres, to which additions are constantly being made; 109.7 miles of boulevard connect the eight large parks, four of which, Lincoln, Jackson, Grant and Burnham, lie along the shore of Lake Michigan. Lincoln Park, including the additions, extends along the lake for about 5 miles, and has a fine lagoon, bathing beaches, courts for golf and tennis, the Aquarium, the Zoo, the Academy of Sciences, and the Conservatory. Washington Park contains a conservatory of 18,000 square feet, and provisions for many outdoor enjoyments. Humboldt is the largest and most beautiful of the West Side parks and contains pavilions, pergolas and terraces.

Grant Park contains the Buckingham Memorial Fountain, set in a garden 600 feet square. Its dimensions are more than twice as large as the fountain of Latoria in the garden of Versailles. During the hour after dark when the major display of water is in operation, several million candlepower of electric illumination of various colors is played on the water. There are also 270 parks and playgrounds in the city. Within the very complete system of parks and forest preserves are located a great number of fields for all sorts of games, besides ski and toboggan slides, two aviation fields, swimming pools and skating ponds. The Forest Preserve Districts (33,000 acres, of which 1,378 are within city limits) contain 50 miles of bridle paths and 20 miles of park drives.



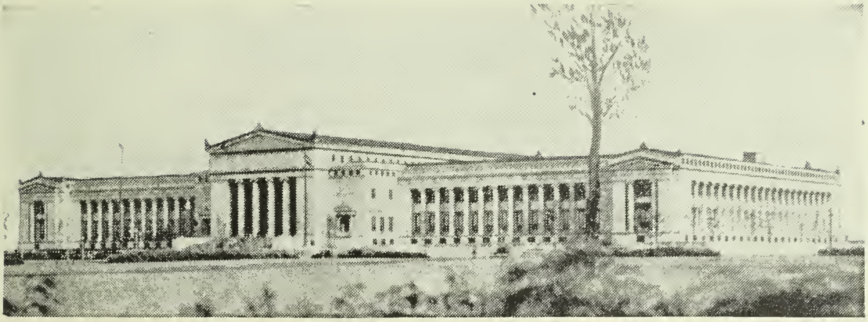
Courtesy Chicago Park District

AIR VIEW OF JACKSON PARK, CHICAGO

The Adler planetarium (see Orrery) in Grant Park was dedicated May 10, 1930. Its cost, $1,000,000, was given by Max Adler of Chicago. The planetarium edifice is 160 feet in diameter at the foundation and is twelve-sided. Each of the twelve sides is decorated with a sign of the zodiac. The lower structure is built of Minnesota granite, surmounted by a copper dome of which the top is eighty-eight feet above the level of the terrace on which the building stands. Within a corridor that encircles the hall are an astronomical museum and a library. The interior of the dome affords a realistic illusion of a view of the heavens unobstructed by clouds, with more than 4,500 planets, planetoids and stars in their orbital movements. The interior of the dome is constructed of a steel network into which a filling of concrete was sprayed. Over the hardened concrete surface was spread a white cloth covering, serving as a screen on which to project motion pictures of celestial images. Lectures are given every day.

The Shedd Aquarium, which opened June 1, 1930, also stands in Grant Park. It is octagonal in form, the foundation measuring 300 feet in diameter, while the height to the top of the dome from the foundation line is 100 feet. There are 132 exhibition tanks with over 4,000 live fish, both salt and fresh water, representing species from many parts of the globe.

Hotels and Clubs.—Chicago has some 604 hotels, most of the important ones being in or near the center of the city. Among the principal hotels in the business district are the Stevens (with 3,000 rooms), the largest hotel in the world; the Palmer House (2,268 rooms), the Morrison, Sherman, La Salle, Bismarck, Blackstone, Atlantic, Breevort, Harrison, Washington, Y. M. C. A., and Majestic. Other hotels outside of the downtown district are the Drake,



FIELD MUSEUM OF NATURAL HISTORY, CHICAGO

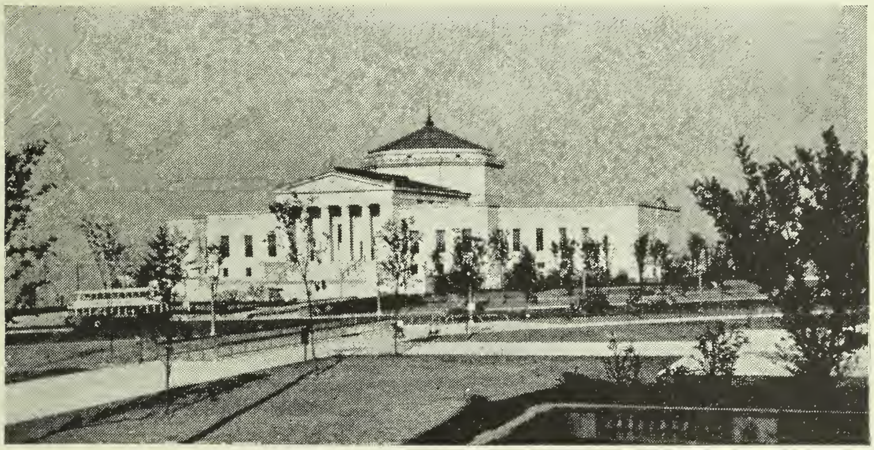


Photo by Raeburn Rohrbach

SHEDD AQUARIUM, CHICAGO

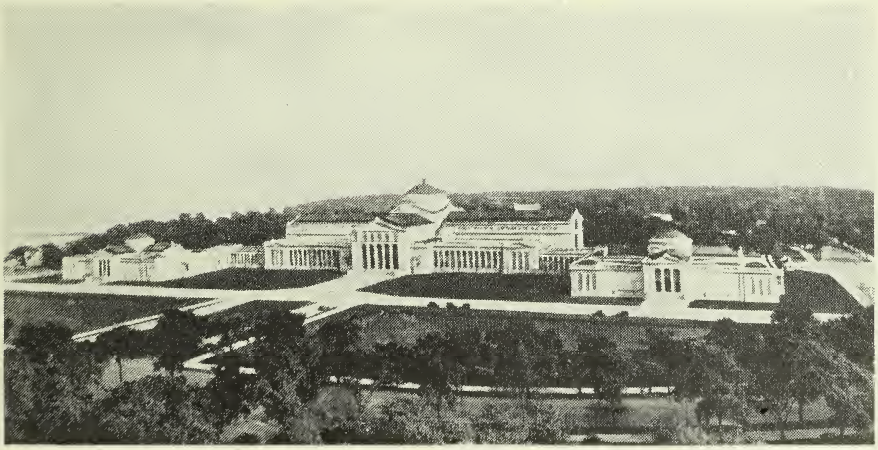


Photo by Chicago Architectural Photographing Co.

MUSEUM OF SCIENCE AND INDUSTRY, CHICAGO

Edgewater Beach, Ambassador, Grasmere, Belmont, Belden-Stratford, Sheridan Plaza, Del Prado, Lake Shore Drive, Sherry, Seneca, Shoreland, Park Lane, Park Dearborn, Surf, Sovereign, Knickerbocker, Maryland, Plaza, Hyde Park and many others.

Prominent among the many clubs in Chicago are the Union League, Hamilton, University, Covenant, Germania, Illinois Athletic, Chicago Athletic, Iroquois, Medinah Athletic, Mid-Day, Prairie, Racquet, Standard, Adventurers', Attic, Casino, Chicago, Chicago Commonwealth, City, Chicago Motor, Chicago Yacht, Cliff Dwellers, Columbia Yacht, Cordon. There are also numerous college and alumni associations, and business and trade associations.

Theatres.—The city has approximately 300 theatres representing various types of entertainment, of which 280 are devoted to motion pictures.

In the matter of halls the city is well supplied for the purpose of large gatherings, conventions, athletic contests and sports of all kinds. The largest of seating capacity is Soldiers' Field, an outdoor amphitheatre seating 120,000 people. It is there that football contests of national importance, and other types of athletic endeavor are held. Next in capacity is the Chicago Stadium, built in 1929 and seating 22,000. It is here that the National Political conventions are held when allotted to the city. Next in capacity is the Coliseum seating approximately 15,000 persons.

The Civic Opera House was built by a group of prominent Chicagoans as a permanent home for the Chicago Grand Opera Company which was formed in 1910. Orchestra Hall is next in size, being the home of the Chicago Symphony Orchestra (known as the Theodore Thomas Orchestra until 1913).

Chicago's Loop boasts of the fine group of motion picture palaces including the Oriental Theatre, Palace Theatre, Chicago Theatre, United Artists Theatre, Roosevelt Theatre and McVicker's.

The legitimate theatres of first rank in Chicago's Loop are the Harris, Selwyn, Apollo, Erlanger, Grand Opera House, Garrick, Studebaker, Great Northern and Blackstone.

In addition, there are nearly 500 public halls of all descriptions.

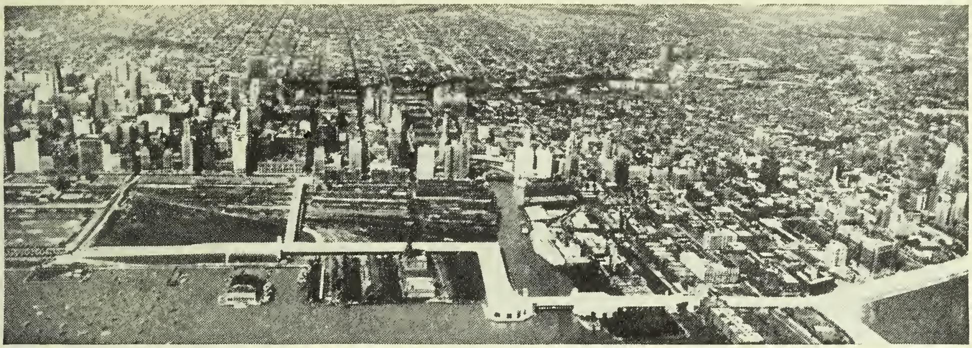
Churches.—Notable among the many churches, chapels and missions of the city are the Roman Catholic Cathedral at Superior and North State streets; Fourth Presbyterian Church of Chicago, North Michigan Ave. and Delaware Place; First Methodist Episcopal Church, Chicago Temple, Clark and Washington streets; St. James Episcopal Church, 666 Rush Street; University of Chicago Chapel, 58th St. and University Ave.; Hyde Park Baptist Church, 56th and Woodlawn; Irving Park Lutheran Church, Belleplaine and Harding Ave.; St. Paul's Evangelical Church, 2335 Orchard St.; First Church Christian Science, 4017 Drexel Blvd.; Sinai Temple, 4622 South Parkway.

Libraries and Museums.—Chicago has been the headquarters of the American Library Association since 1910, and has been termed the library center of the country. The Chicago Public Library contains 1,993,604 volumes (1942), and has many branches and sub-branches, as well as branch libraries in high schools. The Municipal Reference Library is a department of the city government, located in the City Hall. It is a special library on municipal government, municipal administration and legislation, and contains approximately 155,000 books and pamphlets. The John Crerar Library (655,000 books and pamphlets) is a reference library on the social, physical, natural and medical sciences and the field of technology. The Newberry Library (565,274 books and pamphlets) is a reference library in the field of the humanities, history and literature. The Chicago Historical Society Library and Museum contains 79,000 volumes and pamphlets, in addition to a very large manuscript and map collection. The Ryerson Library of the Art Institute (39,100 volumes), is devoted to works on fine art. The Burnham library of architecture (9,040 volumes) is also located in the Art Institute. The Field Museum of Natural History has a library (124,000 volumes and pamphlets) mostly relating to natural history subjects in the special fields of anthropology, botany, geology and zoölogy. Other large collections are the libraries of the University of Chicago (1,437,000 volumes); Northwestern University Library (668,410 bound volumes and 415,577 pamphlets), the E. H. Gary Law Library, a part of Northwestern University (119,325 volumes); Garrett Biblical Institute Library (189,000 volumes and 22,000 pamphlets) is a reference library of theology on the Northwestern University campus at Evanston; the Chicago Law Institute Library (98,227 volumes) is located in the County Building, Chicago; and the Loyola University Libraries (149,292 bound volumes).

The Field Museum of Natural History was founded in 1893 by Marshall Field who made an initial gift of $1,000,000 for the purpose and later increased his contributions to $9,430,000. The building is located in Grant Park. The exhibits and study collections of the museum are grouped into four departments: anthropology, botany, geology and zoology. Two units of the museum organization, the N. W. Harris Public School Extension, and the James Nelson and Anna Louise Raymond Foundation for Public School and Children's Lectures, maintain special educational activities in coöperation with the schools of Chicago. The Harris Extension circulates traveling exhibits, and the Raymond Foundation provides motion pictures, lectures, story-hours and other children's entertainments. The museum ranks among the four leading scientific museums of the world. The collections are especially extensive and unique in North American ethnology, physical anthropology, prehistoric man, botany, mineralogy, Chinese ethnology and archæology, paleontology and habitat groups of animals and birds from many parts of the world.

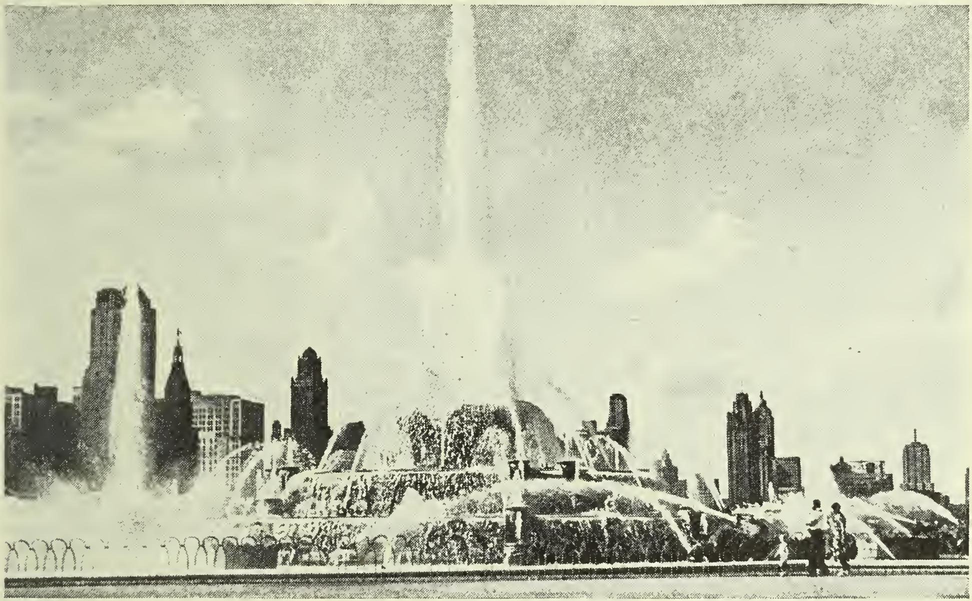
The Art Institute has collections of paintings, sculpture, etchings, engravings, textiles, Oriental art, antiquities, etc., which are considered among the finest in the country. A notable collection is that of eighteen paintings by George Inness, presented in 1911 by E. B. Butler. The Academy of Sciences in Lincoln Park has a good collection of local natural history specimens and of molluscs.

Education.—Seven miles south of the center of the city are the beautiful buildings of the University of Chicago (see CHICAGO, UNIVERSITY OF). Northwestern University (q. v.), with its main buildings in Evanston, has in Chicago the Schools of Commerce, Law, Medicine, Dentistry, and Pharmacy at the Chicago Campus in the 300 blocks on East Chicago Avenue. Under the administration of the Society of Jesus is Loyola University, with its academic department, St. Ignatius' College, on Roosevelt Road, and schools of law, medicine, pharmacy, engineering, and philosophical and social science, and preparatory schools. A technical school of high standing is the Illinois Institute of Technology. Schools of Theology include Chicago Theological Seminary (Cong.), Presbyterian Theological Semi-



Courtesy Chicago Park District

AERIAL VIEW OF THE LAKE FRONT AND DOWNTOWN CHICAGO



Courtesy Chicago Park District

BUCKINGHAM FOUNTAIN IN GRANT PARK, CHICAGO

Courtesy The Merchandise Mart, Chicago

THE MERCHANDISE MART ON THE NORTH BANK OF THE CHICAGO RIVER nary, Western Theological Seminary (P. E.), and an Evangelical Lutheran Theological Seminary. There are many independent medical schools in Chicago. The art school of the Art Institute offers courses in drawing and painting, leather, and metal work, book binding, design and ceramics. The Chicago Academy of Fine Arts was founded in 1902.

Hull House, located at 800 South Halstead Street, was the first American settlement, being established in 1889. Its object is 'to provide a center for a higher civic and social life; to institute and maintain educational and philanthropic enterprises and to investigate and improve conditions in the industrial districts of Chicago.' Hull House and its influence has meant a great deal to Chicago and the Middle West. Its classes in languages, arts and crafts, athletics, dramatics and music have been of inestimable value in teaching Chicago's foreign groups the benefits of good citizenship.

Chicago has 12,640 teachers and 390,376 pupils enrolled in its public schools. The system includes a teachers' college, one junior college, 14 vocational centers, two vocational schools, four schools for crippled children, one continuation and trade school, 331 elementary schools, and 41 high schools. Social centers at the school buildings were initiated in 1910. The public school system is administered by a board of education of eleven members appointed by the mayor, which elects the superintendent of schools.

Hospitals.—The Cook County Hospital with its 3,300-bed capacity, is said to be the largest general hospital in the world. This institution includes the Psychopathic Hospital and Cook County Morgue. The Children's Department building cost $1,000,000 and has a capacity of 500 beds. The group of institutions known as the Research and Educational Hospitals of the State of Illinois represents a most interesting effort toward the solution of problems involving medical education, public health and welfare as well as related social problems. Included in the group are the Research Hospital; the University Laboratory of Medical Research, with its library; the Orthopedic Hospital; the State Psychopathic Institute; the northern branch of the State Health Department Laboratory; the Free Dispensary of the Medical College. The Municipal Contagious Disease Hospital is considered one of the most modern and best equipped infectious disease hospitals in existence. The Municipal Tuberculosis Sanitarium at Crawford and Bryn Mawr avenues (capacity approximately 1,200 beds), is conducted on the plans of a general hospital highly specialized in the treatment of tuberculosis or any complicating condition that may arise in its course. It covers about 160 acres. There is invested $7,000,000 in buildings. One of the special features is a School of Tuberculosis to which students from three Class A medical schools come for study as a required course by such schools.

The Albert Merritt Billings Hospital conducted by the University of Chicago Medical School, one of the most beautiful buildings on the University campus, is planned with the idea of meeting the requirements for research and education in medicine, and providing the best facilities for the care and treatment of patients. The Children's Memorial Hospital is supported by endowments and private contributions. In 1919, it entered into an agreement of affiliation with the University of Chicago in order to promote post-graduate study. In line with this plan all the facilities of the hospital are available for teaching purposes. Other large hospitals in Chicago are the Augustana, Henrotin, Illinois Masonic, Martha Washington, Mercy, Passavant, Presbyterian, St. Luke's, Wesley Memorial, Michael Reese, Chicago Lying-In, Chicago State and Chicago Osteopathic.

Charities and Corrections.—The Institute for Juvenile Research at 907 South Lincoln Street is maintained by a State appropriation under the supervision of the Department of Public Welfare. A dispensary is for the study of the behavior difficulties of children with the object of obtaining information in regard to the nature and treatment of these difficulties. The Juvenile Court and Detention Home is located at Ogden Avenue and Roosevelt Road. The Court hears and disposes of cases brought before it; grants mothers' pensions in cases coming under the Mothers' Pension Act; and, in addition, has jurisdiction in the cases of feebleminded children in which the element of dependency or delinquency is present, and in truancy cases brought before the court under the Compulsory Education Law. The Juvenile Detention Home is an institution providing temporary custodial care for alleged dependent truant and delinquent children awaiting action by the Juvenile Court. It is maintained by the Chicago Board of Education. There is a branch of the Institute for Juvenile Research of the State of Illinois located here with its staff of psychiatrists, psychologists and psychiatric social workers.

Water Supply.—Chicago's water supply has developed with the growth of the city from the system first constructed in 1842 comprising an intake about 150 feet into the Lake, a wooden tank, and about 2 miles of wooden mains; to a system now composed of 6 intake cribs located 2 to 3.2 miles in the Lake, about 64 miles of tunnels connecting the cribs to the pumping stations, over 3,900 miles of cast iron water mains, and 12 pumping stations; having a total value of nearly $200,000,000. The average pumpage in 1942 was 956 million gallons of water daily. The pumping capacity of all the pumps is approximately two and one-half billion gallons daily.

The larger tunnels are constructed through solid rock 150 to 200 ft. below lake level. The Chicago Avenue tunnel, the largest in the city is 16 ft. in diameter, and has a capacity of about 800 million gallons of water daily. It serves five of the pumping stations.

The water mains radiate from the pumping stations through the streets of the city and vary in size from 54 to 4 inches in diameter. Connected to these mains are approximately 42,000 fire hydrants and 417,000 services to buildings.

The water is now chlorinated at the pumping stations to make it safe from bacteriological pollution. For the southerly intakes, where the water is more highly polluted, it is chlorinated at the intake cribs and again at the pumping stations.

In order to purify more adequately the polluted south district water, the city in 1938 started the construction of a filtration plant. This plant was about 60 per cent complete in 1943, and will filter the water for a population of about 1,400,000 located on the south side of the city. It will have a nominal rating of 320 million gallons of water daily, and a maximum capacity of 550 million gallons.

The filtration plant is located on land reclaimed from the Lake, and in addition to the plant proper, includes a breakwater in the Lake, a cofferdam around the plant, and the filling in of a large area to be used for a park and bathing beach. In this plant the water will be chlorinated, coagulated, settled, and filtered to remove all of the impurities. Activated carbon will be used for taste and odor removal.

Transportation. — Chicago's elevated system operates 231.5 miles of track, and the street railways, 1099.6 miles. The traction and elevated systems center in the Loop district. Upon the expiration of the franchise arrangements with the railway companies in 1927, no agreement was reached. The Chicago City Council on June 19, 1941 passed an ordinance to provide for a comprehensive unified local transportation system for the city and its metropolitan area. This ordinance was amended on Sept. 22, 1941 and April 15, 1943, and approved by the voters at a referendum election on June 1, 1942. Before becoming finally effective, however, certain further action was necessary in connection with the reorganization plan for the local transportation companies. Numerous bus lines connecting Chicago with other towns and operating on the city streets and parkways have helped the situation to some degree.

The Municipal Airport is located at 63rd Street and Cicero Avenue, approximately 13 miles from the downtown district. Chicago is the greatest municipal air transport center in the United States. It is the hub of the air mail service. More airplanes arrive and depart daily from the Municipal Airport than from any other airport in the country.

Bridges.—In the year 1943 the city of Chicago owned and maintained 56 movable bridges, of which 41 were trunnion bascules, 9 were rolling lifts, 3 were swing bridges, two were vertical lifts and one a pontoon bridge. The pontoon bridge is operated by a gasoline engine, all the others by electric motors. The city owned and maintained 25 fixed bridges and 12 viaducts. It also owned partly and maintained two other viaducts within the corporate limits. Various railroad companies owned and maintained 36 bridges and 36 viaducts, exclusive of grade separations at street intersections. Railroads also partly owned four viaducts and they owned and maintained six foot bridges over their rights-of-way. Private interests owned and maintained two viaducts. Within the city limits there were also several bridges and viaducts built and maintained by the state of Illinois and by Cook county. The approximate value of the bridges and viaducts owned by the city is $50,000,000, allowing for depreciation.

Tunnels.—The freight tunnels underlie nearly all the streets in the central business section of Chicago. They are used chiefly in transporting goods to and from railroad freight yards and in carrying coal to business houses. The tunnels are nineteen feet below city datum or 33 feet below the surface of the streets. The tunnel system was put into operation in 1906–07.

Commerce.—No other large city in the United States is so near both the center of area and the center of population as Chicago. Combined with this advantage, its situation at the head of the most southwestern of the Great Lakes, its extraordinary railway facilities, and its proximity to raw materials have made it one of the foremost commercial cities of the world.

The volume of Chicago's lake commerce is shown by the figures for 1941, when there were 10,252 arrivals with a tonnage of 11,688,863. The principal receipts were animals and animal products, wood and paper products, vegetable food products, textiles, nonmetallic minerals, metals and manufactures of ores and textiles. The number of vessels clearing the port was 10,230, with a tonnage of 11,592,902 tons.

The project for a 'Lakes to the Gulf Waterway,' eventually to be carried out, may still further increase Chicago's commerce.

Manufactures.—The seven leading industries are meat packing, foundry and machine-shop products, printing and publishing, iron and steel, men's clothing, and bread and other bakery products.

The Union Stock Yards are located at 42nd and Halsted streets, about 6 miles from the center of the city. The 'Stock Yards' need no introduction. They are situated on 500 acres of ground. About one-half of the space is given up to pens for livestock, the balance being occupied by the buildings of the packing companies. Over 15,500,000 head of cattle, calves, hogs, sheep and horses (for this is also a horse market) are received each year. The value of this livestock is given as over $520,000,000. The need for large scale industries of this kind is seen when it is realized that two-thirds of the livestock in this country is raised west of the Mississippi River and that more than two-thirds of the meat is eaten east of this river. The Stock Yards visit is one of the most interesting in Chicago.

The packing plants are open during working hours to visitors. Here may be seen the method of dispatching animals, preparing them for market by separating them into various cuts; methods of preparing ham and bacon; big smoke houses where hams and bacon are stored; large coolers where fresh meats are kept in perfect condition until shipped to retail trade.

About 200 trade and technical papers are published in Chicago and 43 newspapers in 17 foreign languages. Book and job printing is ranked third among Chicago's industries, and printing newspapers and periodicals is ranked fifth. Together they place the publishing business second among Chicago's manufactures.

Manufactures producing between 50 and 100 million dollars' worth of products in 1929 were confectionery, furniture, paints and varnishes, women's clothing; those producing between 25 and 50 million dollars' worth were coffee and spice roasting and grinding, steam railroad cars, structural and ornamental steel and iron, tin cans and other tinware, planing mill products; those producing from 10 to 25 million dollars' worth were boots and shoes, paper boxes, millinery, ice cream, sausage, meat puddings, head cheese, etc.; professional and scientific instruments, copper, tin and sheet iron work including galvanized-iron work, paper goods, signs and advertising novelties, lithographing, roofing, photo-engraving, book binding and blank-book making, forgings (iron and steel), stoves and ranges, house furnishings, feeds for animals, beverages, surgical and orthopedic appliances and chemicals.

Population.—In 1940 the population of Chicago was 3,396,808, making Chicago the second city in the United States, and the fourth in the world. The total foreign-born white population (census of April 1, 1940) was placed at 668,500, with 149,622 Polish, 111,366 German, 78,462 Russian, 73,960 Italian, 65,735 Swedish, 54,789 Irish and 48,814 Czecho-Slovak. The increase of population is shown by the following census returns: In 1930 it was 3,376,438; in 1920, 2,701,705; in 1910, 2,185,283; in 1900, 1,698,575; in 1890, 1,099,850; in 1880, 503,185; in 1870, 298,977; in 1860, 109,260; in 1850, 29,963; in 1840, 4,470; and at the time of its incorporation on March 4, 1837, it was 4,170.

Government.—Chicago is administered under a combination of authorities that has hampered municipal progress. Taxes are levied by the city, the county, the Board of Education, the three boards of park commissioners, the Sanitary District, and the Forest Preserve District. At the head of the municipal government is a mayor, elected for a four-year term. The common council of 50 members, one from each of the 50 wards, controls the excise, the police, the budget, and city contracts and city franchises, and confirms appointments by the mayor. The mayor appoints the heads of the city departments, and has the veto power; but ordinances may be passed over his veto by a two-thirds vote of the common council. There are several commissions such as the school board, the public library board, and commissions in charge of elections, the municipal tuberculosis sanitarium, and several pensions funds.

History.—Marquette and Joliet both visited the site of Chicago in 1673, and Marquette spent the winter of 1674–5 on the south branch of the Chicago River. According to tradition, La Salle was here later in the century, and predicted that it would one day become 'the gate of empire, the seat of commerce.' There is some evidence that at the end of the century a French fort was in existence at Chicago. A treaty of Wayne with the Indians in 1795 secured the cession of six square miles of this territory to the United States.

In 1803 a log house built about 1777 by a Santo Domingo Negro was sold to John Kinzie, who thus became Chicago's first American settler; and in the same year a block house, called Fort Dearborn (q. v.) was built. Between 1809 and 1818, while Illinois was organized as a Territory, Chicago was in the limits of Wisconsin; but a change in the boundary brought it within the Illinois state line in the latter year. In the beginning of the War of 1812, Fort Dearborn was destroyed, and 52 (out of 70) of the garrison and their wives and children were massacred by the Indians near the present intersection of Prairie Avenue and Eighteenth Street. The fort was rebuilt in 1816, and maintained until 1837.

Until 1830 the settlement was chiefly a military post and fur-trading station. It was incorporated as a town in 1833. In 1835 a treaty with the Indians, opening up a territory of 31,000 square miles, attracted settlers, and growth was rapid, incorporation as a city taking place in 1837. The Illinois and Michigan Canal, begun in 1836, was completed in 1848 at a cost of $6,170,226; and the latter years saw Chicago's first railroad.

Destructive fires visited the city in 1839, 1849, 1857, and 1871, the last being the greatest disaster in Chicago's history. On Oct. 8–10, 1871, the city, owing to a high wind and prolonged drought, was in large part laid in ruins by a fire that drove 100,000 persons to the shelterless prairies, and destroyed between 200 and 300 lives and $150,000,000 worth of property. In two years the city was rebuilt more solidly than before, and in 1875 it was incorporated under the Illinois Cities and Villages Act.

In 1886 occurred the famous Haymarket Riots, when, upon the breaking up by the police of an anarchist meeting held during a strike of 4,000 workmen, a bomb was thrown, fatally injuring 8 policemen and wounding 66 others. Seven anarchists were convicted of murder and one of manslaughter; four were hanged, one committed suicide, and the others were ultimately pardoned. The next serious labor crisis was in 1894, when railroad rioting, growing out of a strike at the Pullman Car Company's works, was put down by U. S. troops at President Cleveland's order, to prevent the obstruction of the U. S. mails.

The World's Fair, commemorating the discovery of America, was held in 1893 in Jackson Park (see WORLD'S COLUMBIAN EXPOSITION) and did much to stimulate the city's aesthetic development. In 1903 the city celebrated the 100th anniversary of its settlement.

On Dec. 30, 1903, occurred the Iroquois Theatre fire, in which 575 lives were lost. The Chicago Plan Commission was appointed in 1909 and a city plan was drawn up by Daniel H. Burnham (q. v.). The summer of 1919 witnessed race riots and a strike of street-car employees.

Following the prohibition amendment to the Federal Constitution, Chicago attracted world-wide attention as a center for criminal gangs who exploited the liquor traffic and whose banditry and crimes brought into being the Chicago Crime Commission. In 1931 the fight against crime in Chicago came to a head when 'public enemy No. 1' was sentenced to prison. By November of that year, 41 of the original list of 'public enemies' were dead, in prison, or in custody and six were fugitives.

In 1927 the taxpayers of Cook County successfully contested the 1927 tax assessment. A reassessment 18 months later found the depression under way. Tax rates were held confiscatory and discriminative. The 1928 and 1929 tax levies were held invalid because of the omission of a large amount of personal property. By April, 1933 back taxes due the city totalled $200,000,000; teachers and others remained unpaid; the U. S. Federal Treasury had struck Chicago bonds from the list of investments for postal savings; and spectacular parades and near riots were common.

In 1933 the Century of Progress Exposition marked the 100th anniversary of the city as a chartered municipality.

The National Democratic Convention was held in Chicago in 1932 and 1940.

Bibliography.—Consult A. T. Andreas, *History of Chicago* (3 vols. 1884–86); H. C. Chatfield-Taylor, *Chicago* (1917); P. T. Gilbert and C. L. Bryson, *Chicago and Its Makers* (1929); J. P. Goode, *Geographic Background of Chicago* (1926); J. Hall, *Story of Chicago* (1929); H. R. Hamilton, *Epic of Chicago* (1932); J. A. Kinzie, *Wau-bun, the Early Days of the Northwest* (1930); C. E. Merriam and Others, *Government of the Metropolitan Region of Chicago* (1933); H. B. Mitchell, *Historical Fragments of Early Chicagoland* (1928); B. L. Pierce and J. L. Norris, *As Others See Chicago* (1933); M. M. Quaife, *Checagou; from Indian Wigwam to Modern City, 1673–1835* (1933); W. C. Reckless, *Vice in Chicago* (1933); H. J. Smith, *Chicago, a Portrait* (1931); H. J. Smith and L. Lewis, *Chicago Centennial* (1933); B. L. Pierce, *A History of Chicago* (2 vols. 1937–38).

Chicago Drainage Canal, a canal diverting the flow of the Chicago River from Lake Michigan, which is the source of the city's water supply, to the Mississippi, by way of the Des Plaines and Illinois rivers. Until the construction of this canal by the Sanitary District of Chicago, all the sewage of Chicago emptied into the lake or the Chicago River and its branches. The main channel has a total length of 32 miles; bottom width of 160 feet in rock, 162 to 202 feet in soil; with vertical sides in rock, side slopes of soil; navigable depth of 22 feet; capacity of 10,000 second-feet; and cost $45,289,000.

An act providing for the organization of the Sanitary District was passed in 1889 by the Illinois legislature, work was begun in 1892, and the canal was opened in 1900. The controlling works at Lockport originally consisted of a bear-trap dam 160 feet wide and seven sluice gates 30 feet wide. Two miles south of Lockport a powerhouse was put in operation in 1907 which develops power by turbines to light the streets of Chicago and operate a part of the sewage treatment works of the Sanitary District. In 1910 the North Shore Channel was completed at a cost of $4,143,000 to flush out the north branch of the Chicago

River. In 1922, the Calumet-Sag Channel was completed at a cost of $14,175,000 to reverse the flow of the Calumet River. In 1908 a special bond issue of $20,000,000 was authorized by the state of Illinois for the construction of a nine-foot waterway from Lockport powerhouse to Utica. This was completed with the aid of the Federal Government and opened for traffic in 1933. Under the River and Harbor Act of 1930, the Drainage Canal became a part of the Illinois Waterway, a navigable waterway of the United States. Traffic was begun for barges and tugs from the Mississippi basin. In 1940, practically all the collectible sewage of the Sanitary District was receiving treatment, after the construction of 175 miles of intercepting sewers and four major sewage treatment works. Three are of the activated sludge type, the fourth an Imhoff tank plant. The Sanitary District has an area of 442 square miles, a population (1940) of 3,965,000, including Chicago and some 60 other municipalities. To date (1944) the Sanitary District has spent $266,000,000 of which $172,000,000 is for sewage treatment, including intercepting sewers, sewage treatment works, and pumping stations.

Chicago Heights, city, Cook county, Illinois, on the Chicago and Eastern Illinois, the Chicago, Milwaukee, St. Paul, and Pacific, the Michigan Central, and the Elgin, Joliet, and Eastern railroads, and on the Baltimore and Ohio, Chicago Terminal Transfer; 22 miles south of Chicago. Bus service connects the city with the electrified Illinois Central. Its manufactures include steel, oil, fertilizers, fence posts. Pop. (1930) 22,321; (1940) 22,461.

Chicago River, Illinois, is formed by a north and south branch joining in Chicago, one mile from Lake Michigan. The Chicago Drainage Canal (q. v.), which connects the south fork with the Des Plaines River, reverses its current and diverts the city's sewage from the lake into the Mississippi through the Des Plaines and Illinois rivers. The Illinois and Michigan Canal connects it directly with the Illinois River.

Chicago, University of, a co-educational, privately endowed institution of learning in Chicago, Ill., chartered in 1890, succeeding a former University of Chicago founded in 1857 by Stephen A. Douglas and abandoned in 1886. Its organization was owing largely to John D. Rockefeller, who made a subscription of $600,000 toward an underwriting fund, and whose personal gifts to the University ultimately reached a total of more than $35,000,000. The work of organizing the institution was carried out largely through efforts of the American Baptist Educational Society. Originally the charter provided that the president of the University and two-thirds of its trustees shall be members of the Baptist Church. There now is no requirement that the president shall be a Baptist, and of the Board of 35 members, three-fifths must be members of Christian churches, of whom a majority must be Baptists. William Rainey Harper, first president of the University, assumed office July 1, 1891, a date since celebrated as the founding of the University.

The educational ideas and principles which Dr. Harper introduced in organizing the University had a significant effect on American higher education, particularly in the development of the true university spirit of graduate education and research, theretofore existing only in Europe. He also devised the quarter system, to provide continuous operation of the University throughout the year; and established a University Press, opened classes to women on the same basis as men, and notably raised the level of academic salaries.

The University was opened to students Oct. 1, 1892 on lands given by and purchased from Marshall Field. The original site included 17 acres, since increased to 105 acres, adjacent to the Midway Plaisance of the World's Columbian Exposition, and between Jackson and Washington Parks about seven miles south of the Chicago loop. The University also owns various properties used for educational and research purposes, among them the site of Yerkes Observatory (q. v.) at Lake Geneva, Wis.; Wychwood Plant and Bird Sanctuary, also at Lake Geneva, and a field headquarters of the Oriental Institute at Luxor, Egypt. The 85 buildings on the quadrangles are English collegiate Gothic architecture, established in the original plan of Henry Ives Cobb, who designed the buildings erected before 1900.

The University still retains the character established by Dr. Harper, but has revised its educational organization and methods. In 1930, the 'Chicago Plan' established a College and the four upper divisions of Humanities, Social Sciences, Biological Sciences, and Physical Sciences under which departments were grouped. There also are six professional schools—Business, Divinity, Graduate Library, Law, Medicine, and Social Service Administration—and downtown University College, as well as a Home Study (correspondence) department. In January, 1942, a further step in the reorganization was taken by the faculty, the College becoming a four-year unit beginning at the level of the junior year of high school and ending with the sophomore year of the traditional College.

The College, an autonomous unit with its own faculty, administers a basic liberal education, for which the Bachelor's degree is awarded. Students who have completed the sophomore year of high school enter the College for four years; those who have graduated from high school enter the second half of the College and require approximately two academic years to attain the degree. The program follows the principles established in the Chicago Plan, with required general courses as the basis of the curriculum, and comprehensive examinations to test achievement. It is not necessary for students to attend courses to take the examinations; if by previous training, independent study, or by other means they believe they can meet the standard of the examinations, they are free to take them. Considerable freedom is allowed students in the last two years of the College, but those in the first two years are under close supervision. The Chicago Plan also provides for small discussion groups, and a comprehensive advisory system, special sections for students needing assistance, and extensive remedial facilities, such as the reading clinic. The Divisions continue education in specialized fields; a student graduating from the College may enter a Division for a three years' program for the Master's degree and then continue for the Ph.D., or may begin professional study.

Numerous interdepartmental and inter-divisional committees have also been established to provide a broad basis of graduate study. The Law School formulated a new curriculum in 1937, integrating, with its instruction in law, material from the social sciences, philosophy, accounting, and other fields basically related to the development and function of law. In 1943, the Divinity School, in cooperation with Chicago Theological Seminary (Congregational); Disciples Divinity House; and Meadville Theological Seminary (Unitarian), all contiguous to the University and previously in loose affiliation with it, organized the Federated Theological Faculty which formulated a curriculum for students of all four institutions, except for a fraction reserved for special denominational education. All Divinity degrees are awarded by the University in cooperation with the individual seminaries. In organization and in all financial aspects, each seminary remains independent. The Medical School of the University is the only one in the country organized with a staff devoting full-time to medical education and research, and engaging in no practice outside the University Clinics, the clinical units of the School. Under a cooperative agreement made in 1939, the astronomy faculty of the University staffs the McDonald Observatory of the University of Texas, located at Fort Davis, Tex., and equipped with an 82-inch reflector.

The University of Chicago Press, oldest of its kind in continuous operation in the country, ordinarily publishes 75 to 100 books a year, and 18 learned journals. Its primary function is to provide a medium for publication of scholarly research, but it also publishes books of interest to considerable sections of the public, and numerous texts, principally those developed for use in the Chicago Plan courses. In 1944 it completed publication of one of its most important undertakings, *A Dictionary of American English,* in four volumes, preparation of which began in 1925.

Large use of the resources of the University was made by the Government during the Second World War, and considerably more than half of the University facilities and faculty were engaged in war research, training for the armed forces, and other purposes, on a non-profit basis. During the war, civilian enrollment, which in pre-war years averaged 7,700 students in a quarter for all schools and divisions, declined approximately 50 per cent, and the normal preponderance of men was reversed. Students of the armed forces regularly enrolled in the University, however, offset the loss of civilians. In addition to these service students, there were special service groups not enrolled as students, and a large contingent of Navy enlisted personnel in Signal and Radio Schools also was at the University.

As of June 30, 1943, the book value of all University assets was $125,902,953, of which endowment funds amounted to $69,423,973. For the fiscal year, 1942–43, the regular budget income of the various academic divisions (excluding income from restricted expendable funds and auxiliary enterprises and most of the income from war contracts with the Government (on a non-profit basis), was $8,113,505. War contracts, for teaching, research, housing, and messing, numbered 160 with 19 departments of the Government. The libraries of the University contain 1,437,000 bound volumes, including many special collections. In 1943, Encyclopaedia Britannica, Inc., publishers of *Encyclopaedia Britannica, Encyclopaedia Britannica, Jr.,* and other reference works, came under control of the University of Chicago through a gift made by Sears, Roebuck & Co. of Chicago. Encyclopaedia Britannica, Inc., in December, 1943, bought Erpi Classroom Films, Inc., largest producer of sound motion pictures for classroom instructional purposes.

Presidents of the University of Chicago have been: William Rainey Harper (1891–1906); Harry Pratt Judson (1907–23); Ernest DeWitt Burton (1924–25); Max Mason (1925–28); Robert Maynard Hutchins (1929–).

Chicane, a system of petty tricks. In the game of bridge the word is used for the points which a player may score if he holds no trump cards.

Chichagov, chē-chä'gof, island, the largest of the Alexander Archipelago, Alaska, north of Baranov Island.

Chichas, chē'chäs, a South American Indian tribe of the Gran Chaco, Argentina, who differ in a marked degree from the other tribes (mostly predatory) of that region. They have fixed settlements, and cultivate the land in the Upper Bermejo district, where they were supposed to be *mitimaes,* or Peruvian colonists. They wear a cloth dress woven by themselves from llama wool, and are said to have been employed by the Incas in the neighboring silver mines.

Chichele, or CHICHELEY, HENRY (1362?–1443), archbishop of Canterbury, England, in reigns of Henry V and Henry VI.

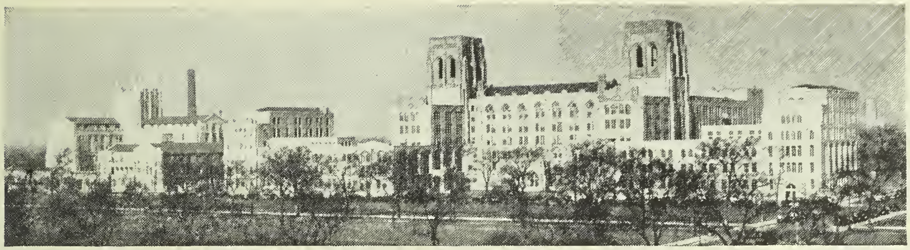
Chichen, chē-chen', CHICHENITZA, or CHICHEN-ITYA, an ancient ruined city of Yucatan, Mexico, so-named from *Itza,* or *Itya,* a tribe of the great Mayan stock, and *Chechen,* well mouths, because the city was built around two natural pools or wells which supplied its natives with water. It is situated 25 miles west of Valladolid and 100 miles southeast of Merida. The history of the city is unknown.

The ruins, which cover less than one square mile, consist of some half dozen important piles, with numerous remains of inferior structures, some of which are so completely buried in the forest that their exploration has never been undertaken. In plan and dimensions the buildings are greatly diversified. The materials are the soft gray limestone found in the vicinity, lime-sand mortar, and wood. The pyramid-temple is the prevailing type. The buildings are generally simple in their arrangement of corridors, vestibules, and chambers, and there are no underground structures. Sculpture played an important part in their embellishment, and the function of most of the buildings was undoubtedly religious. One of the most important ruins is El Castillo, a pyramid-temple between 75 and 80 feet high, whose walls are covered with relief sculptures. The Tennis Court or Gymnasium consists of four structures independently placed, but enclosing an oblong rectangular court about 450 feet long by 120 feet wide. The lateral structures are colossal walls, 34 feet thick and 25 feet high. Near the south end of the eastern wall is the Temple of the Tigers, one of the most elaborate of the existing ruins. The buildings at the north and south ends of the Court are small and insignificant. Other notable ruins are the Carocol or Round Tower; the Red House; and the Nunnery or Palace, this latter one of the most interesting buildings in Chichen.

Chichester, chich'es-tėr, city, municipal borough, and market town, Sussex, England; 61 miles southwest of London. It stands on a plain between an arm of the sea and the South Downs. It is well built, and has wide streets. Within the suburbs the city is surrounded by an ancient wall, 1½ miles in circuit, with some semi-circular bastions, and now a promenade under the shade of elms. The Cathedral, erected in the twelfth and thirteenth centuries, has a detached bell tower, or campanile (120 feet), the only structure of the kind retained by an English Cathedral.

Chichester was the Roman *Regnum,* and has afforded many Roman remains. It was taken and partly destroyed in 491 by the South Saxons; but was soon after rebuilt by Cissa, their king, and called *Cissanceaster,* or Cissa's Camp. It was for some time the capital of the kingdom of Sussex. The city was incorporated under a mayor and aldermen in 1604. It has been regularly represented in Parliament since 1295. It was a place of considerable commercial importance throughout the Middle Ages. In December, 1642, the royalists of Chichester surrendered to the parliamentarians under Waller. Pop. (1931) 13,911.

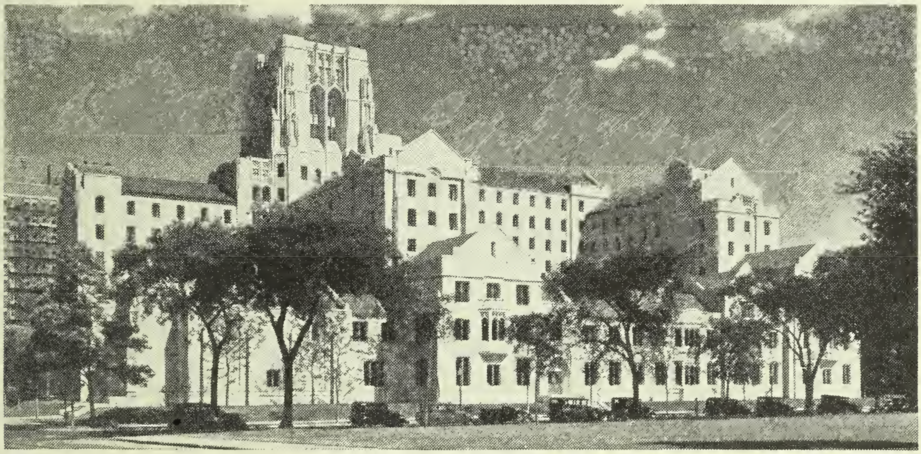
Chi-chou, one of the nine



Courtesy The University of Chicago

Photo by Capes

THE UNIVERSITY OF CHICAGO CLINICS



INTERNATIONAL HOUSE AT THE UNIVERSITY OF CHICAGO

Courtesy The University of Chicago

Photo by Capes

HUTCHINSON COURT AND MITCHELL TOWER

divisions of China in the Hia or Hsia dynasty, 2205–1766 B.C., corresponding with West Chi-li, Shansi, and the part of Ho-nan north of the Yellow River.

Chickadee, the black-capped titmouse. See Tit.

Chickahominy, chik-*a*-hom'i-ni, river, Virginia, a tributary of the James, which it joins 22 miles below City Point. Along its banks were fought, in 1862, the battles of Fair Oaks or Seven Pines, Mechanicsville, Gaines's Mill, Savage's Station, and Frazier's Farm or White Oak Swamp, and, in 1864, Cold Harbor.

Chickamauga, chik-*a*-mô'g*a*, Battle of, a battle of the American Civil War, fought along Chickamauga Creek, near Chattanooga, Tenn., on Sept. 19–20, 1863, between about 57,000 Federals (the Army of the Cumberland) under General Rosecrans and about 70,000 Confederates under General Bragg. After a campaign marked by brilliant strategy, Rosecrans had manœuvred Bragg out of middle Tennessee, and on Sept. 9, without fighting a battle, had gained possession, as the result of a flanking movement, of Chattanooga. Bragg, reinforced, refused, however, to withdraw farther southward, and on Sept. 19 attacked Rosecrans. General Thomas, commanding the Federal left, bore the brunt of the attack and neither side gained any decisive advantage. On the following day (Sept. 20), Bragg again attacked (Polk commanding his right and Longstreet his left). About noon the withdrawal, through mistaken orders, of a division from the Federal line on the right of the center opened a gap, into which the Confederates poured, thus isolating the Federal right under General McCook, which, with the center under Crittenden, was soon overwhelmed, the Federals, accompanied by Rosecrans in person, being forced in disorderly retreat back to Chattanooga. Thomas, though assailed by twice his number, stood firm, thus earning his sobriquet the 'Rock of Chickamauga,' and finally, without opposition and in good order, withdrew during the night to Rossville, the total result of the battle being an important victory for the Confederates. The Federal loss in killed, wounded, and missing was 16,179; that of the Confederates about 18,000.

Chickamauga National Military Park, a tract of land (15 square miles) in the southeastern part of Tennessee and the northwestern part of Georgia, embracing the battlefield of Chickamauga and the scenes of other actions of the Civil War around Chattanooga. It was established by Congress in 1890, with the cooperation of Georgia and Tennessee, and was dedicated September 19–20, 1895.

Chickasaw Bluffs, Battle of, a battle of the American Civil War, fought Dec. 29, 1862, at Chickasaw Bayou, an arm of the Yazoo River, about 10 miles northeast of Vicksburg, Miss., between the Federals under General Sherman and the Confederates under General Pemberton. The Federal attempt to gain possession of the bluffs at this point was repulsed. The Federal loss was nearly 2,000; the Confederate loss, nearly 200.

Chickasaws, chik'*a*-sôz, a tribe of North American Indians akin to and former allies of the Choctaws. Their camping grounds stretched along the left bank of the Mississippi from a little south of what is now Memphis to the confluence of the Ohio and the Tennessee. In 1834 they ceded their lands to the United States and settled in Oklahoma where they are known as the Chickasaw Nation. In 1920 the nation numbered 10,966, of whom 5,659 were full or mixed-blooded Chickasaws.

Chickasha, chik'*a*-shā, city, Oklahoma, county seat of Grady county, on the Washita River and on the Chicago, Rock Island and Pacific, and the St. Louis-San Francisco railroads; 50 miles s.w. of Oklahoma City. The city is surrounded by extensive gas fields. The manufacture of cotton and cotton products is the chief industry. Pop. (1930) 14,099; (1940) 14,111.

Chicken. See Poultry.

Chicken-pox, or Varicella, an acute, highly contagious disease, occurring chiefly in children characterized by an eruption of vesicular type, appearing in crops and accompanied by mild febrile disturbance. The lesions dry in a few days into crusts, which drop off, occasionally leaving faint scars. Chicken-pox is one of the mildest of the acute exanthematous diseases, and internal treatment is seldom required, though mild antiseptic lotions may be employed locally. The incubation period is variable —from a few days to three weeks.

Chick Pea (*Cicer arietinum*), an annual leguminous plant, native to the countries bordering on the Mediterranean. It grows to about two feet in height, with leaves consisting of from three to seven pairs of leaflets and a solitary terminal leaflet, and bears short oblong pods, each containing two seeds. These seeds are ground into meal and form an important article of food in Spain, the Orient, and eastern Asia.

Chick'weed, a group of plants belonging to the order Caryophyllaceæ. The Common Chickweed (*Stellaria media*) is a hardy persistent weed found throughout most of the cooler parts of the world. It has a slender weak stem with a fringe of hairs on one side, small ovate leaves, small white five-petalled flowers, and numerous round brown seeds. It is used as a food for cage-birds. Other varieties of chickweed are Mouse-ear Chickweed (*Cerastium vulgatum*) and Field Mouse-ear Chickweed (*Cerastium arvense*), sometimes cultivated for its white starry flowers.

Chiclayo, chē-klī'ō, town, Peru, department of Lambayeque, about 10 miles from the coast. It produces sugar, and has manufactures of soap and leather. Pop. 35,000.

Chicle, a milky product obtained from the bark of the Sapodilla Plum (q. v.) or Bully Tree, from which chewing gum is made. The fluid sap of these trees is collected, exposed to the air for a short time, and then boiled until the water is practically all evaporated. The residue, a sticky, pasty mass, is melted, and kneaded into solid blocks for shipment. The greatest quantity came from Yucatan and British Honduras.

Chico, chē'kō, city, California, Butte county, in the valley of the Sacramento River, on Chico Creek, and on the Southern Pacific Railroad; 82 miles n.w. of Sacramento. It is the seat of the State Teachers' College of Chico, has a public library, and a large natural park. The chief industry is trade in agricultural and dairy products. Manufactures include lumber, matches, and flour. Pop. (1930) 7,961; (1940) 9,287.

Chicopee, chik'ō-pē, city, Massachusetts, Hampden county, at the confluence of the Chicopee River with the Connecticut River, and on the Boston and Maine Railroad; 4 miles north of Springfield. It is a thriving industrial town, deriving abundant water-power from the Connecticut. There are large cotton mills, bronze works, and manufactures of boilers, hardware, firearms, farming and mechanical tools, carpets, knit goods, and automobiles. Chicopee was originally part of Springfield. It includes Aldenville, Fairview and Willimansett, and Chicopee Falls, which was the home of Edward Bellamy. Pop. (1930) 43,930; (1940) 41,664.

Chicory, chik'ō-ri, Succory, or Endive (*Cichorium intybus*), is a tough-stemmed composite plant, usually growing about two feet high, and commonly flowers on waste ground and by roadsides in summer. Its sky-blue flowers are only open during the hours of sunshine. Chicory is grown for a salad by blanching the leaves of well-grown roots. The blanched leaves are known as *barbe de Capucin,* or *witloof.*

Chicory is also extensively cultivated for its root, to be mixed with coffee. It is easily grown in most well-drained soils, but the ground should not be heavily manured. The root is roasted in fat till dry, and then ground to powder. Although dissimilar in composition, in its action on the human organism chicory much resembles coffee. See Folkard's *Plant Lore, Legends and Lyrics* (1884).

Chicoutimi, tn., Canada, Quebec, co. seat of Chicoutimi co., about 100 m. N. of Quebec, on the Saguenay R., on the Que. and L. St. John R. R. It is the seat of a college, is a Roman Catholic see and has a cathedral. Lumbering is the most important industry, and timber is exported directly, the river being navigable to large vessels. Pop. (1941) 15,975.

Chief, in heraldry, one of the nine 'ordinaries,' and defined as the uppermost 'third' of the shield defined by a horizontal line.

Chiemsee, a lake of Bavaria, at the N. foot of the Bavarian Highlands, 56 m. by rail E.S.E. of Munich; is 8½ m. long by 7 m. broad, and lies 1,700 ft. above sea-level. On the largest of its three islands stands the palace (unfinished) of Herrenchiemsee, built by King Ludwig II, after the model of the palace of Versailles.

Chiengmai, MUANG-MAI, or ZIMME, chief trading tn. of N. Siam, on the Meping R., a branch of the Menam, about 500 m. N.W. of Bangkok. It is a center of the Siamese teak trade, and traffics with Yünnan, Maulmain, and Bangkok.

Chieti, province of central Italy, forming part of Abruzzi and Molise; embraces a relatively low, fertile coast belt, backed by a barren, mountainous region —the Abruzzi—which culminates in the steep Majella (9,170 ft.). Wheat, olives, wine, flax, tobacco, and rice are produced, and there is some industrial activity (textiles, hats, leather wares, etc.). Swine-keeping, fishing, and the preparation of salt also belong to the chief occupations. Down to 1871 it was known as Abruzzo Citeriore. Area, 1,138 sq. m. Pop. (1930) 34,085.

Chieti. The ancient *Theate Marrucinorum,* archiepiscopal see of Italy, cap. of above prov., 8 m. S.W. of Pescara, on the Adriatic. It is a well-built town, with a cathedral of the 11th century, and ruins of a Roman amphitheatre and other structures, and also of a Norman castle. Woolen hats, soap, etc., are manufactured. The monastic order of the Theatines was founded here in 1524. Pop. (1930) 20,234.

Chiffchaff (*Phylloscopus rufus*), a small European bird, olive-green above and white below. The name is due to the note, which is often heard in woods, lofty elms being specially favored by the bird, which is one of the warblers.

Chigi, AGOSTINO (1465–1520), Roman banker, and the friend and patron of artists during the age of Pope Leo X, more especially of Raphael, for whom he built the Villa Farnesina. The family of Chigi has furnished five cardinals, and a pope, FABIO (1599–1667), who adopted the title Alexander VII. He is best remembered for his share in the Jansenist controversy, when he declared for papal infallibility on questions of doctrine; also for his collision with Louis XIV of France, whose army annexed Avignon. To Alexander VII is due the splendid colonnade of the Square of St. Peter.—FLAVIO CHIGI (1810–85), cardinal, and papal nuncio at Munich (1850) and Paris (1861). Made cardinal in 1873.

Chignecto, bay, forming the N.E. branch of the Bay of Fundy, between Nova Scotia and New Brunswick, Canada; it divides into Shepody Bay and Cumberland Basin.

Chignecto. Isthmus between Chignecto Bay and Northumberland Strait.

Chigoe, JIGGER, or SAND-FLEA (*Sarcopsylla penetrans*), a parasitic insect native in tropical America, but now found in other parts of the world. It attacks man, and while the male apparently does not differ in habits from other fleas, the female buries the anterior part of her body in the skin, and becomes enormously distended with eggs. The place of attack is usually the skin beneath the toes, so that children and persons who go barefoot are particularly liable to fall victims. How far the disagreeable and even dangerous effects which ensue are due to the actual presence of the insect, as distinct from the secondary results due to the patient's treatment of the wound, appears a little uncertain, but the insects are greatly dreaded in the countries in which they occur. The treatment is the removal of the parasite by means of a needle from the wound, care being taken that the insect is not broken, and that no eggs are left in the vicinity. If eggs or young are left behind in the wound, extensive ulceration is set up.

Chigwell, vil., England, Essex, on the Roding, 2 m. N.E. of Woodford. It is in the vicinity of Epping and Hainault Forests. Its 'King's Head Inn' figures in Dickens's *Barnaby Rudge* under the name of 'The Maypole.' Pop. (1938) 23,750.

Chihli, or CHI-LI ('direct rule'), the metropolitan province of China, in many English maps called Pe-chi-li; bounded on the E. and N.E. by the Gulf of Pe-chi-li and Manchuria, and on the N. by Mongolia. Area, 115,800 sq. m. To the S. of Peking is a great plain, but N. of Peking the country is mountainous, and embraces a small portion of the Mongolian plateau. The thermometer ranges from about 105° F. in summer to below zero in winter. At Peking there are frosts at night from October to March. Little snow falls; the rainfall is between April and October, and averages about 23 inches. Great dust-storms are frequent in spring. Grain, Indian corn, and millet are the chief crops; tobacco, cotton, buckwheat, indigo, seamum, and the potato and sweet potato are also grown. Grapes, peaches, apricots, plums, pears, apples, water and other melons, persimmons, and walnuts are abundant. The province lacks harbors; one was constructed at Chinwangtao. Pao-ting-fu is the capital of the province, though since 1870 the viceroy has generally resided at Tientsin. Pop. (1936) 28,644,739.

Chihuahua, state, Mexico, with New Mexico on the N. and Texas and Coahuila on the E. It is the largest state of Mexico, traversed in the S. and W. by ridges of the Sierra Madre, but has in the E. great tracts (Bolson de Mapimi) of desert. Its importance is due to its mineral wealth, its silver mines ranking at one time as the richest in Mexico. Gold and copper are also mined. Area, 94,822 sq. m.; pop. (1940) 623,944.

Chihuahua, town, cap. of above, is on the Mexican Central Railway, 225 m. S. of El Paso. It has a magnificent cathedral, and its mint, established a few years ago, is now the third in the republic. Pop. (1940) 56,796.

Chilas, vil. and fort on l. bk. of Indus, India, 35 m. S.W. of Gilghit; of strategic importance owing to its position on the N.W. frontier between Astor and Gilghit. On its occupation by the British in 1893 it sustained a determined attack by the hill tribes.

Chilblain, or FROSTBITE (*Erythema pernio*), is an inflammatory condition of the skin, occurring principally in children and the aged, and more often in girls than boys. The commonest situations are the feet and hands, but chilblains may also be found on the ears and nose. They follow coldness of the part, and are therefore a winter affection, but some people suffer from them almost all through the year. They are most generally believed to be the result of deficient nutrition and sluggish circulation, though this has been denied. A typical chilblain, if severe and unchecked, passes through the stages of heat and itchings, followed by a small blain or bleb, followed again by a breaking of the skin and a serous discharge. The itching is increased by warmth. The best preventive is to keep the extremities well clad in warm, loose gloves and boots, and, after exposure to cold, to restore circulation by gentle rubbing rather than by toasting at the fire. In the early stage, when chilblains are unbroken, iodine may be painted on; and various liniments of chloroform, belladonna, and aconite are recommended. The application of guaiacol has lately been advised, while some favor the warm electric bath. This is given by placing the affected parts in an earthenware footbath filled with warm water, and passing a current from an induction coil through two metal electrodes, one at each end of the bath. Some consider this, if used for seven or eight consecutive nights, a perfect cure for chilblains, and state that it seems to have a lasting effect upon a poor circulation.

Child. The most noteworthy features in the child's general conformation, as compared with the adult, are the large size of the head, the small size of the thorax, the large size of the abdomen, the shortness of the legs, and the length of the arms. These features are most pronounced in infancy, becoming gradually less with advancing years.

The Skeleton.—The chief peculiarities of the skeleton depend upon the fact that it is a growing structure. The bones are more vascular than in the adult, and contain a larger proportion of organic material and a smaller percentage of lime salts. The skull is incompletely ossified at the time of birth. The sutures between the different cranial bones and the spaces between their angles are completed by membrane. The largest of these spaces is situated between the parietal bones and the two halves (at first separate) of the frontal bone, and is called the anterior fontanelle, or, popularly, the opening of the head. This fontanelle is usually closed by about the eighteenth month. At the end of the first year it measures about one inch in diameter. The face is of very small size compared with the cranium. The germs of the teeth are present at the time of birth in dental sacs which rest in depressions in the jaws. The chest is of small size during infancy and childhood. It is not until the third year that the circumference of the thorax surpasses that of the head. The long bones of the child are characterized by the presence of a plate of cartilage between each extremity and the shaft. The growth of the bone in length is due to changes taking place in these cartilages. The growth of the bone in thickness is due to the addition of layers upon the outside by means of the periosteum, which is very thick and vascular. The inner layers of the bone undergo gradual absorption, and in this way the medullary or marrow cavity is produced.

Alimentary System.—The most obvious peculiarity of the alimentary system at the time of birth is the absence of teeth. The deciduous or milk teeth are twenty in number. The following shows the average time of their appearance:

6 to 8 months	two lower central incisors	= 2
8 to 10 "	four upper incisors	= 6
12 "	two lower lateral incisors	= 8
14 "	four first molars	=12
18 to 24 "	four canines	=16
24 to 30 "	four second molars	=20

Both the time and the order of appearance of the teeth are subject to considerable variation. Infants may even be born with teeth, but this is very rare. The permanent teeth appear as follows:

6 yrs.	. . first molars	= 4
7 "	. . central incisors	= 8
8 "	. . lateral incisors	=12
9 to 10 "	. . bicuspids	=20
12 to 13 "	. . canines	=24
13 to 15 "	. . second molars	=28
17 to 25 "	. . third molars (wisdom)	=32

The stomach lies obliquely in infancy, and vomiting may occur very easily from contraction of the organ, without the severe strain with which retching is attended in older subjects. At the time of birth the capacity of the organ is about 1 oz.; at three months, about 4½ oz.; at six months, 6 oz.; at one year, 8 or 9 oz.

The comparatively very large size of the liver indicates that it is an important organ throughout childhood.

The digestive process in infancy is deficient in the power of transforming starch into sugar. This power develops gradually during the later months of the first year, but it is possessed by the saliva to a very slight extent as early as the third or fourth month. The larger proportion of the stomach contents, however, passes into the intestine, from which absorption takes place of the same substances as from the stomach, with the addition of fat. The absorption of fat and proteins is imperfect, both these substances being present in the feces. When fat is deficient in the food constipation is a common result.

The child's diet during the first nine or ten months is composed largely of mother's milk. In some communities milk banks have been established to supply breast milk to infants whose mothers are unable to nurse them. Breast milk is important not only for proper nourishment but because it protects the infant from infection. Where artificial feeding has to be resorted to, substitutes for human milk, such as modified cow's milk, unsweetened evaporated milk, dried whole milk must be selected to fit the needs of the individual infant. The average composition of human milk as compared with cow's is as follows:—

	Human Milk.	Cow's Milk.
Fat	4.0	3–4
Sugar . . .	7.0	4.3
Proteins . .	1.5	4.0
Salts . . .	0.2	0.7
Water . . .	87.3	87.0

The modification of cow's milk consists in diluting the milk to reduce the protein to the required amount, and adding fat (cream) and sugar of milk in suitable proportions. The protein of cow's milk is less easily digested than that of human milk, and the dense curd which it forms in the stomach often gives rise to alimentary disturbance. Perhaps the greatest drawback to the use of cow's milk lies in the fact that, under existing conditions, it is often contaminated by extraneous material, and swarms with microorganisms. It frequently contains also, especially in hot weather, products of fermentation. It is for this reason that unsweetened evaporated milk and dried whole milk made up to suitable formulae are often preferable.

Although formerly infants rarely received nourishment other than mother's milk up to the age of nine or ten months, it is now customary to supplement this diet with orange or tomato juice, for vitamin C, and cod liver oil, for vitamin D, as early as the second to fourth week of life. From three to six months of age, cereals, egg yolk, liver, vegetables and fruit are added. Such foods are usually strained, or can be bought in cans ready for use. The variety and quantity of food administered may be gradually increased during the second year. From the third to the sixth year four meals should usually be given daily. The diet should be light, varied, and palatable. Meat or fish should be given once a day, and the diet should include a large amount of milk. Eggs also are particularly valuable from the large amount of fat and albumin they contain. Children require relatively more protein than adults. The National Research Council on Foods and Nutrition has published tables showing the daily requirements at different ages.

Circulatory System.—The heart is of relatively large size during infancy. The blood pressure is low. The pulse is rapid, and in infants it is often slightly irregular. During the first year the pulse rate is from about 110 to 120 when the child is at rest. At the age of seven or eight the rate has fallen to between 80 and 90. Organic disease of the heart is more common in childhood than is supposed. Rheumatism and such strain as may result from injudicious physical exercise are important causes.

Respiratory System.—At the time of birth the lungs contain air. The cry of the infant at birth begins the process of inflation—a process which takes place gradually, being most rapid in robust infants with a strong cry. The lungs are very liable to disease during childhood, and therefore even slight ailments, such as a cold in the head, which may be followed by pulmonary affections, should be carefully attended to. The value of singing for developing the lungs is scarcely sufficiently recognized.

Nervous System.—The brain is relatively very large at birth, and it continues to grow actively till about the age of seven, when it attains almost its full size. After the age of seven it grows very slowly in weight, but the complexity of its structure and of the arrangement of its fibers continues for a considerable time to augment greatly. During early childhood the nervous system is very unstable and excitable, and the power of control is defective. Hence numerous functional nervous disorders are common, and these often arise from quite trivial causes. Accordingly, it is of great importance that the child should be protected from all unnatural excitement, that the diet should exclude all stimulants such as tea, coffee, and alcohol, and that an abundance of sleep should be secured. School children should be under the supervision of teachers or others who are competent to recognize the earliest symptoms of undue strain.

The Growth of the Child.—At the time of birth a healthy infant usually weighs about 7 lbs., but a weight of 8 or 9 lbs. is not uncommon. Boys weigh slightly more than girls. During the first few days of life the child loses a few ounces, but this loss is usually made up in about a week. After this the infant should gain from two-thirds of an ounce to one ounce daily for the first four months, and from one-third to three-fourths of an ounce for the rest of the first year. The baby's weight should have doubled at the age of six months, and trebled at the age of one year. The following table (from L. E. Holt, 1897) shows the height and weight of children chiefly of American parents:—

Age.	Height without Shoes (in inches).		Weight with Clothes (in lbs.).	
	Boys.	Girls.	Boys,	Girls.
Birth	20.06	20.05	7.6	7.2
1 year	29.00	28.07	20.5	19.8
2 yrs.	32.50	32.50	26.5	25.5
3 "	35.00	35.00	31.2	30.0
4 "	38.00	38.00	35.0	34.0
5 "	41.70	41.40	41.2	39.8
6 "	44.10	43.60	45.1	43.8
7 "	46.20	45.90	49.5	48.0
8 "	48.20	48.00	54.5	52.9
9 "	50.10	49.50	60.0	57.5
10 "	52.20	51.80	66.6	64.1
11 "	54.00	53.80	72.4	70.3
12 "	55.80	57.10	79.8	81.4
13 "	58.20	58.70	88.3	91.2
14 "	61.00	60.30	99.3	100.3
15 "	63.00	61.40	110.8	108.4
16 "	65.60	61.70	123.7	113.0

It will be noticed that girls are taller than boys at the ages of 12 and 13, and heavier at the ages of 12, 13, and 14. At all other ages the boys are both taller and heavier.

Mental Development.—During the first few weeks after birth the infant can scarcely be said to have any mental life at all. The movements of the head, the body, the limbs, crying, sucking, sneezing, and so on, take place simply as the result of organic conditions or of external stimuli. Crying after the first ten to fourteen days of life is now no longer looked upon as a mere reflex, but as a signal to nurses or parents that something is wrong with the child and requires attention or adjustment. During the second six months of life the baby begins to attach more or less definite meanings to some of the sounds he utters—sounds which may have no connection with the proper word signified. The progress of comprehension of words and gestures is much more rapid than the progress of articulation. Speech development is gradual. Following the preliminary stages of crying, babbling and gestures, the infant finally proceeds to word formation. At the age of one year a vocabulary of a few words is acquired, crude sentences may be formed at two years and complete sentences at three to four years of age. Average vocabularies at the various age periods have been recorded. These findings are of course all subject to individual variations based on individual health, environment and intelligence of each child.

For some time after birth all movements are obviously independent of will. These early movements are usually classified as (*a*) random or impulsive movements, which are very numerous during the early weeks of life, and which are not obviously dependent upon any sensory stimulus; (*b*) reflex movements, which arise in response to sensory stimuli; (*c*) instinctive movements, which also arise in response to sensory stimuli, but which are more complex and more variable than simple reflexes—*e.g.,* seizing, raising the head, creeping. Now, all these movements furnish sensations of muscular activity, and of these sensations some rise into more vivid consciousness than others, and awaken the child's attention. Such attention is at first entirely passive, but when a movement is frequently repeated it impresses itself upon the memory, and in course of time the mere sensation of the usual exciting cause of the movement suffices to raise the idea of the movement in the mind.

The first act of the will is an act of attention. But when the attention is directed to the idea of a movement, the movement itself tends to follow. The first voluntary movement is simply the outward expression of the motor idea to which the child wills to attend. The will gradually assumes control over movements which are in the first instance simply reflex or instinctive. Maturation of the various tissues such as nerves, bones and muscles is likewise a factor in development of coordination. Eye coordination develops first and is followed by postural control of the head, trunk, arms, and finally of the legs. At eight months of age the baby can hold a bottle, during the second year is able to feed himself, and from 1½ to 3½ years learns to dress himself. Sitting is possible at 9 months of age, crawling from the fourth to seventh month, standing with support at 42 weeks and alone at 62 weeks. The average age for learning to walk is one year. From this time up to the age of 6 years is a period of perfection of skills, with gradual accomplishment of running, hopping, skipping, jumping and climbing. All these skills are improved by exercise, games and sports such as skating, bicycling, swimming and ball-playing. Various writers have issued tables giving standard norms of motor development and coordinations.

Large groups of children of various ages are being studied by trained psychologists in order to obtain a clearer insight into their reactions.

It has been demonstrated that fear depends largely on imitation and on past experiences. It is the suddenness or novelty of an experience, rather than its nature, that inspires fear. There is a decrease in the number of fears from the age of 3 to 6 years, whereas anger increases with age. Also fear of the dark and of being alone increases as the infant grows older. Play is undoubtedly a highly important factor both in bodily and mental development. The kind of play enjoyed at each age is that which affords the bodily and mental exercise needed for the stage of development.

Following the initial interest in toys, the child begins to imitate playfellows at two years of age and at three years begins to play with other children, gradually becoming adjusted to group activities. From the age of 6 to 12 years, or the 'gang age' as it has been called, such group activities are sponsored by institutions such as the Boy Scouts, Girl Scouts, Campfire Girls, etc. From his love of being sung to during his first year of life, the child at two years prefers picture books, up to 8 years of age enjoys fairy tales, from 8 to 15 years comic strips. Both moving pictures and radio broadcasting services are recognizing in increasing degree the need for special consideration for their juvenile patrons.

The chief problem of modern education is to adapt the methods of education to the nature of the child. The most successful effort in this direction is found in the kindergarten system, which seeks to develop the bodily and mental powers by carefully chosen occupations, games, songs, and other means, which the children will look upon as play. The kindergarten age may be said to be from three to six years. The transition period from kindergarten to day school presents problems whose solution is still to be found. The ordinary school period has long been recognized as a time for drill, bodily and mental; a time for the formation of habits; a time during which verbal memory is good, and names and facts are easily remembered. In the future it seems probable that more use will be made of conversation in the teaching of language (English and foreign); of drawing as a means of expression; of manual training. The eye, the ear, the hand will be more cultivated than at present. On the other hand, rules—*e.g.,* those of grammar—and reasons—*e.g.,* those for conduct—will to a large extent be deferred till the child has sufficient experience and knowledge to understand them.

Recognition of the need for special consideration of the problems of childhood has been manifested in the enactment of laws for their protection and for the control of child labor. Child guidance clinics and juvenile courts have been established. Better provision is being made for illegitimate children. The government intervenes actively not only in educational problems, including provision for the crippled and defective child, but also in questions involving their proper nutrition and medical supervision. See Hurlock, *Child Development* (1942); Gesell *et al.: The First Five Years of Life* (3d ed. 1940); Arlitt, *Psychology of Infancy and Early Childhood* (1945); Meredith, *Physical Growth from Birth to Two Years* (1943); Gillett, *Nutrition in Public Health* (1945); Cromwell, *The Health of the School Child* (1945); United States Federal Security Agency, *Health Needs of School Age Children* (1945); United States Labor Dept. Childrens Bureau, *The Child from One to Six. His Care and Training* (1944); Bowley, *The Natural Development of the Child* (2d ed. 1944).

Child, Francis James (1825–96), American scholar and educator, was born in Boston, Mass., and graduated at Harvard (1846), where he held the chair of rhetoric (1851–76), and that of Anglo-Saxon and Early English literature (1876–96). He published *Four Old Plays* (1848), *Poems of Sorrow and Comfort* (1865), an important edition of Spenser (5 vols. 1855), and his valuable *English and Scottish Ballads* (8 vols. 1857–8; new ed. 1882–96). This latter work gives various readings of the ballads, with comparative notes, and is admittedly one of the half dozen greatest productions of English-speaking scholars. See Prof. Kittredge's biographical sketch contained in the 1882–96 edition.

Child (*née* Francis), Lydia Maria (1802–80), American author, was born at Medford, Mass., and completed her education under the instruction of her brother, a professor in the Harvard divinity school. She published her first novel, *Hobomok,* in 1821, and kept a private school at Watertown, Mass., until her marriage, 1828, to David Lee Child, a Boston journalist. She established, 1826, the *Juvenile Miscellany,* the first monthly magazine for children published in the U. S. Both she and her husband took up the anti-slavery cause with vigor in 1831, and Mrs. Child's *Appeal for That Class of Americans Called African* (1833) was the first anti-slavery book published in the U. S. She edited the *National Anti-slavery Standard* (1840–3), at New York. After 1844 the Childs resided at Wayland, Mass. Her correspondence with Gov. Wise and Senator Mason in regard to John Brown (1859) reached a circulation of 300,000 copies. Her other publications include *The Rebels* (1822), *Looking towards Sunset* (1824), *The First Settlers in New England* (1829), *Philothea* (1835), *The Power of Kindness* (1851), *Isaac T. Hopper, A True Life* (1853), *The Progress of Religious Ideas through Successive Ages* (3 vols. 1855), and *The Aspirations of the World* (1878). Her tales are pleasing, but her historic work is unreliable. See her *Letters,* with biography by Whittier (1882).

Childebert, two kings of the Merovingian Franks. Childebert i, son of Clovis; received the western quarter of his father's kingdom at the partition of 511; defeated the Visigothic king, Amalrich ii, near Narbonne (513); and conquered Burgundy (532). He died 558.—Childebert ii (571–596), son of Sigbert and Brunhild of Austrasia; succeeded his father in 575, and in 593 inherited the crown of Burgundy.

Childeric, name of three kings of the Merovingian Franks. Childeric i, reigned from 463 to 481, and was the father of Clovis.—Childeric ii, king of Austrasia from 660, and of Neustria and Burgundy from 669; was killed in 673.—Childeric iii, the last of the Merovingian kings (743–751), was deposed by Pepin the Short, and died in a monastery at St. Omer in 754.

Child Labor. One of the most serious consequences of the Industrial Revolution, so called, has been its effect on the employment of children. This effect, first manifested in the textile mills and coal mines of England, has extended to virtually all branches of industry, to trade and transportation, and even to agriculture; and to-day children are found engaged in practically all the classes of occupations open to men and women, though seldom in positions requiring special training or any considerable degree of skill. For the introduction of the factory system was accompanied and has been followed by far-reaching changes of various sorts—the growth of cities where children trade in the streets; multiplication of offices and stores, in which large numbers of boys and girls are employed; the coming of machinery to the farms, with a great resultant modification of rural economy, and from various causes (we refer particularly to the United States) an exodus of the former adult farm-labor supply to urban centers; the disruption in some large sections of the normal course of farm tenancy to its culmination in ownership; the appearance of rural slums, and a tendency to apply to certain important crops, like beets and onions, the methods of large scale industrial production. By these and many other influences and developments the status of children as labor supply, and the nature of their tasks as workers, have been profoundly affected.

Child labor, even in its opprobrious sense, had existed long before the Industrial Revolution that began in England toward the close of the eighteenth century and reached America a few decades later. In both countries it was customary for children to work at home with their parents when industrial production was largely a home enterprise, or away from home under the protective and educational conditions of apprenticeship (see Apprentice); but industry went out of the home, and apprenticeship went out of industry until it almost disappeared. The work of children, although already there had doubtless been abuse of their labor power, assumed a new and different character—it became work at fatiguing and repetitive machine processes, work lacking in the protective and supervisory features of the earlier period, work at tasks which possessed little or no educational value and led nowhere, work that in many instances was deforming pliable bodies, producing sickness and disease, and permanently ruining the health throughout shortened lives.

In England the movement for the regulation of child labor (apart from the earlier guild and apprenticeship legislation) dates from the first half of the nineteenth century, when a series of parliamentary inquiries gradually aroused public opinion to the abuses attending the unregulated employment of children. The first regulatory measure was enacted in 1819, prohibiting the employment in cotton mills of children under nine years of age and limiting the working hours of children under sixteen to 12 a day. By a further act in 1833 the provision excluding children under nine from cotton mills was extended to all textile mills, the number of hours during which children might work was further limited, and provision was made for factory inspection. Subsequent legislation raised the age and hour standards and made special provision regarding extra-hazardous employment. In 1901 the employment of children under twelve was prohibited in factories and workshops, and in 1918 the Fisher Education Act provided for the regulation of child employment in all forms of gainful occupation, including agriculture and domestic service. This act prohibits the employment of all children under ten years and further limits child labor by requiring full-time school attendance of children up to fourteen years of age and compulsory continuation school attendance of all children up to sixteen years of age; the local authorities are permitted to raise the age of full-time school attendance to fifteen. The provisions as to continuation schools are still held in abeyance, but many schools of this type are in operation.

As in England, the earliest measures against child labor in the United States belong to the first half of the nineteenth century. Six states had made special provision for the education of children employed in manufacturing industries prior to 1860, and eight states had made some attempt to regulate hours of labor for children. Commencing about the middle of the century, laws were enacted prohibiting the employment in manufacturing industries of children under certain ages, varying in the different states. The first laws providing a fourteen-year minimum for both boys and girls were those of Colorado and New York, 1887 and 1889 respectively.

Child labor legislation is so diverse in its character that a comprehensive statement of its tendencies is difficult. In general it may be said to include minimum-age provisions; educational requirements for admission to employment; the requirement of certain conditions of health and physical development; legislation requiring school attendance (at full-time or continuation schools); limitations of the hours of labor for children, now in force in all states of the United States; prohibition of night work for children; special provisions against hazardous or unhealthful occupations or occupations dangerous to morals; measures for enforcement, including inspection and the requirement of 'working papers' or employment certificates.

The first Federal measure for the regulation of child labor was the so-called Keating-Owen bill, passed by Congress on Sept 1, 1916, and effective Sept. 1, 1917. This bill regulated child labor indirectly through the control of interstate or foreign commerce. On June 3, 1918, after this law had been in operation 275 days, it was declared unconstitutional by the Supreme Court of the United States, by a 5 to 4 decision, on the ground that it was an undue extension of the power to regulate interstate commerce.

On Feb. 24, 1919, Congress enacted as a part of the Revenue Act of that year a provision levying a tax of 10 per cent on the annual net profits of any mill, cannery, workshop, factory or manufacturing establishment, or any mine or quarry, employing children in violation of the age and hour standards established by the former Federal law. This measure was also declared unconstitutional by the United States Supreme Court on May 15, 1922, on the ground that it was an infringement of the reserved rights of the states.

Two attempts to pass a Federal child-labor law, constitutionally valid, having failed, it was felt by many that the constitution should be so amended as to give Congress a definite sanction for legislation of this subject. On April 26, 1924, the House of Representatives, and on the following June 2 the Senate, passed a resolution which submitted to the several states for ratification a child-labor amendment in this form:

> *Section 1.* The Congress shall have power to limit, regulate and prohibit the labor of persons under eighteen years of age.
>
> *Section 2.* The power of the several States is unimpaired by this article except that the operation of State laws shall be suspended to the extent necessary to give effect to legislation enacted by the Congress.

This proposed grant of authority was ratified by only 6 states between 1924 and 1933. Strong opposition to it, organized by the National Association of Manufacturers and the southern textile operators, was an effective factor in adverse state action, or no state action. Economic conditions in the 1930's led to renewed state activity on the amendment, and 14 states ratified it in 1933. Vigorous efforts were made to secure ratification by the 16 more states needed for adoption but only 8 states ratified between 1933 and 1937. Emergency regulation of child labor on a national basis was obtained, beginning in 1933, by incorporating provisions in the industrial codes, under the National Recovery Administration, prohibiting employment of children under 16 years. Of 500 codes adopted, all but 13 barred employment under 16 years, with a 14-year limit for employment outside of school hours in nonmanufacturing occupations, and more than 400 codes had a higher age limit, usually 18, for hazardous occupations. The N.R.A. codes were declared unconstitutional in 1935, but subsequent U. S. Supreme Court decisions in 1936 and 1937 broadened the interpretation of the power of Congress to regulate interstate commerce, and opened the way to the inclusion of child labor provisions in the Federal Fair Labor Standards Act, popularly known as the Wage-Hour Act, which was enacted in 1938.

These provisions, specifically declared constitutional by the United States Supreme Court in February 1941, set the following standards for industries producing goods for shipment in interstate commerce:

1. A 16-year limit for employment during school hours.
2. A 16-year limit for employment in manufacturing or mining operations at any time.
3. A 14-year limit for employment outside of school hours and during summer vacations, in occupations other than manufacturing and mining, found to be suitable by the Federal Children's Bureau (the agency made responsible for enforcing the Federal child labor provisions).
4. An 18-year limit for occupations found and declared to be hazardous by the Children's Bureau.

The only exemptions to the above provisions for employment of children in industries producing goods for interstate commerce was for children in agriculture while not legally required to attend school, children employed as actors in motion pictures and theatrical productions, and children employed by their own parents in occupations other than manufacturing or mining. A subsequent Supreme Court decision (1946) ruled that the provisions do not apply to children employed by concerns, such as Western Union, which are engaged in interstate commerce but which do not produce goods for shipment in commerce.

Seven hazardous occupation orders have been issued under these Federal provisions establishing an 18-year limit in the following occupations: occupations in explosive plants, in coal mining (with the exception of specified surface occupations); in logging and sawmilling (with certain specified exceptions); operations of woodworking machines; occupations involving exposure to radioactive substances; motor vehicle drivers and helpers; operation of power-driven hoisting apparatus including elevators.

Other Federal laws affecting child labor are: (a) The Sugar Act of 1937, since renewed, which stipulated that to qualify for benefit payments growers must not employ children under 14 years of age nor children 14 to 16 years of age for more than 8 hours a day; and (b) the Walsh-Healey Act of 1936, which sets a minimum age of 16 years (18 years for females) in the production of goods made under contract with the Government.

Organized activity to secure ratification of the amendment by 8 more states ceased in 1941 as a result (1) of the Supreme Court decision on the constitutionality of the child labor provisions of the Fair Labor Standards Act; (2) the entry of the United States into the war. No state has ratified the amendment since 1938 and revival of activity to secure ratification is not anticipated.

Federal regulation of child labor is limited to interstate commerce industries. Under the Fair Labor Standards Act, it has put an end to the employment of children in the types of occupations considered most dangerous or objectionable, regulation of which by state laws had proceeded slowly and unevenly for 30 years or more, such as employment in factories, mines, canneries, and tenement house work, if the products are shipped in interstate commerce. The act can be extended by Congressional action to provide complete coverage in industrialized agriculture and in all industries engaged in interstate commerce regardless of whether they produce goods (*e.g.*, telegraph companies, railroads, steamship lines, etc.).

Public condemnation of child labor resulting in this Federal legislation and in progressively higher standards in state child labor and compulsory education laws, plus rapid mechanization of industry, reduced the number of children 14 through 17 years of age in the labor force for full or part time work from 2,395,443 reported in the 1920 U. S. census to 1,278,812 reported in the 1940 census. Of this number in 1940, the total actually at work (not including those seeking work) was 873,314. This decrease in the number of employed children was accompanied by a marked increase in high school enrollment, from 2,200,000 in 1920 to 6,700,000 in 1940. The following table shows the percentage changes in school attendance and child labor between 1910 and 1940:

School Attendance and Child Labor, 1910–1940[a]

Age Group	*1910*	*1920*	*1930*	*1940*
Under 14 years				
Percentage of population 7–13 years attending school	86.1	90.6	95.3	95.0[b]
Percentage of population 10–13 years gainfully employed	12.3	4.4	2.4	[c]
14–15 years				
Percentage of population attending school	75.0	79.9	88.8	90.0[b]
Percentage of population gainfully employed	30.7	17.5	9.2	4.3
16–17 years				
Percentage of population attending school	43.1	42.9	57.3	68.7[b]
Percentage of population gainfully employed	[c]	44.7	31.7	13.5

[a] Figures taken from the United States censuses, 1910–1940.

[b] The basis for determining school attendance in the 1940 census differed from that of previous years. In 1940, school attendants were those who had attended or been enrolled in school during March, the month preceding the census; former censuses included persons who had attended school at any time between the previous September and the census date. The 1940 figures, if on a comparable basis with those of previous years, would therefore be higher than those given.

[c] Not reported.

The trend revealed by the table was rapidly reversed during the war, and by April, 1944, the number of children 14 through

17 years of age, employed full or part time, had risen to about 3,000,000, and approximately the same number was employed in April, 1945 (2,800,000). High school enrollment during the same period decreased by more than 1,000,000. Of the 2,800,000 employed in April, 1945, one-half was estimated to be working full time, and one-half working part time while attending school. Nearly 1,000,000 were 14 or 15 years of age, or four times as many of this age as were employed in 1940. One-third of this age group (350,000) was estimated to be out of school for full-time work. The 16 and 17 year old workers, whose numbers increased proportionately less than the 14 and 15 year olds, were about three times as numerous in April, 1945, as they were in 1940. Two-thirds of them were estimated to be out of school for full time work.

The table below gives the figures showing the changes between April, 1940, and April, 1945:

Employed Minors 14–17 Years of Age

	1940 *			*1945* †		
Age Group	*Total*	*Attending School*	*Not Attending School*	*Total*	*Attending School*	*Not Attending School*
14 & 15 Years	209,347	75,021	134,326	900,000	550,000	350,000
16 & 17 Years	662,967	111,741	551,226	1,900,000	700,000	1,200,000

* U.S. Census figures, 1940
† U.S. Census estimates

Since the end of the Second World War the employment curve has gone down slowly, to 2,250,000 in April 1946, and to 1,970,000 in April 1947. The 1947 total is still more than twice as high as the total for 1940. High school enrollment in 1946–1947 showed very little gain as the total enrollment figure continued to be 1,000,000 less than in the peak year of 1940–1941.

Though progress had been made in raising the standards of state child labor and compulsory education laws prior to 1940, the extent of child employment during the war, particularly of 14 and 15 year old children, revealed the inadequacy of many state laws. Lack of opportunities for employment during the depression years, and the enactment of the Federal child labor provisions in 1938, created a belief on the part of the public that child labor was a thing of the past, and that bringing state laws regulating intrastate industries up to the standards of the Federal law was unnecessary. The extensive school leaving, excessive hours of part-time employment after school, increase in night work and in industrial accidents to young workers 14 through 17 years of age which distinguished the war years, stimulated renewed public concern to raise the standards of state child labor laws as post-war measures.

The standards recommended as desirable for state child labor laws are basically the same as Federal child labor standards. These standards, recommended by the White House Conferences of 1919, 1930, and 1940, and endorsed by governmental and voluntary agencies concerned with juvenile employment, have been adopted to the following extent by the states:

1. *16-year age limit for all employment during school hours and for manufacturing employment at any time.* This standard has now been adopted by approximately one-third of the states. In the remaining two-thirds of the states the age limit for full-time employment is 14 years, with the exception of 4 states, which have adopted a 15-year age limit. These age limits do not cover all occupations in all states, and agriculture and domestic service are exempted from practically all state child labor laws. Other exemptions in some states include 'economic need,' provisions for special permits, etc.
2. *14-year age limit for employment outside of school hours.* This standard has been adopted by about half of the states. The states which have failed to adopt it are, in general, those which permit full-time employment at 14 or 15, and which have a lower age limit or no age limit for part-time and vacation employment. Of the 15 states with a 16-year limit for employment during school hours, only one has failed to set a 14-year limit for employment outside of school hours. Agriculture and domestic service are usually exempted, and street trades are either exempted or regulated under special provisions.
3. *8-hour day, 40-hour, 6-day week under 18 years.* 42 states have an 8-hour day for minors in some or most occupations, but in all except 13 of these states it applies only to minors under 16 years of age, and not to minors under 18 years of age. Of these 13 states having an 8-hour day under 18 years, two have a 40-hour week, four have a 44-hour week, and seven a 48-hour week. Of the 29 states with an 8-hour day only to 16 years, 5 have a 40-hour week, 4 a 44-hour week, and 19 a 48-hour week (one state, Maine, has an 8-hour day under 16, but no weekly limit). The six states which do not have an 8-hour day permit minors to work 9 or 10 hours a day, 54 hours a week, or have no hour regulations.
4. *Limited hours of part-time employment when schools are in session.* 11 states limit the hours of part-time employment of minors of 14 and 15 when schools are in session, and 2 states regulate such employment of minors over 16. In some of these states the hours of combined school and work are limited to 8 a day; in others the hours of work on a school day are specifically limited to 3 or 4 hours. There is no regulation of part-time work in the other 37 states.
5. *Prohibition of night work under 16 years and under 18 years.* Most states regulate night work for children under 16, but only 12 states prohibit it from 6 P.M. to 7 A.M. (for a total of 13 consecutive hours). Some states prohibit 11 or 12 hours of night work (7 P.M. to 6 or 7 A.M.), but in the other states night work is prohibited only between 8 P.M. and 5 A.M., or 9 P.M. and 6 A.M. Night work after 10 P.M. is prohibited for minors of 16 and 17 in 9 states.
6. *Work permits required under 18 years.* All but 4 states require the issuance of employment certificates or work permits as evidence of legal age for employment. Approximately half of these 44 states require certificates or permits to 18 years, the other half only to 16 years.
7. *Hazardous occupations prohibited under 18.* Most state laws prohibit employment under 16 in a substantial number of hazardous occupations, but prohibition of hazardous employment under 18 is usu-

ally limited to a few specified occupations. In 20 states a state administrative agency has authority to declare occupations hazardous under 18 years of age.

If progress toward these standards had been more rapid prior to the war, there would have been more checks on child employment during the war. Child labor laws were relaxed to some extent, though in general these relaxations were limited to minors over 16, and violations of both Federal and state laws were extensive; but most children worked legally under existing state laws, many of which permitted them to leave school for work at 14, or to put in 8 hours of work after school. The Federal law prevented employment under 16 in manufacturing employment in interstate commerce industries, prevented employment of children under 14 in non-manufacturing employment in such industries outside of school hours, and limited their hours of part-time work. Children under 16 were employed mainly in local industries, such as trade and service industries, and they, as well as many older children who worked in local industries, were subject only to state laws. The enormous increase in employment, even in states which had not previously had large numbers of young workers, created problems of enforcement for under-staffed agencies responsible for inspection, and for agencies charged with the responsibility of issuing employment certificates. When the number of children going to work increases 500 per cent or 1000 per cent, as it did in many states and cities, enforcement machinery inevitably lags far behind, particularly when appropriations remain fixed at the previous level, which was the case with the Federal and with most state appropriations for child labor enforcement. Between 1940 and 1944 the number of firms found violating the Federal law increased 450 per cent, but no increase was made in the appropriation for enforcement.

In the fall of 1944, while public concern about wartime child labor was acute, a nationwide campaign was organized by the Children's Bureau, and cooperating agencies, to promote the 16-year age standard for full-time employment, and corresponding upward revisions in state child labor laws. Bills to accomplish this were introduced in a number of state legislatures in 1945, 1946, and 1947. Two of these bills were enacted—one in Georgia, and one in Illinois—but the others were defeated or allowed to die.

Compulsory education laws are of necessity companion laws to child labor laws since the age of school leaving and for legal employment must coincide. All states now have a 16-year age standard for compulsory school attendance. The three which had retained a 14-year standard—Georgia, North Carolina, and Virginia—adopted the 16-year standard between 1944 and 1946. However, most states which have 14-year employment laws have retained exemptions in their compulsory education laws permitting school leaving for full-time employment at 14. Removal of these exemptions from compulsory attendance laws is an essential corollary to raising the age limit for full-time employment in child labor laws to 16 years.

Compulsory education laws also vary in the amount of education required, particularly in the agricultural states. School terms vary from 6 or 7 months in rural areas to 8 or 9 months in urban areas. Laws which permit short school terms, or 'crop vacations,' for agricultural employment prevent children in agricultural areas from obtaining as much education during the years they are in school as urban children receive. Provisions for enforcement are likewise inadequate in many agricultural states and absence for employment in agriculture, either at home or away from home, is usually considered a 'legitimate absence.' The table below shows that nearly 3,000,000 school-age children 7 to 17 years of age, inclusive, were not enrolled in school in 1940, and that non-enrollment was highest in farm areas.

The states which use the largest number of children in agricultural employment are also the states which have the least amount of money to spend on their schools. Poorly equipped schools, staffed by poorly equipped and poorly paid teachers, are not sufficiently attractive to reduce absenteeism for agricultural employment. It has become increasingly evident to those, concerned about the inadequate educational opportunities for young people, in the low income states, that Federal aid to the states for general education is required in order to equalize the quality and availability of education in all the states. Measures to provide this have been actively promoted in Congress for several years by educational, social, and civic organizations. Such aid, if it is made available, should have an important effect in reducing child labor by improving the quality of education in rural schools.

Federal aid to education could also provide means for dealing with the most difficult agricultural child labor problem—the migrant children who move from state to state with their families harvesting crops. Studies of migrant farm families have been made over a period of 30 years by the National Child Labor Committee, the Children's Bureau, Congressional committees, and other government bodies. Conditions became progressively worse up to the Second World

Number of Persons 7–17 Years, Inclusive not Attending School
U.S. Census — 1940 *

7–13 years	(Population — 15,828,035)	*% of Population*
Out of School		*Out of School*
Urban	222,973	2.9
Rural Non-Farm	162,198	4.7
Farm	408,169	8.9
Total	793,340	5.0
14–15 years	(Population — 4,828,249)	
Out of School		
Urban	130,196	5.3
Rural Non-Farm	98,972	9.9
Farm	251,416	18.3
Total	480,584	10.0
16 and 17 years	(Population — 4,892,170)	
Out of School		
Urban	615,837	24.4
Rural Non-Farm	379,061	32.4
Farm	596,066	43.2
Total	1,530,964	31.3

* According to the Census, a school attendant was a person who during March 1940 was enrolled in or attending any school, college, university or educational institution. Attendance at night school, extension school, or vocational school was included when such school was part of the regular school system.

War as economic conditions and changes forced increasingly large numbers of families to become migrant farm workers. The House Committee to Investigate Interstate Migration, under the chairmanship of Representative Tolan, brought out a report in 1941 containing its findings and recommendations for Federal measures for aid to migrant families, but no action was taken because of the entry of the United States into the war. For the same reason a bill, introduced in Congress in 1941 to extend the child labor provisions of the Fair Labor Standards Act to cover employment in industrialized agriculture when schools are not in session, had to be dropped.

All of these studies and findings revealed the severe exploitation of migrant children who rarely have a chance to go to school. They are nonresident children for a large part of the year, and except for two or three states, they are not admitted to the schools in the states where they spend temporary periods with their families while working on the crops. Federal funds allocated to the states for the education of migratory children would enable the states to make provision for them in their schools, and this in turn would reduce migrant child labor, since many parents would send their young children to school, instead of having them work, if the schools would admit them.

The objectives for the future in reducing child employment and increasing educational opportunities may be summarized as follows:

1. Adoption of standards recommended for child labor laws by all the states.
2. Removal of exemptions from compulsory education laws permitting full-time employment under 16.
3. Removal of exemptions for agriculture and domestic service from child labor laws, extension of all required school terms to 9 months, and enforcement of school attendance in all areas.
4. Extension of coverage of child labor provisions of the Fair Labor Standards Act to apply to industrialized agriculture when schools are not in session, and to all industries engaged in interstate commerce.
5. Equalized and improved educational facilities to provide programs of education adapted to the needs and abilities of all students, and of sufficient interest in them to hold them in school at least until they complete the 12th grade.
6. Increased counselling, guidance, and placement services to young people to assist them, while they are still in school, in finding out what their particular abilities are, and what type of employment they should enter, and to help them in securing the right kind of employment when they leave school.

Public and private agencies active in promoting some or all of these goals include the Federal Children's Bureau, the Child Labor and Youth Employment Branch of the Division of Labor Standards, U. S. Department of Labor (responsible for the administration of the Federal Child labor provisions since the Children's Bureau was transferred to the Federal Security Agency in July, 1946), the Office of Education, the Association of Governmental Labor Officials, the National Child Labor Committee, the National Consumers League, and the National Commission on Children and Youth (composed of representatives of national organizations concerned with youth, including the National Parent-Teachers Association, the General Federation of Womens' Clubs, the American Federation of Labor, and the Congress of Industrial Organizations).

Since 1919 child labor has been a subject of international attention through the International Labor Conferences held under the auspices of the International Labor Organization. These conferences have adopted draft conventions at frequent intervals setting standards for employment of children. The 29th Annual Conference, held in 1946, adopted conventions covering medical examinations to establish fitness of minors for employment and extending restrictions on night work in industrial occupations to non-industrial employment. Conventions must be ratified by the legislative body of each country before they become effective in that country. Many have been ratified by foreign countries during the years of the Conference's existence.

In the long campaign for child labor and compulsory-education laws in America, and for an intelligent public understanding of the nature and extent of the child-labor evil, the National Child Labor Committee, since its organization in 1904, has taken a leading part. In addition to its work in promoting state legislation, it organized and led the campaigns for (1) the establishment of the Federal Children's Bureau, (2) the first two Federal child labor laws, (3) the child labor amendment, (4) the child labor provisions of the N.R.A. Codes, and (5) the child labor provisions in the Fair Labor Standards Act. Its work is supported by the contributions of its members in all the states of the Union. It publishes numerous pamphlets and reports, besides a monthly bulletin, *The American Child.* The Illinois Child Labor Committee, the Pennsylvania Child Labor and Public Education Association, state branches of the National Consumers' League, and State Legislative Councils conduct similar educational and legislative activities on a state basis. The Federal Children's Bureau, from the time of its establishment in 1912 as a government agency concerned with child welfare, has given much attention to child labor. Its child labor studies and reports, and its monthly periodical, *The Child,* are indispensable to any student of the subject. Through its responsibilities for administration of the child labor provisions of the Fair Labor Standards Act, from Oct. 24, 1938 to July 1, 1946, and its research and advisory services to state agencies in this connection, it has contributed constantly to the advancement of measures for child protection. Under the President's Reorganization Order, which transferred the Federal Children's Bureau to the Federal Security Agency on July 1, 1946, the Industrial Division of the Bureau, which administered the child labor provisions of the Fair Labor Standards Act, remained in the Department of Labor where it became the Child Labor and Youth Employment Branch of the Division of Labor Standards. Reports of the Child Labor and Youth Employment Branch on child labor and youth employment appear from time to time in *The Child* (published monthly by the Federal Children's Bureau), and in the *Labor Information Bulletin* (published monthly by the U. S. Department of Labor).

Bibliography.—Consult the various publications of the Children's Bureau (U. S. Department of Labor 1912–1946; Federal Security Agency 1946–); the publications of the Child Labor and Youth Employment Branch, Division of Labor Standards, U. S. Department of Labor 1946– ; also the pamphlets and reports of the National Child Labor Committee, New York City; Spargo, *Bitter Cry of the Children;* Clopper, *Child Labor in City Streets;* Nearing, *Child Labor Problem* (1913); Keeling, *Child Labor in the United Kingdom* (1914); Bullock, *Selected Articles on Child Labor* (1915); Ensign, *Compulsory School Attendance and Child Labor* (1921); Fuller, *The*

Meaning of Child Labor (1922); *idem, Child Labor and the Constitution* (1923); Loughran, *Historical Development of Child Labor Legislation in the United States* (1921); Report of White House Conference on Child Health and Protection (1930) and Children in a Democracy, 1940; U. S. Department of Labor, *Monthly Labor Review,* 'Trends of Child Labor' (Dec. 1937, Jan. 1940, Mar. 1943); Abbott, *The Child and the State* (1938); McWilliams, *Factories in the Field* (1939); Report of the Select Committee to Investigate the Interstate Migration of Destitute Citizens (1941); American Youth Commission, *Youth and the Future* (1942); Federal Children's Bureau, *Children in Agriculture* (1929), *Child Labor Facts and Figures* (1933), and *Welfare of Families of Sugar-Beet Laborers* (1935); 'Five Years of Federal Control of Child Labor,' *The Child* (Dec. 1943); *Our Concern Every Child* (1944); Child Labor and Youth Employment Branch, Division of Labor Standards, U. S. Dept. of Labor, *State Child-Labor Standards* (1946); National Child Labor Committee, *Child Labor Facts* (1940), *Child Manpower in Wartime* (1943), *The Long Road—Fortieth Anniversary Report* (1944), and *Work experience in Secondary Education* (1946).

Children, Crippled. Two of the great milestones in the treatment and care of crippled children during the past two decades were the White House Conference on Child Health and Protection called by President Hoover in 1930, and the enactment of the Social Security Act in 1935, with subsequent amendments providing Federal grants to states for services to crippled children. This Act is administered by the Children's Bureau of the Federal Security Agency.

The function of the Children's Bureau is to study the plans of the state agencies submitted to it and if it approves them, to authorize the grants in aid to the qualifying states. More importantly, the Bureau furnishes the states the counsel of specialists in children's services.

The children served in the program largely consist of those disabled from infantile paralysis, congenital malformations, birth injuries, accidents, rickets, osteomyelitis, and bone and joint tuberculosis.

Help and assistance are received from the private voluntary and philanthropic agencies which over the years pioneered in work for crippled children and demonstrated the need of public effort in this respect.

In 1920, there was enacted legislation by the Congress for the provision of vocational rehabilitation services to disabled civilians, through Federal grants to states on a matching basis. In 1943, through the enactment of Public Law No. 113, 78th Congress, the program was greatly broadened both in the provision of Federal funds and in scope of services afforded. The Federal Agency charged with the administration of the Act is the Office of Vocational Rehabilitation of the Federal Security Agency.

Persons eligible for rehabilitation services include those of employable age and beyond. The war has brought focus upon this great need in the case of adults and along with them, crippled children. The services provided consist of medical examination, individual vocational counseling and guidance, tuition and training in colleges, schools and institutions by correspondence courses and on-the-job, and assistance in placement after such training. These services are all free.

Another service to crippled children of employable age by a public agency is that of placement into commercial employment provided by the state employment service under the Federal-state program established by the Wagner-Peyser Act of 1934. A number of these state offices have separate units for provision of special services to the handicapped.

As in the case of the provision of medical and convalescent care and treatment, the private voluntary and philanthropic agencies over the country providing special educational, psychosocial, and other rehabilitation services to crippled children contribute very largely to the whole effort.

Consult publications of the Children's Bureau and the Office of Vocational Rehabilitation, Federal Security Agency, State Crippled Children's Agencies, National Foundation for Infantile Paralysis, National Society for Crippled Children and Adults, Inc., etc.

Children, Cruelty to. Until about 1927, protection from cruelty and abuse was limited to care of children away from their families. The modern meaning implies aid to all children who need protection, who are handicapped in any way, or who are delinquent or in danger of becoming delinquent. Protection may be extended to the child in his own family through preventive, advisory, medical, or psychiatric measures, or if necessary by temporary or permanent separation of the child from his family. Modern sociologists work toward the child's entire welfare and development, calling upon specialists in many fields. Thus public and private social agencies, school social workers, courts, physicians, schools, and psychiatrists coordinate their efforts not only to protect children from present abuse and neglect, but to guide them without physical, social, or emotional handicaps toward successful maturity. The underprivileged, maladjusted, or delinquent child is regarded increasingly as a potentially normal one. Social agencies investigate the conditions and personalities surrounding the child, as well as its practical needs, and help parents or communities to correct the causes of the difficulty and prevent its recurrence. In this effort, the child's happiness, sense of security, chance for development are considered as important as his food and clothing.

In some states, local public welfare agencies maintain facilities for the care of children in need of protection; in others Societies for the Prevention of Cruelty to Children and Children's Aid Societies carry this responsibility with licensed authority from the local governmental agency.

It would be unrealistic to maintain that 20th Century progress has eliminated or even partially succeeded in solving the problems of neglect to children inherent in this complex culture.

Children, Delinquent. Concepts in regard to the definition and treatment of juvenile delinquents have changed appreciably since 1937. Up to the year 1823 it was customary to speak of 'juvenile crime' and 'juvenile criminals.' The delinquent child was regarded as an enemy to the State, and was tried for his crimes and sentenced to prison like adult criminals. In 1824 the New York House of Refuge was established upon a new principle. The child was no longer counted as an enemy of society, but as a ward of the State. He was not sentenced for a definite time, but was committed to the guardianship of the Board of Trustees, subject to release on trial at their discretion. This plan proved so rational and successful that it has spread throughout the civilized world. Many prison features persisted for a long time, such as cells with grated doors, high walls, and severe punishments. Time sentences were still used to some extent, and children awaiting trial were confined in jails subject to corrupting influences.

In 1855 the Ohio State Reform School was built at Lancaster on the cottage plan. The cottages accommodated fifty boys each, and were built with the view of securing as near as possible the conditions of family home life. The school was located on a farm, there were no walls or fences, and the officers were known as 'elder brothers' instead of guards. Experience proved that, although many of these boys reached the age of eighteen or twenty years in the institution, escapes were infrequent, and there was a steady improvement in the spirit and life of the school.

The difficulty of this work increased with the development of the juvenile court. Children who are least vicious and most reformable are placed on probation, and do not reach the juvenile reformatory. The more vicious are first tried on probation, and when probation fails are sent to a juvenile reformatory.

It has been found necessary in many reformatory institutions to separate the defective children from those who are mentally normal, and to devise special training for them. Most juvenile reformatories now have excellent cottage plants and are well equipped for vocational education.

Increasing effort is being made to adjust the delinquent child in his own community, through social work in the schools, child-guidance clinics, and other forms of social service. Only the very difficult cases of juvenile delinquency are left for commitment to correctional institutions, notably those with inherent defects in will power and responsibility. Mass repression and punishment has given way to constructive treatment of the individual child.

The foundations of juvenile delinquency are laid in very early childhood. Large numbers of children coming to the attention of juvenile courts are from homes broken by death, desertion, separation, or divorce of the parents, and from homes in which lack of harmony or ignorance of child character makes it impossible for the child to develop satisfactorily. The maladjustment of the child to his school, association with 'gangs' and the lack of wholesome recreational outlets are contributing causes of delinquency.

Recreational and constructive efforts by private citizens and community groups have done much to mitigate conditions making for local delinquency. The National Conference on Prevention and Control of Juvenile Delinquency, established under the Department of Justice, investigated juvenile crime in 1946–7 and published *Summaries of Recommendations for Action* (1947).

Noticeable trends during recent years have been consideration of the needs of the individual child rather than the institution to which he could be sent; attention to emotional and social development of the child rather than to his food and clothing only; and recognition of the child as a future member of society, needing help to develop as a normal, self-sustaining individual.

Child delinquency increased during the Second World War, demonstrably as a result of unsettled homes, separations, and social conditions. The full effect of this period has not yet been countered in sustaining the programs for prevention sponsored by leaders.

Consult White House Conference on Child Health & Protection, *The Delinquent Child;* Glueck, *One Thousand Juvenile Delinquents;* Healy, and Bonner, *New Light on Delinquency and Its Treatment;* Folks, *Care of Destitute, Neglected and Delinquent Children;* U. S. Dept. of Justice, *Summaries of Recommendations for Action.*

See Children's Courts; Probation; Reformatories.

Childrenite, a rare mineral species found in small brilliant orthorhombic crystals of yellowish-brown color. It is a hydrous basic aluminum iron phosphate.

Children, Legislation in Behalf of. In 1935 the Social Security Act was passed in the administration of President F. D. Roosevelt (with amendments in 1939 and 1946). Included in its provisions was financial aid for 'enabling the United States, through the Children's Bureau, to cooperate with state public-welfare agencies in establishing, extending, and strengthening, especially in predominantly rural area, public welfare services for the protection and care of homeless, dependent, and neglected children, and children in danger of becoming delinquent.' In 1940 President Roosevelt called the first White House Conference on Children in a Democracy. This important meeting was succeeded in 1946 by the National Commission on Children and Youth.

During 1947 amendments to the Social Security Act approved Aug. 10, 1946 raised the national level of Federal payments in states in aid of dependent children from $21.61 per child to $24.76. Federal grants for maternal and child welfare services and for aid to crippled children must be matched in equal amount by state appropriations. Grants for child welfare need not be matched. Use of Federal funds for temporary boarding homes for children was approved in 1947, permitting many states to plan for temporary care of migrant, rural and illegitimate children. The Lanham Act School Aid Bill, 1947, extended aid to war-burdened schools to June 30, 1948, with an appropriation of $5,000,000. Regular Federal school aid funds were increased, additional provisions for school lunches and health programs were made, and laws affecting apprenticeship, dependents of veterans, public libraries, and vocational education were passed.

Aid to children in other countries has been extended by the United States on the principle that the future involves international rather than purely national considerations. The International Children's Emergency Fund received an appropriation of $15,000,000 minimum, $40,000,000 maximum from Congress, for food, clothing, and transportation for European children suffering war effects. Large private contributions may be transported by these funds, and children may be admitted for placement in American homes regardless of immigration quotas.

Children's Bureau. The Federal agency devoted exclusively to child welfare is the Children's Bureau, established by Congress in 1912 and now a branch of the Federal Security Agency. The law provides that: 'The said bureau shall investigate and report to said department upon all matters pertaining to the welfare of children and child life among all classes of our people, and shall especially investigate the questions of infant mortality, the birth rate, orphanage, juvenile courts, desertion, dangerous occupations, accidents and diseases of children, employment, and legislation affecting children in the several States and Territories.' The Bureau publishes the monthly periodical, *The Child,* charts for infant care, bulletins of information, pamphlets and reprints containing important articles on child welfare.

Under the supervision of the Children's Bureau are the state and local public welfare agencies, much of whose attention goes to children's problems. Federal grants-in-aid to states for children through these local agencies are subject to approval of state plans or programs by the Children's Bureau. In almost every community, also, are agencies supported by private funds whose activities supplement those of the public agencies without centralized control. Private or voluntary agencies are able to sponsor specialized services to children which would not be possible for governmental agencies. Private agencies may be licensed by law to take custody of children at the request of a court or members of a community, and to proceed if necessary with placement in foster or adoptive homes.

Children's Courts, or JUVENILE COURTS. The Illinois State Legislature of 1899 passed the first 'juvenile court law,' as a result of a movement started by the Chicago Women's Club, and seconded by the child-helping organizations of Illinois, the Cook County Bar Association, the Illinois State Bar Association, and the Illinois State Conference of Charities.

This Act removed children under sixteen years of age from the category of criminals, and classed them as 'delinquent children.' The jurisdiction of children's cases was transferred from police courts, justices' courts, and criminal courts to the circuit court. The proceedings became chancery proceedings, instead of criminal proceedings, and the children were treated as wards of the court, rather than as enemies of society. The case became the State of Illinois *pro* Johnny Jones, instead of the State of Illinois *vs.* Johnny Jones. Proceedings were begun by a 'petition,' not by a complaint or indictment.

The law provided for the appointment by the court of probation officers, discreet men and women of good character, to make such investigations before and after trial as the court might direct, and to watch over and befriend children, who became wards of the court. The law provided for the presence of the probation officer at the trial, not to prosecute, but to represent the interests of the child. The law provided for the release of the child on probation under the supervision of a probation officer, or for his commitment to some suitable institution, not for punishment, but for care and training. (See PROBATION.)

The juvenile court system was not the invention of one or more wise individuals, but rather an evolution. Boston for years previously had tried children's cases apart from those of adults. In Canada a law had existed for a number of years which embodied many of the features of the juvenile court system; but Illinois was the first to give definite form to the juvenile court. The honor of formulating this law, and especially of substituting chancery proceedings for criminal proceedings, belongs to the late Harvey B. Hurd of Chicago, chairman of the committee which framed the law.

Judge Ben B. Lindsey, formerly of the Children's Court of Denver, Col., was one of the most active promoters of the juvenile court system and the originator of some of its features, especially in the employment of the honor system with young delinquents.

The most essential feature of the juvenile court law is the probation officer. Children stand in the relation of wards to the state and the state recognizes that the juvenile courts have a great responsibility both for the child and the state. In 21 states (1932) the jurisdiction of the juvenile court extended up to the age of 18 years or over in a few instances, but many exceptions and modifications in the laws limit the courts' authority and permit criminal procedure in certain cases.

The Children's Bureau estimated that approximately one child in every 100 of juvenile court age comes before the courts as delinquent in the course of the year. It is a fairly well accepted goal of those interested in the movement that the juvenile courts should have exclusive jurisdiction at least to the age of eighteen years, with power given the judge to waive jurisdiction above the age of sixteen.

Authorities agree that the Second World War caused a greatly increased problem in juvenile delinquency for the courts to handle. During the war there was a relatively larger increase in girls' cases than in boys', although this increase can not be attributable to any one cause. It is recognized that the best juvenile court, assisted by the most adequate of social agencies, can not handle the problem of delinquency if the community does not provide children with the proper mental and physical environment.

Consult F. R. Johnson, *Probation for Juveniles and Adults* (1928); M. Van Waters, *Report on the Child Offender in the Federal System of Justice* (1931); The United States Children's Bureau, *Juvenile Court Standards* (1923), *The Child, the Family, and the Court* (1929), *Youth and Crime* (1930); the White House Conference on Child Health and Protection, *The Delinquent Child* (1932).

Children, Societies for the Care of. Probably the first society in history for the care of poor children was the foundation established by the Emperor Trajan about 110 A.D. The equivalent of $920,000 was established as a fund for the care of 5,000 destitute or abandoned children. Despite such early beginnings there are few historical examples of organized care of children; however, societies for the protection of children are known to have existed during the 12th century in Milan and Montpelier. During Queen Elizabeth's reign, after the breakdown of the Medieval Manor system of caring for children and paupers, legislation assumed orphans or destitute children to be charges of the State, to be supported by taxation. The lag in general recognition of responsibility, however, lingered for 300 years thereafter.

In the United States, the first organized efforts for the care and protection of children was the Children's Aid Society movement and societies for the prevention of cruelty to children. It was not uncommon, even during recent years, to have single organizations caring for both animals and children under the same roof.

From their beginnings in 1853 in New York, Children's Aid societies have exerted lasting influence on the standards of the care of dependent children. They have increased efforts to preserve the family unit, to bring into focus the professional skills found in medicine, psychiatry, sociology, and education, to the end that the individual child may be helped. This improvement in standards involves more careful preliminary case study; more team work by both public and voluntary welfare organizations and institutions for children; more cooperation with juvenile courts; more care in the selection of family homes for placed children.

The Child Welfare League of America, founded in 1919 by voluntary child care agencies and institutions, serves as the standard-setting federation for both public and private children's agencies. It provides the rallying point for agency participation in the extension of services to children throughout the country.

The 1880's saw a widespread development of the Children's Home Society Movement, another forerunner of our modern foster placement agencies. These grew as a result of the conviction that, although certain types of children could be benefited by institutional care, the majority could best be helped by foster family placements. Most of the Children's Home Societies maintained receiving homes for the temporary care of children pending placement. Today, experts in the care of children recognize that institutions can care effectively for certain types of children but that out-moded orphan-type 'homes' have a diminishing utility. With the increased responsibility of government in the Social Security programs for Aid to Dependent Children, and other means of assistance to parents, the care of dependent children has entered a new era.

Consult Child Welfare League of America, *Standards for Institutions Caring for Dependent Children;* Thurston, *The Dependent Child;* Child Welfare League of America, Bulletin, *Report of the Committee on Relations of Family and Child Welfare Agencies;* U. S. Children's Bureau, *Children in the Community—the St. Paul Experiment in Child Welfare;* Lundberg, *Child Dependency in the United States.*

Childress, city, Texas, capital of Childress county, on the Fort Worth and Denver City Railroad; 8 miles south of the Red River. In the vicinity petroleum, gypsum and natural gas are found, and cattle, hogs and cotton are raised. Pop. (1930) 7,163; (1940) 6,464.

Child Study. Children as a separate group were studied by Plato, who laid down rules for their education. Sir Francis Bacon, however, was the first to apply scientific concepts to child study in the modern sense. Later Comenius (1592–1670) chiefly in his *Didactics* (1637), originated the concept of pleasure as an incentive in education. Hermann Francke (1663–1727) founded the first educational-charitable institution at Halle, Germany. Benjamin Franklin marked a step in child study when in 1751 he established his Academy and Charitable School in the Province of Pennsylvania (now the University of Pennsylvania).

Among the greatest contributions to child study along psychological lines was the work of Froebel, founder of the kindergarten, who held that, for mental health as an adult, a child should be taught to feel that he was a part of an ordered universe, with natural phenomena understandable and friendly. To this end he instituted nature study in his kindergartens, and cultivated happiness and fearlessness in children. In his view, emotional growth and actual living were at least as important as technical or cultural education.

In the 20th century John Dewey established many of the principles of modern child study and education on somewhat the same general conception: community attitude and the all-round development of the child. Thanks to the work of such pioneers, the development of the child as determining substantially the future of the adult has now been accepted for many years as of undisputed importance.

Developmental childhood is now accepted universally as determining the whole course of an individual's life, and any professional dealing with the adult takes childhood history into account. Sigmund Freud, the father of modern psychology, did much to show the connection between infant or childhood experiences and later behavior, and the connection has become an axiom of modern psychology. Other steps in the development of child psychology have been: the gestalt psychology (the concept of learning and psychological reaction as a pattern rather than a series of isolated steps): John Watson's theory of behaviorism; and the studies of child behavior by Prof. Arnold Gesell at Yale University.

Observation and general insight by experienced psychiatrists are aided by standardized tests of both normal and defective children, which give useful clues, comparable with facts known about children in general. The first psychological tests were the Binet-Simon tests. These were revised at Stanford University, and later by Terman and Merrill. Other tests are: Thorndike's CAVD test (completion, arithmetic, vocabulary and directions): the Porteus Mental Age Test; the Wallis Pegboard Mental Age Test (in these latter two tests, language is less used than mechanical intelligence); the Seashore Musical Talent Test (an 'aptitude' test); the Otis Self-Administering Test of Mental Ability; the Rorschach Ink Blot Test and the Kent-Rosanoff Association Test ('personality' or 'psychological' tests which give dependable data on psychological experiences, processes, and difficulties): and Harold E. Jones' galvanic skin reflex test which may be used on very young infants.

Such tests are of value only if administered and interpreted by experienced psychologists, in conjunction with knowledge of the child's history, and when linguistic, performance, social and personality tests are used together. When this practice is followed, a child's intelligence may be estimated from the age of about 2½ years: before this, extremes of brilliance or feeblemindedness may be detected. 'Intelligence' tests have been considered more and more in the light of 'accomplishment quotients' or 'educational quotients,' which are more accurate terms for what is actually being measured.

Psychologists have found through years of testing of many thousands of individuals that results for an individual vary throughout his lifetime only about 5 per cent in either direction, the intelligence quotient of feebleminded children being more constant than that of brighter children.

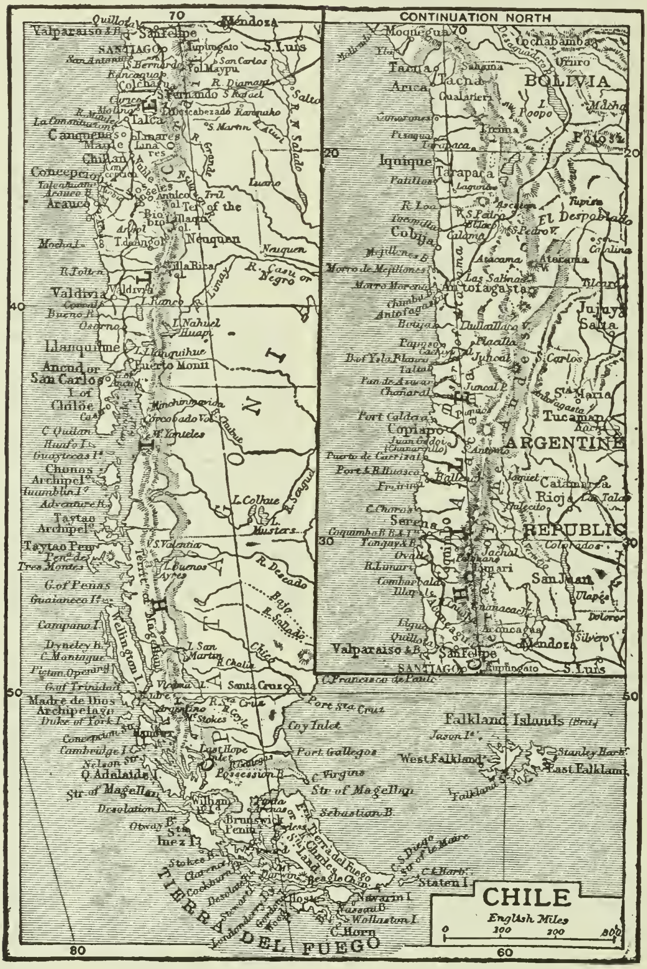
Tests are only one result of modern child psychology. Dr. Arnold Gesell and others have achieved invaluable results from observing and studying normal children, with consequent discoveries, data, knowledge of children's development, and advice to parents and teachers. Used in connection with such knowledge, tests are an index to the child's present status and a means of making plans for his education and treatment on the basis of his actual capacity and personality.

Child guidance clinics, which offer a method of study and treatment of the maladjusted child, were begun in 1909 by Dr. William Healy in connection with the Chicago Juvenile Court. Since then the number of clinics has increased, with results which show the field to be one of the most hopeful in all psychology. Child guidance clinics deal more and more with the 'normal' child, and are used extensively in probation by juvenile courts, adoption or foster placement agencies, and in direct work with children living in their own homes.

The behavior difficulties of hundreds of children were attributed in the St. Paul experiment of the U. S. Children's Bureau primarily to the following causes: Family influences, 85 per cent; Personality Deviations, 76 per cent; and Economic influences 36 per cent. Psychologists find that much neurotic behavior on the part of children is caused by their parents' behavior or attitudes, but that functional neuroses of parents are not inherited.

Child guidance clinics sustained much impetus from the projects sponsored over a period of years by both the Commonwealth Fund and the Judge Baker Foundation of Boston. Experiences such as these have established child guidance as a method effective in assistance to well-adjusted children, and to those showing problem behavior caused by maladjustment. Modern community planning includes provision for safeguarding the mental health requirements of both child and adult. Child guidance clinics staffed with psychiatrists, psychologists, and social workers provide a necessary community service to courts, schools, social agencies, and families.

Consult Teagarden, *Child Psychology for Professional Workers* (1940); Healy and Bronner, *Reconstruction Behavior in Youth;* Pamphlets, U. S. Public Health Service, Washington, D. C., American Social Hygiene Association, New York City, Child Study Association of America, N. Y. C., Children's Bureau, Federal Security Agency, Washington, D. C.; Anna Freud, *Psychoanalysis of the Child;* Gesell and Ilg, *The Child from Five to Ten;* Gesell and others, *The First Five Years of Life.*



Chile, or CHILI, a republic of South America, occupying the strip of land between the Andes Mountains and the Pacific Ocean, from the southern boundary of Peru to the southern extremity of the continent, and also the greater part of the Fuegian Archipelago down to and including Cape Horn. It extends from lat. 17° 15′ s. to 55° 59′ s., with an extreme length of about 2,620 miles. No part is more than 130 miles from the coast. Its area is 286,322 square miles.

Topography.—The eastern boundary is the Cordillera of the Andes, with summits reaching from 14,000 to over 20,000 feet in the northern section, and diminishing to 9,000 and 5,000 feet in the southern section. The scenery generally is grand, the mountain summits being covered with perpetual snow above the level of 13,000 feet in the north, and 3,000 feet in the south. The principal summits are Aconaqua (22,834), the highest peak in the Americas, Mercedario (21,883), Corcoputi (22,162), Llelluyacu (21,500). Of the Andine passes between Chile and Argentina the best known are Bermejo and Iglesia, on the Uspallata road, 13,025 and 13,412 feet, respectively; Pircas, 16,962 feet; Espinacito, 14,803 feet; and Los Patos or Valle Hermoso, 11,736 feet.

From about 28° s. lat. an older coast range runs southward, parallel with the Andes. These coast mountains reach heights of from 2,000 to 3,000 feet, and their slopes dip into the ocean, with practically no level coast lands. Between the coast range and the Andes lies a great tableland that becomes a valley toward the south, and extends to the Gulf of Reloncavi.

From the latitude of the Gulf of Reloncavi (41° 30′ s.) and Lake Nahuel-Huapi the Andes are also crossed by several rivers, and farther south by deep fiords, the watershed here running along the plateau of Patagonia at a low relative elevation. Between the Andes and the watershed are fertile valleys easily accessible from the Argentine Republic. On the Chilean side are many lakes as well as some large rivers.

Climate and Soil.—As Chile covers 38 degrees of latitude, it presents a great variety of climate. Iquique, in the dry lands of the north, has a mean temperature of 64°; Valparaiso, in lat. 33°, about 59°; Ancud, 53°; and Tierra del Fuego, 42°. In the Desert of Atacama the thermometer not infrequently rises to 100° in the day, and falls to 36° at night; the range is much less toward the south, on the tableland being about 20°. North of Copiapo (28° s.) rain seldom falls; south of that latitude it ranges from 3 to 4 inches in southern Atacama to 12 or 15 inches at Aconcagua. At Valdivia it is 100 inches, and at Ancud, in Chiloé, 130 inches. Frosts occur at great elevations, and in the valleys from the central parts of the country southward. At Santiago, at a height of 1,840 feet, the thermometer sinks in winter to three or four degrees below freezing point; snow occasionally falls, but does not lie long. The hottest months are January and February; the coldest, June and July.

The soil is generally fertile, even the desert country producing luxuriant crops wherever irrigation is practiced.

Geology.—A large part of the present surface of Chile is of volcanic formation, and earthquakes are common. The most disastrous occurred in 1746. Another stupendous upheaval took place in 1822, when the coast near Valparaiso was permanently elevated 4 feet over an area of 100,000 square miles. In 1835 Concepcion and Talcahuano were destroyed by a visitation, and in 1868 Iquique shared a similar fate, the latter town being again razed to the ground in 1875. There are many volcanic peaks; those active since 1880 are Osorno (7,200 feet) and Calbuco (7,000 feet).

Flora and Fauna.—The flora of Chile includes the Chilean pine, beech, elm, Chilean oak, walnut, chestnut, quillaia, lingue, and eucalyptus. The potato is supposed to have originated in Chile, and is abundant in the south, as are also the strawberry, date, palm, bean, and pepper plants. Large expanses of rich natural grasses afford excellent pasturage.

Deer and foxes are plentiful in the woods, but wildcats and pumas are rarely seen. Ducks and other water fowl and wood pigeons are abundant; and paroquets and other subtropical birds are found in many localities. The northern streams contain few fish, but the southern rivers are well stocked with excellent food fish. The sea fauna is remarkably abundant, and includes cod, dolphin, whale, seal, and a species of sea elephant.

Forestry.—The forest zone in the south covers 8,671,051 acres. The largest forests are in the provinces of Valdivia, Llanquique and Chiloé. The chief forest product is timber, especially pine. Soapbark is exported. Much of the timber is too heavy to be floated on the upland streams and transportation is inadequate.

Mining.—Chile is rich in minerals. The metals include gold, silver, copper, cobalt, zinc, molybdenum, tungsten, and manganese. The non-metallic minerals are nitrate, coal, borate, salt, sulphur, and guano. Chile's copper reserves constitute 36.8 per cent of the world's reserves, but the country being a cheap producer, exports are hampered by hostile tariffs. Marble and onyx are mined. Iron ore deposits are found in the provinces of Atacama and Coquimbo. Nitrate of soda (salitre) is an important export and a source of considerable revenue to the government. It is found in the desert region of Atacama. The capital for production is mainly American and British. About 66 per cent of the world's supply of iodine is a by-product of the nitrate oficinas or works. Chile is the world's second largest producer of copper.

Agriculture.—The agricultural zone extends from 33° to 42° s., where, between the Andes and the coast mountains, lies the garden of Chile, endowed above most parts of the world in all that makes an agricultural country. The total area of agricultural land is more than 60,000,000 acres. There are 12,393,677 acres of meadows, and 459,872 acres of fruit trees and vines. The area planted to cereals exceeds 2,234,000 acres. Yet Chile is a large importer of foodstuffs because of the feudal nature of land ownership and primitive agricultural methods. The government through the Agrarian Credit Bank and the Agricultural Colonization Bank has aided farm purchasers to establish themselves and has made many grants from its original 56,580,000 acres of public lands. The chief crops are cereals, fruits, especially grapes and apples which are exported, vegetables, tobacco, wheat, potatoes, maize, oats, barley, haricots, peas, sugar beets, flax, hemp, coffee, sugar cane, and cotton.

Stock Raising.—In regions of Patagonia and Tierra del Fuego are vast pasture lands where sheep farming is important. Wool is exported. The industry has not been fully developed. Dairy farming and the production of butter and cheese are increasing.

Transportation.—Chile has 5,200 miles of railways. From southern Chile to Panama there is unbroken railway connection. Those under government control are Valparaiso-Santiago (186 kilometres); Calera-Iquique (1,600 kms.) with branch lines; Santiago-Puerto Montt (1,078 kms.), and Transandine Railway (British) including the Chilean section of Los Andes-Buenos Aires (75 kms.) which rises to 10,338 feet above sea level. Privately owned lines are Antofagasta-La Paz, Bolivia, (1,174 kms.) which rises to 13,000 feet; and the following local railways: the Arica-Tacna Railway, the Iquique Nitrate Railway, the Taltal Railway and the Arauco Railway (British). Many steamship lines ply regularly between Chilean ports and other countries passing through the Panama Canal or around the Strait of Magellan. Travelers from Europe land at Buenos Aires and go by railway across the Andes. In general, the rivers are navigable only for short distances from the coast and but few are navigable for large vessels. Air services include the Chilean Air Service from Santiago to Arica and intermediate ports; Pan-American Grace Airways from Chile to the United States and intermediate countries; Compagnie Générale Aéropostale (mail only) Santiago-Buenos Aires-Paris. There are six civilian and two government airports. There are wireless stations along the coast operated by the Navy, an international radio station, at Quilicura, and three large broadcasting stations.

Manufactures.—Chile has made remarkable industrial progress. The most important manufactures are foodstuffs, leather, gas and electricity, and clothing. Other industries are the manufacture of lumber, metals, textiles, alcoholic and other beverages, chemicals, papers, tobacco, boots and shoes, glass, iron and steel products, cement, and soap. The manufactures are in the main directed and financed by foreign interests.

Commerce.—The commerce of Chile has increased materially since 1938, the Second World War being a contributing factor. Imports are mainly from the United States, Peru, and Great Britain. The largest exports are to the United States, Great Britain, Argentina, and Brazil. Nitrate and copper constitute more than 80 per cent of the country's exports.

The principal imports are motor spirit, sugar, jute sacks, machinery, cotton goods, woolen goods, rice, wrought iron tubes, pipes and accessories, petroleum, tea, bar iron and steel, coffee, soya bean oil, wire, thread, sheet iron and steel, and mineral oils. Exports are nitrate, copper bars, sheep's wool, iron ores, oats, beans, meat, hides, iodine, lentils, bran, barley, copper ores, timber, walnuts, and furs and skins.

The merchant marine of Chile comprises 106 steamships, motor ships, and sailing vessels.

Finance.—In 1931 the nitrate industry was reorganized by the formation of the Chilean Nitrate Company ('Cosach'), capitalized at $375,000,000, of which half is owned by the Chilean Government. The government agreed to receive cash instead of export taxes until 1933 after which time it would take dividends and an income tax.

The monetary unit is the gold *peso,* with, originally, a par value of 12.17 cents United States currency in the old gold dollar now worth 20.6 cents. Ordinarily no gold circulates but in December, 1943 the government agreed to mint a gold coin valued at 1,000 pesos for the use of the commercial bourses. The silver coinage was formerly one coin, the peso, but in 1934 the silver pesos were replaced by coins of 25 per cent nickel and 75 per cent copper. Foreign exchange is controlled by the Central Bank.

Population.—The great majority of the people are of European stock. In the valleys or western slopes of the Andes are Indians of the Araucanian tribe; in the north are the *changos* (laborers); and in and about Tierra del Fuego are the Fuegians (mostly nomadic). The 1940 census gave a population of 5,023,539. The largest cities, with population (1940), are: Santiago, 639,546; Valparaiso, 215,614; Concepción, 92,364; Temuco, 84,696; Viña del Mar, 70,013; Chillán, 61,535; Talca, 56,735; Antofagasta, 51,107; Valdivia, 49,481; Talcahuano, 41,536; Iquique, 39,282; and Magallanes, 33,134.

Religion.—The Roman Catholic religion is dominant though not maintained by the State since 1925. All religions are protected.

Education.—The state provides the cost of education which is compulsory for six years in the cities and four years in the rural districts, and for all children 7 to 15. Professional and secondary education is provided by the State University of Chile, the Catholic University at Santiago, the National Institute of Santiago, the University of Concepción, and by the lyceums and colleges established in the capitals of provinces, and in some departments. The Industrial University of Valparaiso is a technological school.

Army and Navy.—The Army is composed of an active force of 23,782 and the national militia of 609,734 (1932), in which all able-bodied citizens between the ages of 20 and 45 must serve. Recruits, after being trained for 9 months, serve for 12 years in the reserve of the active army, after which they belong to the second reserve. In 1918 an Air Force was organized; in 1943 it had four brigades.

The Chilean Navy has one battleship, one armored cruiser, two protected cruisers, 8 large destroyers, 9 submarines, and various training and auxiliary vessels.

Government.—The government (under the Constitution of 1925) is a republic, composed of 25 provinces. Every male citizen of 21 years is entitled to vote if able to read and write. The President is elected for a term of six years by direct vote and is not eligible for a second consecutive term. The National Congress consists of a Chamber of 143 deputies, elected by direct vote, one deputy for every 30,000 inhabitants, or fraction exceeding 15,000, in a department, the term being four years; and a Senate of 45 members, five members for every one of the nine provincial groups into which the country is divided. Half of the Senate is renewable every four years. A High Court of Justice sits at Santiago, and there are eight courts of appeal, tribunals of First Instances in each department and second class judges in the subdelegations. Santiago is the capital.

History.—The first European to land in Chile—at Chiloé in 1520—was the Portuguese discoverer Magellan, after his famous voyage through the strait which now bears his name. After the conquest of Peru by Pizarro, an expedition was made to Chile from that country overland under the leadership of Diego de Almagro in 1535. This expedition penetrated as far as the Rio Clano, but returned unsuccessful. Another was sent under command of Pedro Valdivia in 1540, which succeeded in annexing the territory as far as the River Maipu, and founded Santiago (1541), and other settlements.

These were nearly all destroyed in a general uprising of the Indians in 1553, and for almost a hundred years there was practically no cessation of the warfare. A peace established in 1640 was broken by Indian wars in 1655, 1723, and 1766, and for the next 150 years the colony struggled against the cruel and selfish policy of Spain.

In 1810 a revolt against the Spanish power broke out, in which Don Bernardo O'Higgins (q. v.) played a conspicuous part, and finally became the first dictator of the new republic. Complete independence was not achieved until 1818; and the last remnant of Spanish power was not shattered till the victory of Bolivar at Ayacucho in 1824. The first constitutional president was General Blanco Encalada. The government was unsettled until 1847.

In 1864 Chile gave Peru valuable support in her war with Spain; and Valparaiso was bombarded by the Spaniards in 1866. In 1879 Chile declared war against Bolivia, and immediately thereafter against Peru, with which Bolivia was allied. For a time the Peruvian fleet kept the Chileans in check, but in August, 1879, the Peruvian ironclad *Huascar* was captured by the Chilean men-of-war *Cochrane* and *Blanco Encalada,* both armor plated. The Chileans occupied Lima and Callao until 1883, when a treaty of peace was signed. Atacama, till then a part of Bolivia, and Tarapacá, a Peruvian province, were permanently annexed to Chile; and the territories of Tacna and Arica were occupied under the agreement that at a future time a plebiscite should be taken to determine whether or not they should be restored to Peru.

President Balmaceda's unconstitutional government led to civil war in 1891, when the congressionalists were victorious. The decisive battle was fought near Valparaiso on Aug. 28, and Balmaceda committed suicide. In 1891 occurred also the Itata Affair (q. v.).

In 1891–2 relations between Chile and the United States were strained because of an attack by a mob in Valparaiso upon some sailors ashore from the U. S. S. *Baltimore,* two of the sailors being killed and several injured. The Chilean government, after some controversy, apologized and paid an indemnity of $75,000.

In 1902 the frontier toward the Argentine Republic was determined by Sir T. H. Holdich, acting for King Edward VII as arbitrator. In 1904 Bolivia recognized the sovereignty of Chile over the province of Antofagasta. In August, 1906, Valparaiso was almost destroyed by an earthquake and nearby towns suffered severely (see VALPARAISO).

In 1909 the Alsop Claim, a dispute of twenty-five years' standing between Chile and the United States over damages claimed by an American firm against the Chilean government, reached an acute stage. Both countries eventually agreed to King Edward of England as mediator, and after his death to King George V, who in 1911 adjudged the sum of $935,000 to the Alsop firm.

In 1910 the old question in regard to Tacna and Arica became acute through a conflict of the clergy of Bolivia and Chile, both claiming spiritual jurisdiction. It was then decided to submit the question to arbitration. After much discussion it was finally agreed to allow the President of the United States to act as arbitrator. A Plebiscitary Commission was appointed with a view to a settlement of the question. In 1929, with Mr. Hoover's mediation, the controversy was settled, Arica going to Peru and Tacna to Chile. Peru also received $6,000,000 and Bolivia was relieved of customs duties on goods entering Chilean ports bound for Bolivia.

For 30 years after 1890 the presidency was involved in an interplay of politics of a low order. In 1920 Arturo Alessandri brought to the administration a magnetic personality but as a dictator he failed to accomplish his promises. In 1924 his government fell into the hands of a military junta which lasted until the early part of 1925 when Alessandri was invited to return to Chile. He accepted under certain conditions, one of which was the calling of a Constitutional Assembly to reform the Constitution, and returned in

March, 1925. In October Emiliano Figueroa was elected president. During 1925 many laws were passed to improve labor and social conditions, and an income tax to break the hold of the rich. In 1926 the Central Bank was created under the advice of the Kemmerer Commission of American financial experts, to have exclusive right to issue money and to be the government's fiscal agent. In 1927 Ibañez established a dictatorship but failed to balance the budget. Ibañez was overthrown in July, 1931. Pedro Opazo, president of the Senate, succeeded Ibañez but was forced to resign the next day and Juan Estebán Montero became acting president. Montero was elected president Oct. 4, 1931. Montero's government was overthrown on June 4, 1932. Several provisional administrations followed until, on October 21, that of Oyanedel was recognized on the assurance of an election to be held October 30. Arturo Alessandri was elected and in April, 1933 was granted dictatorial powers. In 1938 Aguirre Cerda was elected president at the head of a popular front administration. Before he could inaugurate a vast public works program for housing, education, and social security, an earthquake in Jan. 1939 wrought death and havoc over a considerable area. Don Juan Antonio Rios was elected president in February, 1942. On January 20, 1943 Chile broke diplomatic relations with Germany, Italy, and Japan, and on May 18 with Bulgaria, Hungary, Vichy France, and Rumania. On April 11, 1945 Chile declared war on Japan.

Bibliography.—Consult W. Knoche, *Chile* (1931); publications of the Pan American Union and Great Britain's Department of Overseas Trade; *Annuario Estadistico de la Republica de Chile* (Annual); G. M. McBride, *Chile: Land and Society* (1936); Galdames, *History of Chile* (1941); Hanson, *Chile, Land of Progress* (1941).

Chilecito, chē-lā-sē'tō (officially called Villa Argentina), town, Argentina, in La Rioja province; 40 miles northwest of La Rioja. It owes its importance to the rich Famatina mines, yielding silver, copper, and gold. It is also noted for its wines. Pop. about 4,000.

Chililaya. See Puerto Perez.

Chil'koot (Chilcoot) **Pass,** a difficult pass over the coast range of the Rocky Mountains in Alaska. It begins at the town of Dyea, at the head of Lynn Canal, and 13 miles from this point attains an altitude of 3,502 feet. Thence the route descends 15½ miles to Lake Bennett or Lindeman, in Yukon, Canada. It is open during most of the year.

Chillán, chēl-yän', town, Chile, capital of Nuble province on the Toscas River; 56 miles northeast of Concepción. It is one of the most active commercial cities of central Chile, and has trade in cattle, grain, and hand-made lace. Industries include flour mills, tanneries, breweries and hat factories. The much-frequented sulphurous baths of Chillán, 40 miles to the southeast, issue from the flanks of the Viejo volcano. Pop. (1940) 61,535.

Chillicothe, chil-i-koth'i, city, Missouri, county seat of Livingston county, on the Burlington, the Chicago, Milwaukee, St. Paul and Pacific, and the Wabash railways; 87 miles northeast of Kansas City. It is a trade center for coal and agricultural products and a manufacturing center. The Missouri Industrial School for Girls is located here. Pop. (1930) 8,177; (1940) 8,012.

Chillicothe, city, Ohio, county seat of Ross county, on the Scioto River, and the Baltimore and Ohio and the Norfolk and Western railroads; 44 miles south of Columbus. Its manufactures include engines, furniture, shoes, flour, agricultural implements, machinery, iron, paper, and leather; there also are large railroad machine shops. Pop. (1930) 18,340; (1940) 20,129.

Chillingworth, William (1602–44), English theologian, was born in Oxford. Engaging in religious controversy with a Jesuit, Fisher, he became converted to Roman Catholicism, but reverted to Protestantism (1634). He then held several disputations against Catholic priests and wrote polemical tracts. He afterward became chancellor of Salisbury, prebendary of Brixworth, and then master of Wigston's Hospital in Leicester. He supported the king in the Civil War, was captured by the Parliamentarians, and died in the bishop's palace, Chichester.

Chilliwhack, or Chillwhack, town, British Columbia, Canada, on the Fraser River, and on the Canadian National Railway, 75 miles from Vancouver. It is in the midst of a fine agricultural district, and has timber factories and fruit canneries. Pop. (1931) 5,802.

Chillon, shē-yon', a celebrated and well preserved castle (thirteenth century) in the Swiss canton of Vaud, at the eastern extremity of the Lake of Geneva; 2 miles southeast of Montreux. It is the scene of Byron's *Prisoner of Chillon,* which is largely imaginary, as the real Bonivard, here imprisoned (1530–6), was a political prisoner, and did not become a Protestant till after his release.

Chiloé, chē-lō-ā', a province of southern Chile, composed of Chiloé Islands, an archipelago of about 60 miles lying from 30 to 50 miles from the coast, Guaitecas Islands and Chonos Islands, and a large body of the mainland. The province contains 12,680 square miles and has a population of 113,488 (1937), mostly Indians and half-breeds. The capital is Puerto Montt. Other towns are Ancud, or San Carlos, on the northern coast of Chiloé Island, and Castro, on the eastern shore, the oldest town on the island. The province of Chiloé is one of the three great forest provinces of Chile.

Chilon, chē-lōn', a Spartan, one of the Seven Wise Men of Greece. He appears to have lived about 550 B.C. or earlier. Nothing is known of his life, but he is said to have died of joy at his son's winning a prize at the Olympic games.

Chilperic, chil'per-ik, two kings of the Merovingian Franks. Chilperic I reigned from the death of his father Clotaire (561) to 584.—Chilperic II, son of Childeric II, reigned over Neustria (715–720), and opposing Charles Martel, major-domo of Austrasia, was defeated by him at Vincy and Soissons.

Chil'tern Hills, a range of hills with rounded summits, chiefly in the center of Buckinghamshire, England.

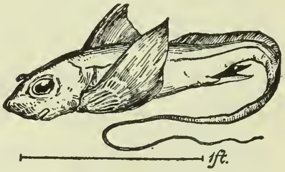
Chiltern Hundreds, the three hundreds of Stoke, Desborough, and Burnham, in the Chiltern Hills, Buckinghamshire, England, formerly a tract of forest under a steward or bailiff. A nominal salary is attached to the sinecure office of steward; and being thus an office of profit under the crown, its acceptance by a member of the House of Commons involves the vacating of his seat. As a seat in Parliament can not in terms be resigned, the acceptance of the Chiltern Hundreds from the Chancellor of the Exchequer is the regular method of resigning a seat.

Chimaera, ki-mē'ra, or Chimera, a legendary animal, according to Homer, shaped like a lion in its fore part, a dragon in its hind quarters, and a wild goat in the middle, whose breath was fire. It was slain by Bellerophon aided by Pegasus.

The word is also used to describe an idle fancy or any absurd or ridiculous product of the imagination that can have no real existence.

Chimaera (*Sea Cat*), or CHIMERA, an interesting genus of fish whose members, though generally resembling sharks, are in some respects so anomalous that they are placed in a separate order (Holocephali). The sea cats are found mostly in northern seas. They do not exceed five feet in length, and have a long, filamentous tail. The skin is naked; the four gill clefts are covered by an operculum or fold of skin; the anterior dorsal fin has a strong spine. In the North Atlantic Ocean occurs *Chimaera monstrosa,* which from its striking appearance has received many popular names—*e.g.,* King of the Herrings, King Fish, Sea Rat. The head is large, and in the male crowned by a projecting process of skin; the tail is very long and slender.

Castle of Chillon, near Montreux, Switzerland



Chimaera

Chimay, town, Belgium, in the southeast corner of the province of Hainaut, was founded in the seventh century. Because of its nearness to the French frontier Chimay was frequently exposed to the ravages of war through the centuries and was several times besieged. The French Marshal Turenne reduced it to ruins in 1640. The town is best known for the castle and park that bears its name. This was originally the stronghold of the princely and ducal family of Croy. Later it passed into the possession of the d'Arenbergs and through them to the princes of Caraman-Chimay, the present owners. A château in the Tudor style was built here in the eighteenth century. There is a church which contains a fine statue of Phillippe de Croy, chamberlain and companion in arms of the Emperor Charles v. Froissart, the famous chronicler, is buried here, and a statue has been erected to him in the public square.

Chimborazo, chim-bō-rä'zō, province, Ecuador, South America, to the south of Chimborazo mountain; area about 3,200 square miles. The capital is Riobamba. Pop. (1938 est.) 258,500.

Chimborazo, volcanic mountain peak of the West Cordillera of the Andes, the highest in Ecuador, situated 100 miles southwest of Quito. It has several glaciers, and was first ascended in 1880 by Whymper, who states its altitude to be 20,496 feet. Although 150 miles inland, it can be seen from the Pacific coast.

Chimbote, chēm-bō'tā, seaport, Peru, in the department of Ancachs, on El Ferrol Bay; 172 miles southeast of Huaraz, with which it has railway connection. It exports sugar and coffee. Pop. 1,500.

Chimere, shi-mēr', a bishop's upper robe, to which the lawn sleeves are attached. It is a long sleeveless gown of silk or satin, open down the front, gathered in at the back between the shoulders, and worn over the rochet. That of Anglican bishops is of black satin; that of Roman Catholics is of purple silk.

Chimkent, shim-kent', CHEMKEND, or TCHIMKEND, town of the Syr Daria province of Kazakstan, U.S.S.R., on a subtributary of the Syr Daria River, 72 miles N.E. of Tashkend. It occupies a valuable commercial and strategical position at the western outlets of the great breach which separates the Karatau from the Alexander range, and is the meeting place of three great trade routes—from Tashkend, Samarkand, Bokhara, and Fergana, on the south; from the Aral and Orenburg, on the northwest; and from Vyernii (Vernoye) and Semiryechensk, on the northeast. Chimkent Citadel, now in ruins, overlooks the town from a scarped terrace; it was taken by the Russians in 1864. Lately it has become a health resort for Russian tuberculous patients who come here to take the kumiss (fermented mare's milk) cure. There is a chemical factory which produces santonin. Other industries include the production of cotton, oil, flour, and tobacco. A branch line connects Chimkent with the Trans-Siberian Railway.

The population is mainly Sart. The name, 'Green Town,' is derived from the gardens that surround it. Pop. 12,000.

Chimney, a structure usually of brick or stone or metal. Chimneys serve two purposes: first, they produce a draught through the furnace, in order to secure combustion of the fuel with the minimum waste of heat; secondly, they discharge the waste gases into the atmosphere at such a height as to be non-injurious to the neighborhood. The draught is produced by the difference of pressure between the column of heated gases in the chimney and the cool external air, and is often stated in inches of water. For steam boilers the internal temperature of the chimney should not exceed 600° F., while for reverberatory furnaces it may be as high as 2,200° F.

A chimney should be such as to supply on emergency much more than the usually required horse power, the draught being regulated by a damper, so as to produce the required effect. The best form of cross section for the stability of a chimney under wind pressure is circular, then polygonal, and lastly square; but, on the other hand, the bond is better, and consequently the strength of the brickwork is greater, in the square or polygonal than in the round. A rule sometimes given for height of stack is that for round, octagonal, and square section, respectively, the height should be no more than twelve, eleven, and ten times the lower outside diameter; but many high chimneys exist of heights from fourteen to eighteen diameters. The width should diminish regularly, being at the top about two-thirds that at the bottom. The shape and dimensions of the internal flue are also important matters. The use of forced draught has rendered high chimneys less necessary than formerly, but tall structures are being constantly erected. For many purposes steel or iron stacks are preferred, as they can be erected speedily and at less expense.

Chimneys are of comparatively modern origin. Only traces of them are found in classic antiquity; but there must have been some such means of discharging the smoke from the fires which heated the hypocausts of the Roman baths. In mediæval times, the earliest examples of fireplaces with chimneys, such as those in the Norman castles of Rochester and Castle Hedingham, erected in the twelfth century, have only a short flue ascending a few feet, and discharging by an oblong aperture in the outer face of the wall. These were no doubt found very smoky and inconvenient, and ultimately the chimneys were carried to the roof. In Gothic buildings they are often detached, and the outlet is ornamented with trefoil and other openings. In the English halls the centre hearth was long retained, without any chimney, the smoke being allowed to find its way out through an opening in the roof called the Louvre (q.v.). In the late Gothic and Elizabethan styles the chimneys are among the most striking features of the design, being carried up in lofty and highly ornamented stalks, frequently built in brick.

Chimney Swallow, in North America, is the Chimney Swift (q.v.). Elsewhere it is the name of a familiar swallow, as the British *Hirundo rustica,* which nests in and about walls and chimneys.

Chimney Swift, a small, sooty brown, swallow-like bird, the commonest of North American swifts (*Chætura pelagica*). In summer it haunts the neighborhood of villages and farmhouses throughout temperate North America, and occupies chimneys and similarly light but sheltered breeding places. In spring it spreads northward as far as Labrador and the Hudson Bay region, and in winter migrates to Central America. Outside the nest it is almost continuously on the wing, gathering, openmouthed, minute insects and even the materials for its nest. The latter is a hollowed bracket of small twigs, broken from trees by the bird in flight, and glued together and to the wall by the bird's viscous saliva. A few feathers form a bed for the five white eggs. In early times the chimney swift inhabited hollow trees, attaching its nest to the inside walls; but at the building of houses it took up its residence in chimneys and attics. At times large colonies live together.

Chimoio, station on the Beira Railway, Portuguese East Africa, 120 miles northwest of Beira, at an altitude of nearly 3,000 feet.

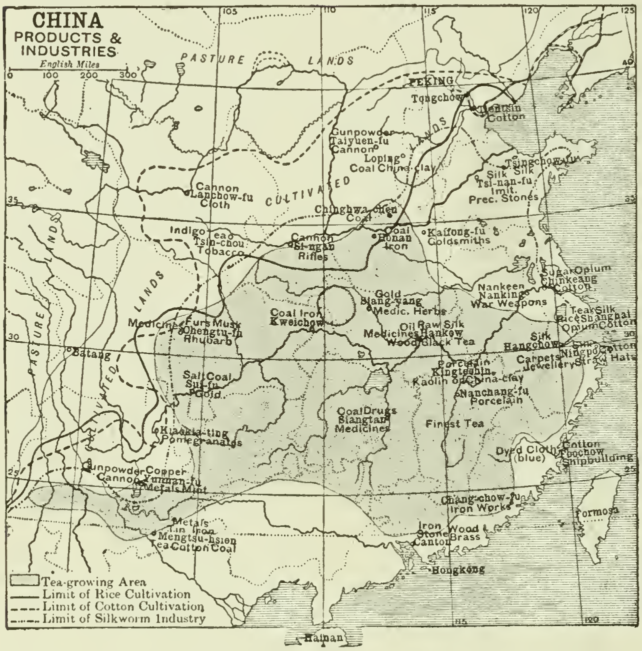
Chimpanzee, chim-pan'zi (*Anthropopithecus troglodytes*), one of the four living types of anthropoid apes. The chimpanzee is found on the coast of Guinea and farther inland. It occupies a wider area than the gorilla, and is even said to have been found in East Africa, to the south of Abyssinia. It lives in forests, is an adept climber, but keeps a good deal to the ground. The diet consists mainly of wild fruits; but animal food seems to be occasionally eaten. The chimpanzees live in families or in small societies. They construct pent houses in the thick forest, and the males are said to pass the night below the family nest. They make a great deal of noise, of a dreary and horrible character, especially when provoked by other monkeys. Though they generally flee at the sight of man, they can with hands and teeth make themselves in extremity formidable antagonists. The natives shoot them with arrows or javelins, or in recent days with firearms. The flesh is eaten by the natives of some parts of Africa; the skulls may serve as fetishes.

Chimpanzee.

The animal stands about four feet high, has very dark, all but black hair, a broad, leathery, reddish-brown face, small nose, large mouth, protruding lips, large brow ridges, and small ears. The face has an angle of 70 degrees. The head hangs down upon the chest; there are no cheek pouches. The arms are very long, and reach the knee; their span is about half as much again as the height. The hand is narrow, but as long as the foot. The sole of the foot can rest flatly on the ground, and the animal readily stands or walks erect; but his favorite attitude is leaning forward, and supporting himself on the knuckles of the hand. The backbone begins to exhibit the curves characteristic of man, and the chimpanzee is alone among anthropoids in having the spine of the second neck vertebra bifurcated as in man. It has one pair of ribs in addition to the twelve possessed by man. There is of course no tail, nor are there any sitting pads or ischial callosities. The volume of the brain is about half the minimum size of a normal human brain. All the *gyri* (ridges) of the human brain are represented in the cerebral hemispheres of the chimpanzee; but they are simpler and more symmetrical, and larger in proportion to the brain.'

The chimpanzee is often kept in confinement in zoölogical gardens. Such specimens have all been caught while young, suffer much from the effects of the northern climate, which is quite unsuited to them, and usually die early from pulmonary disease. They show much intelligence, and readily acquire certain human habits, such as using knife, fork, and spoon in taking food, and so on.

China, chī'n*a*, a country that comprises a vast territory in Asia, extending from lat. 50° to lat. 18° N., and from long. 74° to long. 134° E. It is bounded on the northwest, north, and northeast by Asiatic Russia; on the east by Korea, the Yellow Sea, and the China Sea; and on the south and southwest by the China Sea, French Indo-China, Upper Burma, and the Himalayas. It consists of China Proper (which since 1907 has included Manchuria) and the outlying divisions of Mongolia, Eastern or Chinese Turkestan, and Tibet. The total area is estimated at 4,278,350 square miles, which is considerably greater than that of Europe, and is larger than that of the United States, including Alaska.



The area is approximately divided as follows: China Proper, 1,896,500 square miles (Manchuria, 363,700); Mongolia, 1,367,950 square miles; Chinese Turkestan, 550,580 square miles; Tibet, 463,320 square miles. China Proper lies in the eastern and southeastern part of the republic, and is divided into 21 provinces, including the Manchurian provinces of Feng-tien, Kirin, and Hei-lung-chiang.

Topography.— Greater China is traversed by two immense mountain systems, which have their rise in the plateau of the Pamirs (q.v.), and which throw off numerous chains as they cross the continent: (1) To the northeast and north the Tian-shan (q.v.) system skirts the Mongolian plateau in a series of parallel spurs; (2) south of the Taklamakan and Gobi Deserts extend the lofty ranges of the Kwen-lun or Kuenlun (q.v.) system, divided into numerous parallel chains.

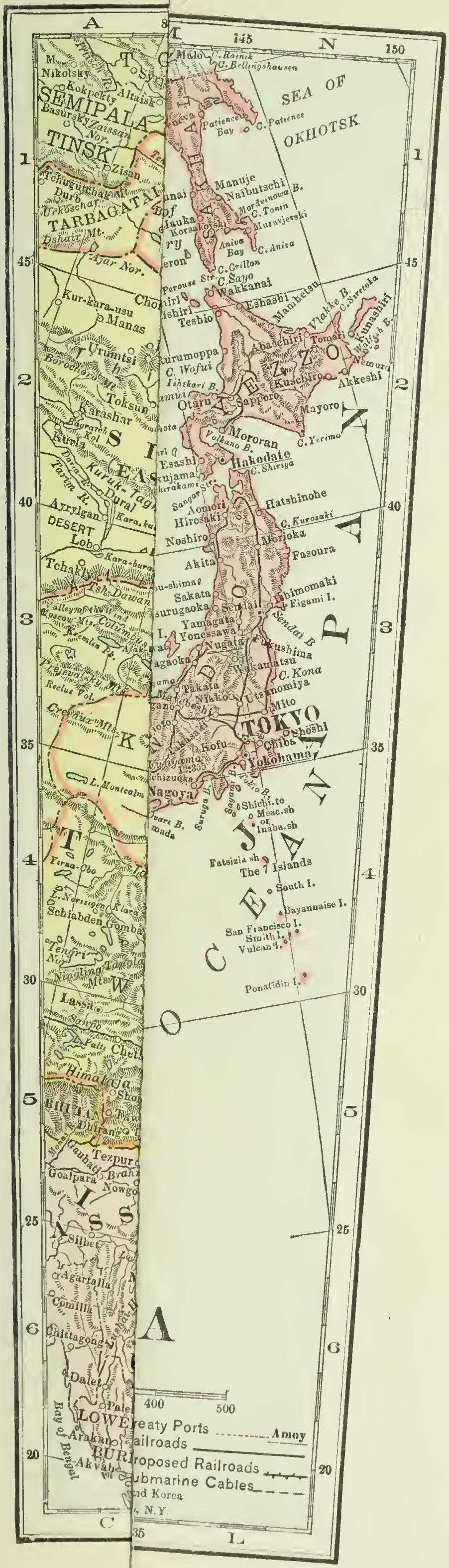
On the northern frontier, outliers from the Tian-Shan range extend northeast to the Khingan Mountains of Manchuria. Some 8° S., the eastern continuation of the Kwen-lun Mountains, known as the Chin-ling-shan and Fu-niu-shan, bisects Shen-si and penetrates far into Ho-nan. Between the two, in West Kan-su, lies a series of massive parallel ranges belonging to the Nan-Shan, a branch of the Kwen-lun. As these advance toward the east they diminish in size, and their outline is hidden under the thick covering of loess, which is the distinctive feature of Northern China.

Two other ranges have their origin in the Tibetan plateau. The one has a north to south direction, and shuts in between snow-capped ridges the head waters of the Salwin, Mekong, Yang-tse-kiang, and Yalung. The other, a wide group of mountains extending from the sources of the Yang-tse-kiang in the Tang-la Mountains, after following a northeasterly direction for some distance, bends more to the east, and includes most of the mountains of Sze-chuen and North Hu-peh. These two ranges, like most Chinese mountains, have no general appellation, and in default of this are named by Von Richthofen the Farther Indian and Chinese systems.

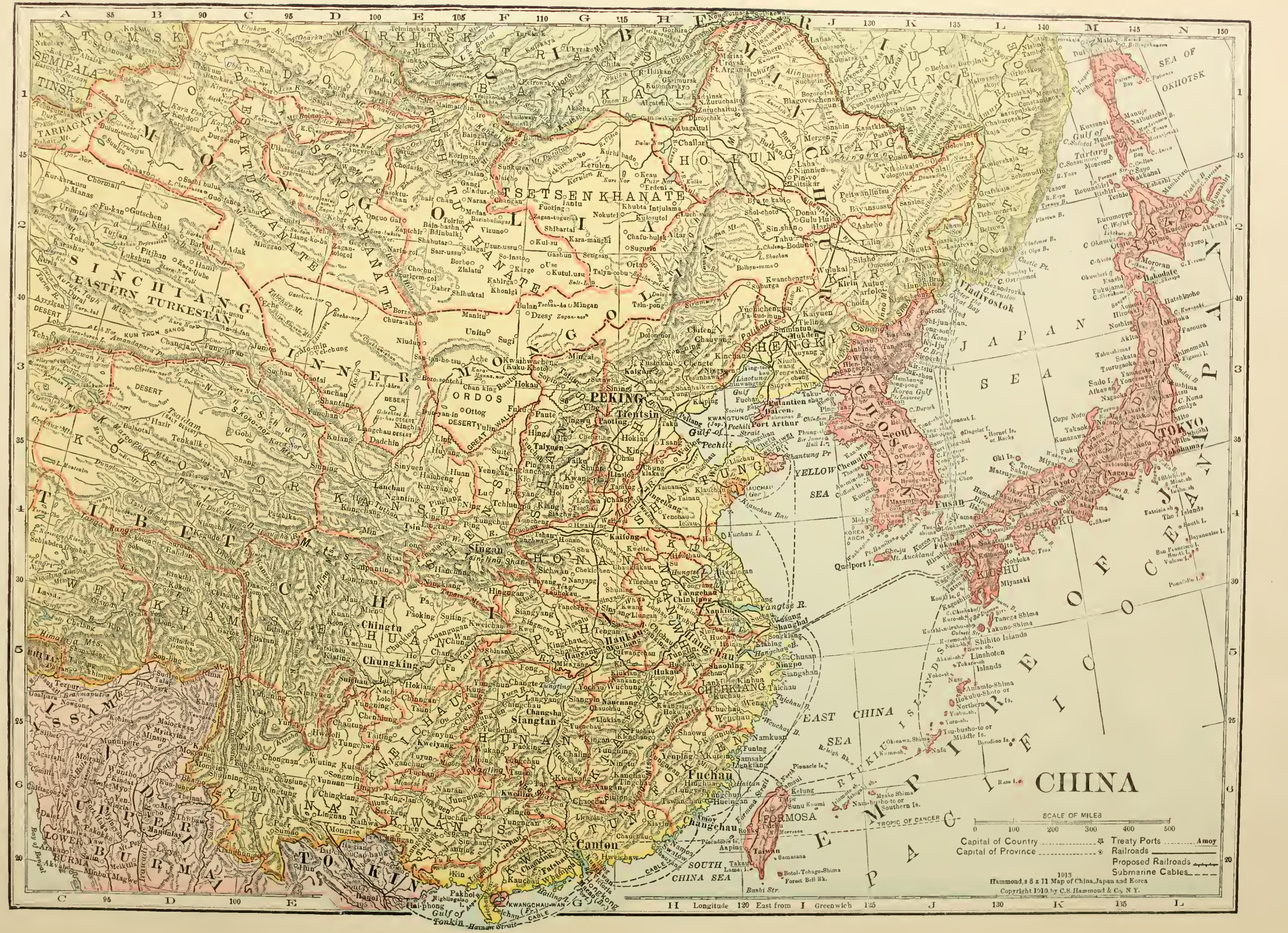
To their southeast lies a large limestone region, covering the whole of Kwei-chou and large parts of Kwang-si, Yün-nan, and Hu-nan. Again, east of this lies a range which is about 400 miles wide, and contains numerous parallel ridges extending from Kwang-tung to the coast south of the Yang-tse-kiang, at the Chu-san Archipelago. The mountains of Shan-tung form an isolated system, in character with the insular nature of the province; while those of Shan-si are offshoots of the Wutai Mountains on the north frontier.

The Chinese extension of the Kwen-lun Mountains, which consists of two or three parallel ranges, precipitous on the north and abrupt on the south side, and in whose whole length there are only four gaps—one of which is artificial, for communication between north and south—marks the division between the loess country of the north, where millions of people dwell in caves, and the southern provinces, where water communication exists in every direction. In climate, as well as in products, the Kwen-lun Mountains form the natural division between Northern and Southern China.

On the whole, the surface of China is mountainous, rugged, and high. The most striking physical feature of the northeastern part, however, is the Great Plain, the joint delta of the Yellow River and the Yang-tse-kiang, which stretches nearly 700 miles from Peking in the north to Hankow in the south. This tract of alluvial soil covers an area of over 200,000 square miles, and comprises the greater part of the provinces of Chih-li, Shan-tung, Ho-nan, An-hui, and Kiang-su. The only other lowlands are the valley of the Yang-



SEA OF OKHOTSK
SEMIPALATINSK
TARBAGATAI
Nikolsky
Kokpekty
Altaisk
Zaissan Nor.
Zisan
Tchuguttchak
Ajar Nor.
Kur-kara-usu
Manas
Urumtsi
Toksun
Karashar
Kurla
Kuruk-Tagh
Dural
Ayrylgan
DESERT
Lob
Kara-buran
Tchaklik
Columbus
Kremlin Pt.
Prejevalsky Mts.
Reclus Vol.
Creduz Mts.
L. Montcalm
Yirna-Obo
L. Norisigen
Schiabden
Gomba
Tengri Nor
Ningling Tang Mts.
Lassa
Sanpo
Palti
Himalaya
BHUTAN
Dhirang
Tezpur
Goalpara
Gauhati
Nowgong
Silhet
Agartalla
Comilla
Chittagong
Dalet
LOWER BURMA
Arakan
Akyab
Bay of Bengal
A
C
Malo
C. Rainik
C. Bellingshausen
Patience Bay
C. Patience
Manuje
Naibutschi
Mordvinowa B.
C. Tonin
Muravjerski
Korsakovski
Aniva Bay
C. Aniva
C. Crillon
Perouse Str.
C. Sayo
Wakkanai
Teshio
Eshashi
Mambetsu
Vlakke B.
C. Siretoka
Kunashiri
Abashiri
Tomari
Walfish B.
Nemuro
YEZO
Kuschiro
Akkeshi
C. Wofui
Ishikari B.
Otaru
Sapporo
Mayoro
C. Yerimo
Mororan
Volkano B.
Hakodate
C. Shiriya
Esashi
Sangar Str.
Aomori
Hirosaki
Hatshinohe
C. Kurosaki
Nosbiro
Morioka
Fasoura
Akita
Sakata
Ishimomaki
Eigami I.
Sendai
Sendai B.
Yamagata
Yonessawa
Nugata
Fukushima
C. Kona
Wakamatsu
Utsunomiya
Takata
Nikko
Mito
TOKYO
Shoshi
Kofu
Chiba
Yokohama
Nagoya
Fujiyama 12,355
Suruga B.
Sagami B.
Tokio B.
Owari B.
Shichi-to
Meac.sh or Inaba.sh
Fatsizia sh
The 7 Islands
South I.
Bayannaise I.
San Francisco I.
Smith I.
Vulcan I.
Ponafidin I.
JAPAN
OCEAN
145
150
N
L
45
40
35
30
25
20
1
2
3
4
5
6
400
500
reaty Ports
Amoy
ailroads
roposed Railroads
ubmarine Cables
nd Korea
, N.Y.


CHINA
SCALE OF MILES
0
100
200
300
400
500
Capital of Country
Capital of Province
Treaty Ports
Amoy
Railroads
Proposed Railroads
Submarine Cables
1913
Hammond,s 8 x 11 Map of China, Japan and Korea
Copyright 1910 by C.S. Hammond & Co, N.Y.
Longitude 120 East from Greenwich
TROPIC OF CANCER
MONGOLIA
INNER MONGOLIA
TSETSEN KHANATE
SINCHIANG
EASTERN TURKESTAN
TIBET
KOKO NOR
MANCHURIA
HEI LUNG KIANG
KIRIN
SHENGKING
CHOSEN
JAPAN
YEZZO
SHIKOKU
KIUSHU
FORMOSA
PEKING
Tientsin
Port Arthur
Dalren
Gulf of Pechili
YELLOW SEA
EAST CHINA SEA
SOUTH CHINA SEA
JAPAN SEA
SEA OF OKHOTSK
PACIFIC OCEAN
Vladivostok
Seoul
TOKYO
Shanghai
Nanking
Hankau
Canton
Hongkong
Fuchau
Chungking
Chingtu
Singan
ORDOS
HONAN
HUNAN
SZECHUAN
KWEICHAU
YUNNAN
KWANGSI
KWANGTUNG
CHEHKIANG
KIANGSI
HUPEH
SHANTUNG
KANSU
SHENSI
SHANSI
CHIHLI
ASSAM
UPPER BURMA
LOWER BURMA
TONKIN
Gulf of Tonkin
Hainan Strait
KWANGCHAU-WAN (Fr.)
RIUKIU ISLANDS
AMUR PROVINCE
COAST PROVINCE
IRKUTSK
TOMSK
SEMIPALATINSK
TARBAGATAI
TRANS BAIKAL

tse-kiang, covering about 20,000 square miles, and the narrow tracts of fertile soil that border the smaller rivers.

Rivers.—The most important rivers of China are the Yang-tse-kiang and its tributaries, the Yellow River, the Canton rivers, the Wei of Ho-nan and Chih-li, the Pei-ho (on account of its approaching Peking), and the rivers which have their mouths at Ning-po, Wen-chou, Fu-chou, Amoy, and Swatow.

The Yang-tse-kiang (q.v.), which is known by various names throughout its course, is the largest waterway of the republic. Rising in the mountains of Tibet, it enters China in Sze-chuen, flows south between Sze-chuen and Yün-nan until it reaches the southern limit of the former province, then turns north and holds its way eastward to the sea. In the first half of its course it falls nearly 16,000 feet in about 1,600 miles, and is throughout that distance enclosed in deep ravines. Then at Ping-shan, in Sze-chuen, it at once becomes the centre of an immense boat traffic, with numerous rivers on either side navigable for great distances. On the banks of these tributaries stand many rich and populous cities, among which are Nanking, An-ching, Kiu-kiang, Hankow, and I-chang. With the exception of the passage through the I-chang gorges, this is the character which the Yang-tse-kiang retains until it reaches the sea. It is navigable for small craft for nearly 2,000 miles of its course; ocean-going vessels penetrate to Hankow, 600 miles from the mouth; and river steamers nearly 400 miles farther. The most important tributaries are the Min and Han, which are navigable for 200 and 600 miles repectively.

The Hwang-ho, or Yellow River (q.v.), rises not far from the source of the Yang-tse, in the plain of Odontala. It pursues a tortuous course eastward to the province of Kan-su, from which it flows north to the highlands of Mongolia, where its course changes to due east. At 111° long. it turns sharply, and for almost 500 miles flows directly south, finally turning eastward again and continuing through the Great Plain to the Gulf of Chih-li. While hardly inferior in size to the Yang-tse, the Hwang-ho is navigable only in parts, owing to the swiftness of the current, the sand banks in the channel, and stretches of mud along the banks. Numerous changes in its course and frequent inundations, causing serious loss of life and destruction of property, have gained for it the name of 'China's Sorrow.' Its only important tributary in China is the Wei-ho.

The Si-kiang (q.v.), or West River, traverses the southern provinces of Yün-nan, Kwei-chau, Kwang-si, and Kwang-tung for 1,250 miles. It is navigable for steamers for over 200 miles, and for small craft for 100 more.

Of the rivers in the outlying dominions the largest is the Amur (q.v.), formed by the confluence of the Shilka and Argun on the Mongolian plateau, and constituting the northern boundary of Manchuria. Others are the Mekong and Salwin (qq.v.), which rise in the Tibetan table land, follow parallel courses for about 900 miles through Chinese territory, and continue through Indo-China and India.

Canals.—In considering the water systems of China, it is impossible to exclude its canals from notice. In the southern section of the delta of the Yang-tse-kiang alone—*i.e.*, within an area of 5,400 square miles, of which 1,200 are occupied by lakes —the total length of the canals has been estimated at 36,000 miles. In the corresponding section on the northern bank of the Yang-tse-kiang, the system of canals is even more perfect, though the mileage is perhaps less, as small canals are not so common. In a less degree, the whole delta of the Yang-tse-kiang below Hankow is intersected by canals. This is repeated in the artificial network of rivers formed by canals, embracing 2,000 square miles near Cheng-tu in Sze-chuen; on a smaller scale it obtains on the coast line of Che-kiang and Fo-kien; and in Kwang-tung it resembles that in the lower Yang-tse-kiang delta. (See also Grand Canal.)

The more important lakes are Tung-ting in Ho-nan, Po-yang in Kiang-si, and Tai-ho, or Great Lake, in Kiang-su.

Mention should be made of the *Great Wall*, a monument of human labor that has stood for 2,100 years. In 214 B.C. Shih-huang-ti determined to erect a grand barrier all along the north of his vast empire, to be a defence against the incursions of the northern tribes. The wall commences at the Shan-hai Pass, and is carried westward to the Kiayu barrier gate. It is about 1,500 miles long, about 25 feet wide at the base and 15 feet wide at the top, and the height varies from 15 to 30 feet. (See Wall, Great, of China.)

The character of the coast of China north and south of the Yang-tse-kiang differs greatly. Except in Shan-tung, there is no port north of the Yang-tse-kiang which a vessel of deep draught can enter. At the new port of Ching-wan-tao (near Shan-hai-kuan) vessels drawing 20 feet can enter. South of the Yang-tse-kiang the coast is lined with islands throughout almost its whole length, but there are not many harbors for large vessels. Nimrod Sound, Sanmun Bay, and Amoy are among the best. For smaller vessels harbors are numerous, and the islands afford many places of shelter.

Climate and Soil.—In Northern China the winter is very severe. Snow falls, but on account of the extreme dryness of the atmosphere does not lie except in the mountains; the rainfall takes place between April and September; and the temperature ranges from over 100° F. to below zero. South of the line of the Kwen-lun Mountains the winter is less severe; but even in Kwang-tung frosts are not unknown, and the cold is much felt on account of the moisture in the air. The rainfall is also mainly in summer, but is heavier and more protracted; December is the only month which is almost free from rain. The summer is longer, but near the coast the thermometer seldom reaches 100° F.

The climatic conditions are largely influenced by the monsoon winds (see Monsoons), the rainfall throughout China being generally coincident with the summer monsoon. In Northern China the annual average rainfall is about 25 inches, increasing to 44 in the valley of the Yang-tse, and to 88 or more in the southeastern provinces. The rainfall decreases toward the interior, and excessive dryness characterizes the table lands of Central Asia and the plains of Mongolia.

Another characteristic feature is the cyclonic storm called the typhoon (q.v.), which is caused by the conflict of southwest and southeast trade winds in the China seas. Typhoons occur regularly every summer along the coast south of the Yang-tse-kiang.

While the greater part of the land is rugged and mountainous, there are large areas of fertile soil, notably in the Great Plain and valleys of Northern China, in the valleys of the Yang-tse-kiang and other rivers farther south, and in the Red Basin of Sze-chuen. The prevailing soil formation in the north is that known as loess (q.v.), a porous yellow earth occurring in deposits which cover thousands of square miles, and sometimes hundreds of feet deep. This soil is extremely fertile, requiring little cultivation; but on account of its porous nature it demands a plentiful water supply. Since its character makes irrigation impossible, seasons of insufficient rainfall lead to failure of the crops and widespread famine. The alluvial soil of the river valleys and lake basins of Central and Southern China is also very fertile, and under the careful cultivation of the Chinese farmer yields abundant crops. These naturally fertile areas are supplemented in many sections by the elaborate terracing of hillsides, which are thus adapted to the growing of rice, cotton, and other products.

Flora and Fauna.—The flora of China is both rich and varied, with a gradual transition from the Manchurian types in the north to those of tropical India in the south. Although extensive forests are rare, except in the outlying districts of Southeastern Tibet, Mongolia, and Manchuria, plants of the arborescent orders are numerous. Of these the bamboo (q.v.) is of prime importance on account of its wide range of usefulness in the everyday life of the Chinese. Evergreens and resinous species, as the pine, fir, camphor tree, and liquidambar, are abundant; maple, ebony, oak, teak, mahogany, birch, and elm are also found.

Nearly every variety of fruit of the temperate zone is cultivated, as well as many subtropical varieties, including the apricot, banana, date, fig, guava, orange, lemon, mango, pomegranate, litchi, loquat, and pomelo. The mulberry tree is grown extensively in the interests of silkworm culture. Cereals, tea, cotton, indigo, opium, hemp, sugar, spices, and tobacco are other products of cultivation. The country abounds in flowering shrubs and beautiful plants, among them the azalea, camellia, gardenia, peony, orchid, chrysanthemum, and rhododendron.

China Proper is too thickly populated and too well cultivated to harbor a great many wild or dangerous animals; but tigers, wild boars, elephants, leopards, and several species of bear, monkeys, and wild deer are found in certain sections, and a number of dangerous reptiles occur in the forests of the south. The number of rodents is large, including hares, rabbits, flying squirrels, rats, and mice. Among domestic animals are the camel, Indian buffalo, cow, zebu, yak, horse, mule, and donkey.

A majority of the well-known birds are represented among the 800 varieties indigenous to the country, the mandarin duck and the gold and silver pheasant being specially worthy of note. Insect life is abundant, and the lakes, rivers, and nearby waters furnish many kinds of fish.

Forestry. — Private ownership of forest lands, the lack of government supervision, and the congested population have all tended to denude the forests, so that except in the provinces between the Yang-tse-kiang and the Si-kiang, and in Yün-nan, few large wooded areas remain in China Proper. Even in these provinces the forests are disappearing. The chief products of the southern forests are poles of fir and pine, reaching an annual value of about $5,000,000. From the mountains these are floated down the rivers to Hankow, Foochau, and other seaports. Timber from Manchuria is shipped through Antung.

Fisheries. — Among the Chinese, fish ranks with rice as a food staple, and fishing constitutes one of their principal occupations. Little has been done, however, toward developing this industry, so that many of the methods in use to-day have been employed from the earliest times. For deep-sea fishing and fishing off the coast, both nets and hooks are used, fishing vessels usually working in pairs or fleets. In the deeper inland tidal waters, stake nets are employed; in the rivers and canals, large and small nets, lines, and weirs. Fishing with the aid of cormorants is a characteristic method in the Yang-tse Valley.

The common edible fish are the perch, mackerel, sturgeon, goby, pomfret, eel, gudgeon, shad, sole, mullet, flounder, herring, carp, bream, and varieties of shellfish. Besides the usual sea products, sharks' fins, bêche-de-mer, cuttlefish, and jellyfish are important food items.

Mining.—The mineral wealth of China is fabulous. The coal fields are enormous, and have hardly been touched; a far greater amount of iron ore remains in the earth than has been extracted during all the centuries; and copper, lead, tin, antimony, zinc, mercury, gold, and silver exist in many places and in varying amounts.

In Chih-li the mountains bordering the plain contain many beds of coal; and in the northeast the mines near the port of Ching-wan-tao have a weekly output of over 17,000 tons. Shansi has an area of about 35,000 square miles of coal-bearing strata, the eastern half of which is anthracite and the western bituminous. The mines, however, are over 400 miles from a seaport. The coal fields of Kan-su are probably not less in extent than those of Shansi. In Shan-tung there are coal mines at Wei-hsien, Po-shan, and I'chou; and German enterprise has already constructed a railroad from Kiao-chou to Wei-hsien and Po-shan.

Of the southern provinces, Honan is rich in coal, iron, and lead. In Hu-peh coal and iron mines have been worked for some years. In Southeast Hu-nan the coal field extends over 20,000 square miles, and the province holds copper, silver, quicksilver, tin, lead, antimony, iron, and gold. Sze-chuen has probably the largest coal area of all, but much of it is unfavorably placed for mining; iron is very generally distributed throughout the province, and copper is abundant; gold is being mined at Ma-ha with foreign mills; brine wells are widely distributed. Kwei-chou has coal, iron, quicksilver, and copper. Yün-nan is reported to be the richest mining province in China, and possesses the most valuable tin and copper mines, besides iron, lead, and silver. Kwang-tung has coal measures and copper; and coal is also found in Fo-kien, Kiang-su, and An-hui (Ngan-hwei).

The daily output of the Peking Syndicate, which owns the Jamiesen collieries at Ching-hua-chen, reached 2,000 tons in 1912. The total coal output is estimated at from 9,000,000 to 13,000,000 tons a year. The Tayeh iron mines in Hu-peh are said to be among the richest in the world, with some 500,000,000 tons of ore exposed on the surface. They are owned and managed by a Chinese company, but are operated under Japanese supervision; their daily maximum output is from 2,000 to 2,200 tons.

Copper is an important medium of currency, and the mining of the ore is under strict government supervision. China is the largest producer of antimony in the world, and furnishes about 5 per cent. of the world's supply of tin. Among non-metallic deposits are kaolin, which forms the basis of the pottery industry, and petroleum and natural gas.

To the present time, poor means of transport and communication, antiquated methods of mining, and the restrictions of the mining regulations have prevented the development of all but a small part of China's mineral resources. These obstacles, however, are gradually being removed. The republican government has drafted new mining regulations, railroad construction is being extended, and foreign capital and foreign machinery are being applied.

Salt is a government monopoly, and its importation from foreign countries is forbidden. The mineral is obtained by the evaporation of sea water along the coast, from a salt lake in Shansi, and from salt wells in Szechuen and Yünan. The annual consumption has been estimated at 1,448,000 tons.

Agriculture.—The Chinese are primarily an agricultural people, cultivation of the soil taking first place among the divisions of labor, and the farmer ranking after the scholar in the four classes of society. All land is in theory the property of the government, being held by private owners on condition of the payment of an annual tax based on the productivity of the soil. In the southerly provinces, less than one-sixth of an acre is considered sufficient to support one person, 2 acres is enough for a family of five, and the holder of 7 or more acres is classed as well to do. In Manchuria, however, 3 acres is the minimum for a family, and farms of from 10 to 30 acres are common. In the other sections of the country the holdings vary in extent between these two.

In no other country in the world is the cultivation of the soil more intensive than in China. Every available foot of space is utilized; great care and painstaking attention to detail are employed; fertilizers are used extensively; elaborate systems of irrigation are resorted to, and rotation of crops is practiced; but the implements used are of the crudest description.

Rice is the staple food of the Chinese, and is raised in every province except Shensi, Shansi, and Chihli. In Manchuria it is grown on dry land; but in central and southern China it is cultivated in fields lying under water, or on terraces with water flowing from one to the other by stages. The largest producing centers are Anhwei, Hunan, and Kiangsi.

In the north, rice is largely replaced by wheat, barley, millet, and maize, and by peas and beans. The soya bean is of special economic importance, ranking high in the list of Chinese exports.

After rice come tea, cotton, and sugar as the chief products of central and southern China. Cotton is also grown in Manchuria and other sections of the north, but is cultivated with the best results in the Yangtse delta, in Chekiang, Honan, and Hupeh. The normal average annual yield is estimated at over 930,000 tons. Hunan, Hupeh, Fukien, Kiangsi, Anhwei, Chekiang, Szechuen, Kwangtung, and Yünnan are the centers of tea production. The tea plants are grown in small patches about the homestead, and the leaves are picked by members of the family, and dried in the sun. Sugar thrives in Kwangtung, Fukien, Yünnan, and Szechuen, but lack of proper methods of cultivation keeps the supply far below the demand.

The mulberry tree, upon which the silkworm feeds, is grown everywhere, and forms the basis of China's extensive silk trade. Formerly the cultivation of the poppy for opium was of prime importance, but under the vigorous anti-opium campaign begun in 1906 (see OPIUM) it was gradually replaced by other crops.

Other products of China include the usual fruits and vegetables of the temperate and subtropical zones, peanuts, tobacco, sesamum, rape, vegetable fibers (abutilon, hemp, jute, and ramie), vegetable wax and tallow, camphor, and various medicinal plants.

Stock Raising in China is limited to those lands unsuitable for agricultural purposes. Cattle and pigs are raised for export, and a considerable trade is carried on in cow and buffalo hides, goat skins, lamb skins, and pigs' bristles.

Manufactures.—The introduction of machinery into China is of recent date; for centuries the country depended on manual labor for the manufacture of silks and embroideries, porcelains, paper, and lacquer ware, and the spinning and weaving of cotton. Since the Chino-Japanese treaty of 1895, however, which conceded to foreigners the right to engage in manufacturing, hundreds of industrial establishments have sprung up in all parts of the republic.

China long led the world in silk production, being second only to Japan. There are large steam filatures in Canton, Shanghai, Hangchow, Suchau, Hankow, Chefoo, Samshui, and Chinchiang; but silk piece goods are still hand woven by the peasantry, the best coming from Kiangsu and Chekiang. The first cotton mill was erected in 1891, and under the impetus of foreign enterprise the number rapidly increased until civil wars and the war with Japan in the 1930s and 1940s disrupted industrial progress. There were modern sugar refineries at Hong Kong, Swatow, and Amoy; large iron and steel works at Hanyang, near Hankow; and hosiery, underwear, flour, rice, and oil mills in many of the larger cities.

Commerce.—While foreign commerce is of comparatively recent development in China, inter-provincial trade was carried on for many years, being greatly facilitated by the country's river systems, its many canals, and the abundance of labor and consequent cheapness of land transportation. By way of the Sikiang, Min, Han, Yangtse, and other rivers, the Grand Canal, and the numerous mountain passes, the products of the interior were brought to the seaports for shipment, foreign goods found their way inland, and vast quantities of food supplies and merchandise were carried from province to province for domestic consumption. Until the middle of the nineteenth century, inland trade was free from taxation; but from that time until 1922 a tax known as *likin* (q. v.), originally imposed to meet the expenses of the Taiping rebellion, was levied. In many instances this had become a heavy burden on inter-provincial routes. Its abolition was agreed upon at the Washington Conference, in February, 1922.

Prior to 1842, the policy of China toward foreign commerce was that of uncompromising hostility. Although the Portuguese had established trade relations through the port of Macao as early as 1537, followed by Spanish, English, Dutch, French, Russians, and Americans, it was not until the ports of Canton, Amoy, Foochau, Ningpo, and Shanghai were thrown open to foreign trade in 1842 that China entered into official commercial relations with the rest of the world. Subsequent agreements increased the number of treaty ports to about 50; while in addition some 35 places in Manchuria, Sinkiang, Mongolia, Shantung, Kiangsu, Kwangtung, Chihli, and Tibet were declared open to international trade.

In spite of the unsettled condition of affairs, and the consequent fluctuations in trade, Chinese commerce showed a steady growth during the first quarter of the century.

Tea, formerly the main staple of China's export trade, has suffered a decided decline through Indian competition, and is now surpassed by silk, which contributes over one-third of the value of the country's exports, and by the soya bean and its products, which have risen to a position of importance in the last few years. Piece goods form the bulk of the import trade, and there is an increasing demand for kerosene oil, machinery, railway and electrical equipment, matches and matchmaking materials, tobacco, and clothing.

Shipping.—China's shipping has been practically limited to the waters of the Far East. The China Merchants' Steamship Company, with a fleet of 31 ships, was the only Chinese steamship company of consequence, though there were a number of smaller companies, and numerous launch services operating on the inland waters.

Transportation and Communication.—Water transportation was supplied by the various navigable rivers and the canals with which China is so well supplied (see the sections on *Rivers* and *Canals* in this article). The great artificial waterway of China is the Grand Canal (q. v.), covering a distance of 850 miles from Hangchow to Tientsin. Like most of China's public works, however, the Canal is in a state of neglect that renders portions of it of little commercial value.

Railroads.—While roads are numerous, they have generally been allowed to fall into disrepair, and land transportation is mainly by rail. In 1876 the first railroad in China, between Woosung and Shanghai, was constructed by foreign enterprise; but it was purchased the following year by the Chinese authorities, and destroyed. In 1886, a short line was built by the Chinese themselves from the Kaiping collieries to the mouth of the Pei-ho, and two years later this was extended to Tientsin. After the war with Japan the policy of undivided Chinese control of the railroads was abandoned, and construction privileges were granted to the various foreign powers. Following the Japanese-Russian War, however, the policy of Chinese control was reasserted; so that many of the roads built since that time, though financed by foreign capital, are under Chinese administration.

In 1911 the imperial government attempted to settle the question of national *versus* provincial control by ordering the surrender of all privately owned trunk lines, whether completed or under construction, to the central government. This edict, which had special reference to the Szechuen-Hupeh and Canton-Hankow Railways, led to open rebellion in Szechuen, and was one of the causes of dissatisfaction which brought about the Revolution of 1911.

Under the Republic railway development has been in two directions: (1) extensive contracts for new construction, and (2) the combining of existing lines into a national system. The latter scheme was undertaken by a group of traffic managers and chief accountants of the various systems known as the Through Traffic Conference, which planned and carried out many features tending to uniformity and standardization.

The railways already open or actually under construction in China fall into three classes: (1) those under government control; (2) foreign concessions; (3) private and provincial lines.

The government lines included: the Peking-Mukden Railway, 805 miles; Peking-Hankow Railway, 814 miles; Peking-Suiyuan Railway, 392 miles completed, 92 miles under construction; Tientsin-Pukow (Nanking) Railway, opened to traffic in 1912, 687½ miles; Canton-Hankow Railway, 700 miles; Amoy Railway, between Amoy and Chang-chou-fu, 18 miles; Taokow-Chinghau Railway, 94 miles; Shanghai-Nanking Railway, 203 miles; Canton-Kowloon Railway, 112 miles; Lung-Hai Railway, 365 miles open, 190 miles under construction; the Shan-si Railways, 151 miles open; the Kirin-Changchun Railway, a Chinese branch of the South Manchuria line, 80 miles; Shanghai-Hangchow-Ningpo Railway, 180 miles; Canton-Samshui Railway, 32 miles.

Of the foreign concessions, the Chinese Eastern Railway (1,073 miles) was under Russian control; the South Manchuria Railway (680 miles) was surrendered to Japan at the close of the Japanese-Russian War; the Shantung Railway (310 miles), formerly German, reverted to Chinese control Jan. 1, 1923; the Yün-nan Railway (289 miles) is French.

The private and provincial lines were: Tsitsi-har Light Railway, a branch of the Chinese Eastern, 17 miles; Kiang-si Railway, completed from Kiu-kiang to Nan-chang-fu, 86 miles; Canton-Hankow Railway, 140 miles open, 69 under construction; the Swatow Railway, 27 miles; and the Su-ning Railway, 63½ miles.

In spite of civil warfare and the conflict with Japan (1937–45), China has made some progress in road construction. There were 78,580 miles of highway in 1943. The famous Burma road, 700 miles long, fell into the hands of the Japanese but was badly damaged before the end of the war restored it to China. A railway and motor road connect Nationalist territory with French Indo-China. According to the 1945 treaty between China and Russia, the trunk line of the Chinese Eastern Railway and the South Manchuria Railway were merged into one line known as the Chinese Changchun Railway which is to be jointly owned and operated by China and Russia for a period of 30 years after which the line will revert to China without compensation.

The Chinese telegraph system was begun by the opening of a line between Shanghai and Tientsin in 1881. The telegraph service in China has been fairly well developed. In 1943 there were 59,275 miles of line. Wireless telegraph stations have been installed in many places. The principal cities have telephone service, and in 1943 there were 41,384 miles of line in the country. The telephone has made but little headway; the few lines in existence being owned and operated by the government as part of the telegraph system.

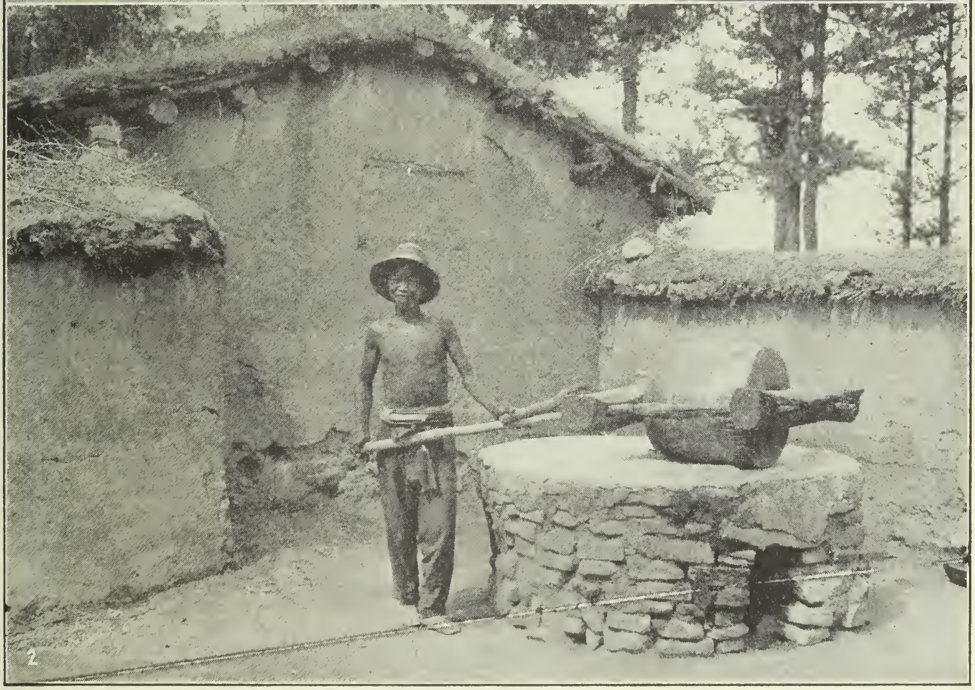
The Chinese Post Office was created by imperial edict in 1896. The number of post offices of all kinds in 1943 was 70,650, and the length of mail routes was 370,461 miles.

Population.—The taking of a census according to Western methods has never been attempted in China, and estimates of the population vary widely. These estimates are usually founded on an enumeration of the families, multiplied by the average number in a household. In 1919 the organization of the Chinese Post Office was used to secure an estimate of the population of China and its Outer Territories.

In China proper the population is largely concentrated in the fertile valleys of the Hoangho and Yangtse Kiang. The most populous provinces are Kiangsu, with 875 inhabitants to the square mile, Che-kiang with 600, and Shantung, with 550. In the border provinces of Kansu and Yünnan, and in Manchuria, the average number of inhabitants to the square mile is well below 100, while in Chinese Turkestan it is but 4, and in Mongolia 2.

Congestion in the great centers, lack of sanitation and hygiene, epidemics, famines, and floods combine to make China's death rate high. Much emigration has taken place, especially from the maritime provinces of Fukien and Kwangtung, and the number of Chinese in other countries is estimated at 8,717,416 (1942). Over 60 races or tribes are represented in the Republic and its dependencies, comprising Chinese, Manchus, Mongols, Tibetans, and many smaller aboriginal and quasi-aboriginal peoples.

The foreign population was estimated, in 1931, at 370,393, including Japanese (260,621), Russians (66,479), British (13,344), Americans (8,637), French (8,651), Germans (3,444), Portuguese (2,368), and smaller



© *1. by Ewing Galloway; 2. by E. M. Newman, from Publishers Photo Service*

China: Rural Life

1. Ploughing in the Rice Fields. 2. Chinese Farmer Grinding Corn in the Ancient Fashion, still used in China.

numbers from other European countries.

The Chinese population of the principal treaty ports in 1936 was as follows: Peiping, 1,556,364; Tientsin, 1,292,025; Chungking, 635,000; Changsha, 606,972; Hankow, 777,993; Chinkiang, 199,776; Shanghai, 3,489,098; Soochow, 260,000; Hangchow, 506,930; Ningpo, 218,774; Wenchow, 631,276; Foochow, 322,725; Amoy, 234,159; Canton, 861,024. The population of Nanking, now the capital, was 1,019,148.

Area and Population of China

PROVINCE	AREA IN SQ. MILES	POPULATION 1936	CAPITAL OF PROVINCE
Anhwei	51,888	23,265,368	Anking
Chahar	107,677	2,035,957	Kalgan
Chekiang	39,780	21,230,749	Hangchow
Chinghai	269,117	1,196,054	Sining
Fukien	61,259	11,755,625	Foochow
Honan	66,676	34,289,848	Kaifeng
Hopeh	59,341	28,644,437	Peiping
Hunan	105,467	28,293,735	Changsha
Hupeh	80,169	25,541,636	Wuchang
Kansu	145,930	6,705,446	Lanchow
Kiangsi	77,281	15,820,403	Nanchang
Kiangsu	41,818	36,469,321	Nanking
Kwangsi	83,985	13,385,215	Nanning
Kwangtung	83,918	32,289,805	Canton
Kweichow	69,278	9,043,207	Kweiyang
Ningsia	106,115	1,023,143	Ningsia
Shansi	60,491	11,601,026	Taiyuanfu
Shantung	69,198	38,029,294	Tsinan
Shensi	72,334	9,717,881	Sian
Sikang	143,457	968,187	Tatsienlu
Sinkiang	705,769	4,860,020	Tihwa
Suiyuan	112,493	2,083,693	Kweihwa-Suiyuan
Szechwan	166,485	52,963,269	Chengtu
Yunnan]	123,539	11,994,549	Yunnanfu
Total China Proper	2,903,475	422,707,868	

Religion.—The religion of China as a whole is based upon nature worship, the belief that the entire universe is animated by good and evil spirits, and upon ancestor worship, the great national duty, about which all later faiths are built. Especially is this true of Confucianism; but even among the adherents of Taoism and Buddhism, the ancestral spirits are as faithfully worshipped as the numerous deities recognized by these other cults.

In *Confucianism* the nation has a philosophy based on the teachings of 'the Master,' Confucius (q. v.), which upholds the conduct of the patriarchs as a model, and defines the duties of men toward one another and of man toward himself, but which does not enter into speculations as regards the unknown. Its teachings find essential expression in its insistence upon the five constant virtues of benevolence, righteousness, propriety, wisdom, and sincerity, and in its definition of the duties of the five relationships of prince and minister, husband and wife, father and son, brother and brother, friend and friend.

In actual practice, Confucianism is coupled with a system of nature worship in which the chief deities are Heaven and Earth, the sun, moon, stars, clouds, and other natural forces. The spirits of dead heroes are also worshipped, and sacrifices are made before the tablet of the founder. While the ideals of Confucianism exert an important influence in the lives of all the people, its official ceremonies are limited to the upper classes.

Taoism was probably founded by the native philosopher Laotse (q. v.) in the sixth century B.C. Theoretically, it teaches the attainment of supreme happiness through conformation with the *Tao*, or order of the universe. Actually, it is a debased ritual catering to the superstitions of the people. It recognizes the deities of Confucianism, to which it adds many more, including certain diseases, parts of the body, numerous animals, and objects in nature. With the worship of these it combines the exorcism of evil spirits.

Buddhism (q. v.) was introduced into China in the first century A.D. It has undergone various modifications, and to-day closely resembles Taoism, many of whose deities it has adopted. Its chief power in China lies in its teachings concerning a future life. It reached Tibet in the seventh century, and that country is now the center of the Buddhist world.

Mohammedanism and Christianity have also considerable strength in China. Mohammedanism reached that country in the seventh century where it underwent modifications. The number of its adherents is now estimated at 10,000,000 to 15,000,000, chiefly in Kansu, Shensi, Shansi, Sinkiang, and Yünnan. Christianity was probably introduced as early as A.D. 635 by the Nestorians, but their influence seems to have disappeared by the end of the sixteenth century. Roman Catholic missionaries first reached the country in the latter part of the thirteenth century, and since the middle of the sixteenth their work has never been totally interrupted. Protestant missions date from 1807, when Robert Morrison reached Canton; and since the Treaty of Nanking (1842) their growth has been remarkable.

Under the empire, Confucianism was the state religion, the emperor officiating at the annual sacrifices to Heaven and Earth. His deputies also presided at the sacrifices to the lesser deities throughout the country. Buddhism and Taoism were also under imperial control, though their internal organization was not interfered with. Mohammedanism was practiced under state recognition, and religious freedom was extended to Christians in various foreign treaties from 1842 to 1903.

The constitution of the Republic, adopted in 1923, extends religious liberty to all. After much discussion, Confucianism was adopted as the state religion in 1914, and at the winter solstice President Yuan Shih-kai, clad in ceremonial robes, worshipped Heaven in the Imperial Temple as the emperors had done before him.

Education.—For centuries education in China, though held in great respect, was to a large extent the monopoly of a special literary class. It was not compulsory and, with the exception of colleges in the large cities, no means of instruction was provided by the state. Such elementary schools as existed were maintained by the people themselves, and the curriculum was limited to the memorizing of the Chinese classics and easy composition. Higher education was also based on the classics, and was conducted with the aim of preparing the student for the competitive examinations for admission to public office.

The *Competitive System* was formerly organized in three principal gradations—the provincial, the metropolitan, and the palace examinations. The students of each province who attained at the district examinations to the style of *Siutsai*, or 'men of talent,' assembled at the provincial capital, where special examiners from Peking conducted the examination for the degree of *Chü (Kü)-jen,* or 'men for promotion,' which perhaps three in a thousand of them might obtain, and which entitled them to some minor appointments. To take the third degree of *Chin shih,* or 'men to be presented to the emperor,' the successful *Chü-jen* from all the provinces must proceed to the metropolis, perhaps about six thousand in all, and there pass a test examination, the successful candidates then went in for the *palace examination.* They and a proportion of the others were admitted to the ranks of the members of the Han-lin, the 'Forest of Pencils,' or 'Grand Academy of Literature.' The remainder received appointments in the provinces or at the capital, according as vacancies occurred. The subjects of examination were taken exclusively from the literature of the country itself.

The first education on Western lines was given by the Christian missionaries, who still carry on much of the best educational work in the Republic. In 1902, after the Boxer rising, the old system was reformed, and in 1906, after the Russo-Japanese War, a new system was inaugurated by imperial edict, in which the curriculum was largely based on the Japanese. Special schools were established—technical, agricultural, normal, language, etc.; thousands of temples were converted to educational purposes; and the old-style examination halls were pulled down, and colleges built on the sites.

The educational facilities still remained inadequate, however. In Chihli, probably in advance of any other province, there was in 1909 one person in 200, or about one in 40 of the children of school age, in government schools; in Szechuen there was one in 55 children. Many Chinese students proceed to Japan, America, and Europe to study; and the government employed the money returned by the U. S. Government from the Boxer indemnity to send students to the United States.

The Revolution of 1911 disorganized existing educational methods, and one of the first problems of the new Republic was to secure a sound educational system for the entire country. The program adopted was essentially as follows:

Provision is made for courses of education covering in all 17 years, as follows: a compulsory primary course of 4 years; 3 years in the higher primary schools; 4 years in the middle schools; 3 years in the preparatory schools; and 3 years in college or one of the professional schools. Technical, industrial, and normal schools are also provided. Every city, town, and village is required to establish primary schools, and every city higher primary schools. These, with the middle schools, are under the control of the provinces in which they are located; schools above that grade under the Ministry of Education. Features of the plan are the emphasis placed on primary schools, the education of girls, the introduction of manual training and the teaching of hygiene, the observance of Sunday as a school holiday, and compulsory education.

In 1921 the seventh National Educational Congress, meeting in Canton, passed a resolution proposing a further reform of the educational system and offering a new and more elastic program to meet the changing social conditions.

Figures are conflicting, but the latest available official reports (1945) put the total number of schools in China at 258,283 with 17,721,103 pupils. There are 58 government universities, including the National University at Peking (q. v.), and several higher normal schools. Other schools for higher education are the University of Communications, under the Ministry of Communications; the Peking Union Medical College, founded in 1906, and now (since 1915) supported by the China Medical Board of the Rockefeller Foundation; the University of Hong Kong founded by Sir Frederick Lugard and H. N. Mody and endowed by means of contributions from all parts of the world; Tsing Hua College, for the preparation of students for study in American colleges; and numerous mission schools of collegiate rank, of which the Canton Christian College is perhaps the best known.

An important factor in the development of education is the native press, which has grown with remarkable rapidity in recent years. The first newspaper in Chinese was published in 1870 at Shanghai, under the title Shen Poa, or Shanghai News. There are now many daily, weekly, and monthly journals in China; Chinese newspapers are published in Shanghai, Tientsin and Peking. The Chinese press, however, with certain notable exceptions, is quite unreliable.

Army.—Previous to the Revolution of 1911, measures had been on foot for some time to reorganize the Chinese army in accordance with the plan drawn up by Yuan Shih-kai in 1895. In January 1905, a plan of gradual and progressive organization was laid down by imperial decree. To replace the various and mostly antiquated forces of which the army had hitherto been composed, efforts were made to create a national army on modern lines. Recruitment was generally voluntary, though a modified form of conscription was enforced in certain provinces. The constitution provides for three years with the active army, six years for regular service, and extended service to age of 40.

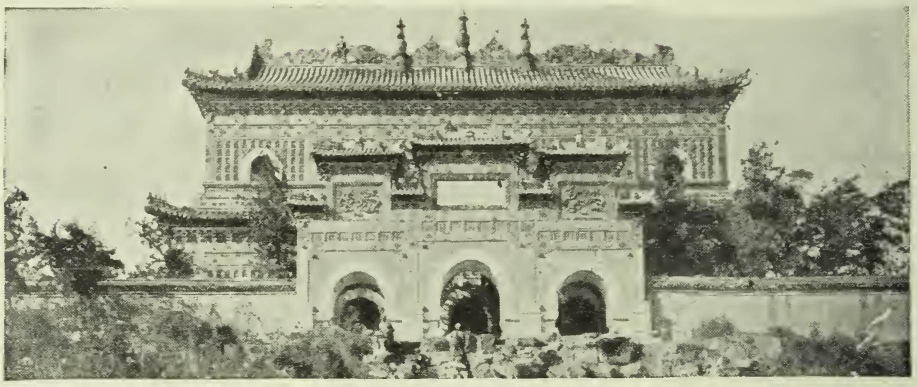
An edict of 1907 reorganized the Green Flag or local troops, placing them under the control of the Minister for War, and forming them into battalions and squadrons. Their duties in peace time were to be as before—the preservation of order; in time of war they were to pass under the command of regular officers, but were not to be employed beyond the limits of their own provinces. In general, the provincial troops are under the orders of the military governors, and are paid out of the provincial revenues. Estimates of the total number of Chinese local troops under arms vary between 500,000 and 1,000,000.

Steps have been taken toward the gradual reorganization of military instructions, and the government has been establishing schools in connection with the different arsenals and military establishments.

Navy.—The Chinese navy is unimportant. A number of Chinese junior naval officers have been trained in the British Navy. There are no naval bases of any importance. In 1946 the nucleus of a new fleet was established with a cruiser, five destroyers, two submarines, a corvette, four submarine chasers, and eight motor launches which were acquired from the British and United States navies. There are also some small cruisers and river gunboats. The naval forces are controlled by the Ministry of the Navy, though a number of the older ships are still under provincial orders.

Government.—Since February 12, 1912, China has been a republic in form. Under the constitution, proclaimed October 10, 1923, the executive power was vested in a president, holding office for 5 years and eligible for re-election; he was assisted by a cabinet of 10 members, the premier, and ministers of the interior, foreign affairs, agriculture and commerce, education, communications, war, navy, justice, and finance. Legislative power was vested in a parliament comprised of a Senate and a House of Representatives. For local administration the country was divided into provinces and districts. The civil governor was the chief civil authority in each province and the district magistrate was the chief authority in each district.

The National Government of China, now seated at Nanking, is composed of the National Government Council, known also as the State Council, the chairman of which is known as the President of the National Government and fills the position of Head of State. In the strict political sense, however, the National Government means the five Yuan (Councils) under the National Government Council—Executive, Legislative, Judicial, Examination and Supervisory. The Executive Council is the highest executive organ. It establishes ministries and appoints commissions. It is analagous to the Cabinet in Western Countries, its chairman serving practically as prime minister.



Ming Tombs, Nanking, China

Finance.—China's financial standing has been frequently imperilled by the country's internal dissensions and by war. Before July 7, 1937, when the war with Japan began, the amount of foreign loans secured on customs, salt, and national treasury revenues totaled 59,059,200 pounds sterling, $30,400,000, 3,300,000 yen, and 1,340,000 Chinese dollars. During the period of hostilities (1937–1945) the National Government raised 12 foreign loans amounting to $870,000,000, besides a number of domestic loan flotations. Foreign loans included one from the United States of $500,000,000 Feb. 1, 1942. In 1944 a new Allied Victory Loan of 5,000,000,000 Chinese dollars, was floated.

Banking in China was formerly subject to no further regulation than any other business, and as a result there were innumerable banks, many of them with small capital. Among the principal Chinese banking institutions are the Central Bank of China, opened in 1928, under control of the Ministry of Finance. It has the right to issue bank notes, to mint and issue coins, to serve as the National Treasury, and to direct the flotation of national loans and treasury notes. Its capital in 1934 was $100,000,000. It has 190 branches in the country and abroad. The Bank of Communications is especially devoted to the development of the industries of the country. It has 102 branches. The Farmers' Bank of China has a monopoly of extending farm loans and assisting rural finance. The Postal Savings and Remittance Bank is mainly a savings bank.

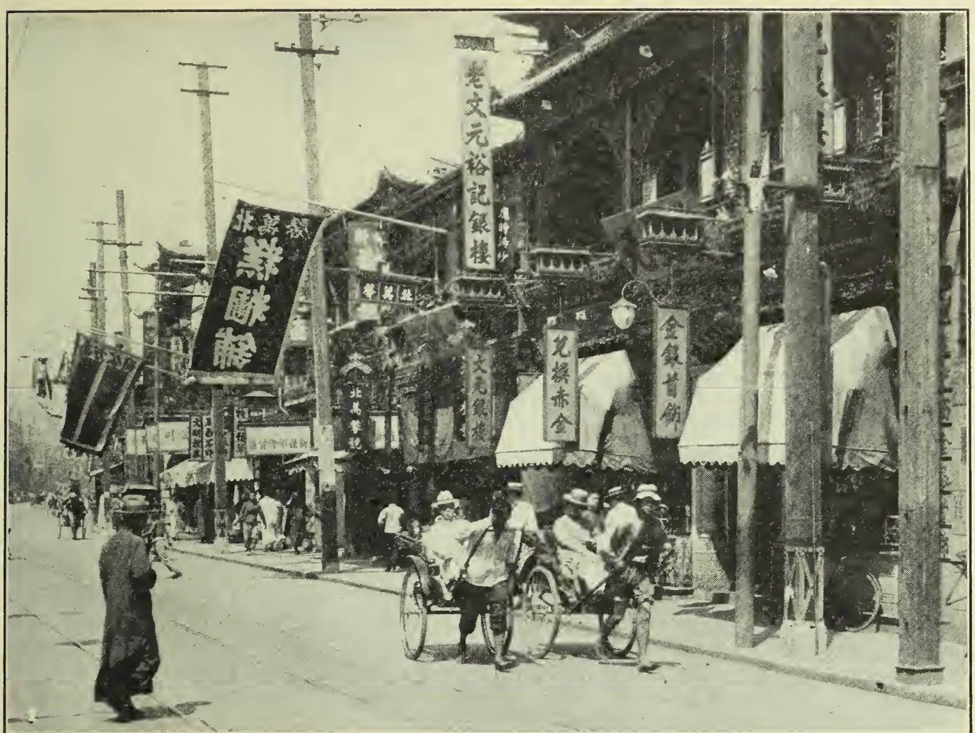
The *Currency* of China is in confusion, owing to the absence of gold coin and the lack of an absolute standard. It consists of taels, dollars, copper cash, and bank notes. The tael, a weight of silver, varies in different parts of the country. The haik-wan or customs tael fluctuates from $.70 to $.80 in value. Theoretically, the tael is subdivided decimally, 1 tael being equal to 10 *mace*, 1 mace to 10 *candareens*, and 1 candareen to 10 *cash*. The actual currency in use among the people is copper cash, cumbrous, often debased, and varying in relative value in every district. Imported Mexican, Spanish, and British dollars and subsidiary silver coins, and copper cents issued by the provincial mints, were largely used; but even silver coins were treated as bullion, and estimated by weight.

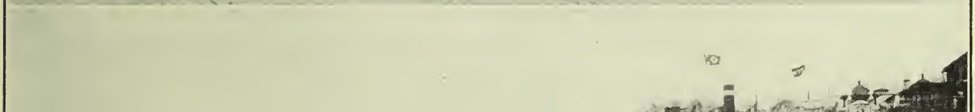
Currency reform is a pressing need of China but owing to unsettled conditions little has been accomplished. The yuan or Chinese dollar was made legal tender Nov. 3, 1935. On July 10, 1942 the rate of exchange was fixed at .05 U. S. dollar. This new dollar is 880/1000 fine and has a gross weight of 26.6971 grammes, with a fine silver content of 23.493448 grammes. It is minted in Shanghai by the National Government.

History.—It is not possible to state precisely from whence or at what date the Chinese entered China. But there seems little reason to doubt that they came from the west of Asia and early settled in the northwest of China, where they had already attained to a respectable degree of civilization before 2200 B.C., and were even then a considerable nation. Spreading along the valley of the Yellow River, they soon reached to the sea, and overflowed into the Yangtse valley. By the sixth century B.C. they had acquired an influence beyond that river, and in the seventh century A.D. the southern provinces were included in the empire.

The earliest reliable historical account is that compiled by Sz-ma Ts'ien in the first century B.C. In the eighth century A.D., a descendant of that historian, Sz-ma Chêng, published, in the form of a preface to his ancestor's history, a narrative professing to go back to the earliest conceivable period; but this must be dismissed as fiction. According to Chinese tradition, which can not be wholly separated from history, the earliest dynasty was that of the 'Five Monarchs,' ruling from the 29th to the 20th century B.C. These were successively followed by the Hia (2205–1766 B.C.), Shang (1766–1122 B.C.), and Chou (1122–249 B.C.) dynasties, of whom only the last is truly historical. Twenty-five of the Chou monarchs are stated to have reigned from 827 B.C. to 249 B.C., and these are recognized as historical by Sz-ma Ts'ien. His views are, moreover, corroborated by certain 'bamboo books' which were found (A.D. 284) in the grave of a North China feudatory who had lived in the fourth century B.C.

It is only with the Chou dynasty, therefore, that we begin to get in some degree on the solid ground of fact. There were seventeen generations from the 'Western Earl,' who effectively founded this dynasty, back to his ancestor who lived at one time





Photos from Ewing Galloway. (1. by Burton Holmes)

CHINA: CITY SCENES

1. The Nanking Road, Shanghai. 2. Houseboats at Canton. Thousands of Chinese spend their lives on these little boats crowded along the river front. In the background are the fine buildings on the Bund.

with the first of the legendary Hia emperors, Yü. The ancestors of the Chou dynasty had their capitals on the two headwaters of the Wei River of Shen-si, and appear to have been an unwarlike western tribe, probably of mixed Tartar-Tibetan stock. It seems clear that when the Western Earl's son Wu-wang was implored by the overtaxed and oppressed people to rescue China (B.C. 1122), the Tibetan and other tribes occupied the whole region west of long. 111° and south of the Yang-tse-kiang. The fifth emperor, Muh-wang, is said to have travelled in B.C. 977–975 all over Turkestan, and in A.D. 284 a copy of his Memoirs, supposed to date from B.C. 300, was found in the same grave as the bamboo records.

The first year of Kung-ho (*viz.* B.C. 842) is the year the historian Sz-ma Ts'ien selected as the earliest genuine date that can be relied on in old Chinese history. We now come to the Ch'un-ts-iu period (723–481)—*i.e.*, to the two hundred and forty years comprised in Confucius' history, during which the powers, great and small, alternately fought, intrigued, favored, or bullied the emperor. Confucius' history, being the first attempt to record political facts, seemed a marvellous achievement to the Chinese of his day, and no doubt it was very far ahead of the bare local genealogies. Mencius, a century later, mentions two such local histories; that of Ts'in (Shen-si) alone survives. Between 481 and 221, when Ts'in became sole master, a period called 'Fighting States' intervened. In B.C. 441 the imperial house became divided into East and West. Ts'in Shï-hwang (*i.e.*, Ts'in's first emperor) was a man of extraordinary force of character. Having mastered China, he set himself to abolish the mediatized kingdoms in favor of governorships. The 'Six Powers' (modern Chi-li was the sixth) were annihilated, China was divided into thirty-six provinces, and the people were for the first time given a national designation as 'Black Heads.' A new and uniform style of writing was introduced with the pencil brush, and the year was moved forward two months. As Chi-li, Shan-tung, and the Yang-tse are described as 'distant states,' it is evident that Old China remained practically as before. Weights, measures, laws, and axle ruts were everywhere equalized—the last a by no means unimportant innovation in a country where narrow roads cut through the soft loess soil.

During the 'Fighting States' period philosophy and casuistry had been very active. Taoism was simply 'truth,' and a general Platonic attitude toward the vicissitudes of life. Socialism was developed by the followers of Mêh Tih or Mêh-tse (Mengtse). The first emperor (Che Hwang-te) grew irritated when the various schools began to 'pass resolutions' and criticise his energetic system. This irritation culminated in an order by edict (B.C. 213) to destroy all copies of the *Shu* and *Shï* except those filed at the imperial university; all 'philosophy,' of no matter what school; all annals except those of Ts'in; and, in short, all literature, except such useful treatises as agricultural, medical, and astrological works.

The civil war between the two generals Hiang Yü, the son of Che Hwang-te, and Liu Pang, which ended in the triumph of the latter (B.C. 202) and in the founding of the Han dynasty, is one of the most interesting episodes in any history, and is, besides, enlivened by poetry and pathos of the first order. The history of the earlier Han emperors embraces the wars with the Hiung-nu, and the diplomatic conquest of Canton (B.C. 200–140); the conquest of Che-kiang, Fo-kien, and Sze-chuen (138–130); the final conquest of the Ordos desert (127–125); of Kan-su—what Marco Polo calls 'Erguiul, Campichu, Sacchiu, and Succiur' (115–111); the annexation of the Two-kwang, Kwei-chou, and parts of Yün-nan (111–109); and the subjugation of the northern half of Korea. The Hiung-nu wars resulted indirectly in bringing the Chinese into close contact with Turkestan and the Pamirs—for the Eptals (Yue-chi, Ephthalites?) had been driven from Kan-su, first to modern Ili, and then to the Jaxartes and the Oxus; later, in B.C. 56, they led to the establishment of a governor-general for the far west; and ultimately to the discovery of Parthia, Mesopotamia, Syria, and, in a vague way, of the Roman empire.

From A.D. 220 to about 265 China was split up into three empires—a branch of the old Liu family of Han in Sze-chuen (Shuh), the Sun family south of the Yang-tse-kiang (Wu), and the usurping Ts'ao family in the north (Wei). The continuity of imperial history is now broken; for the southern dynasty had nothing to do with the long struggles between Tunguses, Hiung-nu and Tibetans in the north; while the northern dynasty lost all touch with the Syrians, Hindus, Javans, and other mercantile peoples coming in trading vessels to Canton and to other marts on the Chinese coast. In A.D. 222 the emperor of Wu divided the old realm of Kiao-chï (S. Yüeh) into two manageable halves. The name of Kwang-chou was given to what is now the double Canton province, and Tong-king was called Kiao-chou.

From A.D. 265 the Sz-ma family were for a time nominally sole rulers of China, under the style of the Tsin dynasty. Then a succession of short Tartar dynasties kept the whole of the extreme north in continual ferment. One curious and permanent result of all this was that the Chinese centre of gravity was entirely changed. The rough nomads who swarmed into Northern China not only mixed their blood with that of the Chinese, but debased the language, which in its purer forms moved with the fugitive natives into the semi-civilized regions south of the Yang-tse-kiang. At last a Tungusic family called Toba dispossessed all the other Tartar competitors, and for two hundred years ruled Northern China with great vigor, while the pure Chinese governed the southern half. Finally, Yang Kien, an energetic general in the service of the short-lived Chou dynasty, succeeded (590) in unifying China once more under one sceptre by founding the Sui dynasty (590–618).

During the two hundred years that the Toba Tunguses of Northern China had been in control, another nomadic power, called the Jeujen (Gibbon's Geougen), had become formidable in the desert region, and had also succeeded in subduing most of the Hiung-nu remnants in Southern Siberia and elsewhere. As the power of Tobas declined, the 'Turks,' a subject horde of the Hiung-nu, found an opportunity to measure their strength with the Jeujen. Not only did they destroy this nomad power and take its place, but they began to domineer over the last two Tungusic dynasties of North China and to demand marriage alliances. The Sui dynasty succeeded in repelling the pretensions of the Turks, and also overran Korea as a punishment for her friendliness to these usurpers. This attempted conquest of Korea brought a mission in A.D. 608 from Japan, which now for the first time took the name of Ji-pān, or 'Sun's-rise,' and claimed an imperial status. Likewise, closer relations were formed with Annam, and Chinese envoys were dispatched to 'Red Earth State,' probably modern Siam.

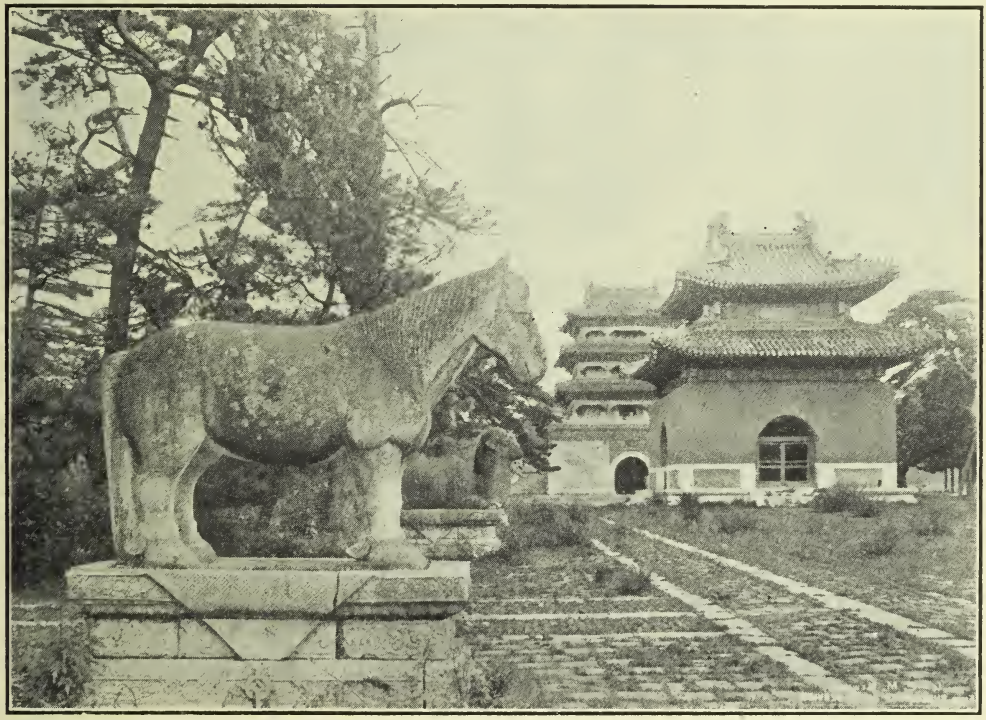
The great T'ang dynasty (618–907) ranks with the Han as one of the two mightiest of Chinese history. Li Shï-min, the real founder, son of the nominal founder Li Yüan, so conquered the Turks and Tunguses that for half a century they were under direct Chinese rule from

Korea to the frontiers of Persia, and for the first time Korea was effectively subdued. During the reigns of his successors, the Turkish power, after a period of revival, was finally broken, and passed into the hands of a kindred race, the Uigurs. The Tibetan *gialbos* of Lhassa also first became a power contemporaneously with the T'ang dynasty. A third great power, which seems to have been practically Siamese, contested supremacy with the Tibetans in the Yün-nan-Sze-chuen region, and we find both Uigurs and the subjects of the Abbaside caliphs taking part with the Chinese in these struggles around and about the upper Yang-tse-kiang. During the T'ang dynasty an able Korean general carried the Chinese arms into the region of Kashmir and Balti, and Nepal is heard of for the first time. From A.D. 940 to 1789 Annam was ruled by native dynasties tributary to China, but after many attempts at independence, in 1886 it came under French control. The T'ang power finally collapsed in 907, and for some fifty years a series of short dynasties held sway.

The Kitans (whence Cathay, the name by which China was known to mediæval Europe) formed a powerful empire (with the capital for the first time at modern Peking) which lasted for two hundred years (915–1115). They were replaced by their eastern subjects, the Nüchêns, who were in turn overthrown by the Mongols. Roughly speaking, both Kitans and Nüchêns ruled only over Old China—*i.e.*, the four provinces of Chi-li, Shan-si, Shangtung, and part of Ho-nan—and over what we now call Mongolia and Manchuria; Turkestan and Tibet lay entirely outside their spheres, and a semi-Tibetan semi-Toba state, called Hia (Marco Polo's Tangut), formed, in the region of Ordos and the Yellow River loop, a barrier (895–1237) between them and the west. During all this time the Sung dynasty, with capitals at various towns in the modern province of Ho-nan, and finally at Nanking and Hang-chou, had a complete monopoly of southern affairs and the ocean trade; while Korea, Hia, and the Uigurs kept up a trimming policy, first with one, then with the other, often with both, of the Chinese powers.

At the beginning of the thirteenth century arose the mighty Mongol Jenghiz Khan (q. v.). He and his successors, especially Kublai Khan, made short work not only of both the Chinas, but also of all their tributary states. Korea was made a subservient dependency, and Mongol influence was extended as far south as Burma, Annam and Yün-nan. Russia was annexed, and Hungary was ravaged. But the Mongols soon became quarrelsome and degenerate after Kublai's death.

A young bonze, or Buddhist priest, named Chu Yuan-chang, founder of the Ming dynasty (1368–1644), raised a patriotic force of 'Boxers,' and drove (1368) the Mongols back to their pristine deserts. He speedily established friendly relations with Korea, and united all of the 'Eighteen Provinces' once more under a native Chinese dynasty. Never was there such marine activity in China as during the first reigns of the Ming dynasty. Chinese junks went as far as the Arabian and African coasts; the Red Sea was first heard of; and tribute was for some time regularly sent from Arabia, Malabar, Ceylon, Sumatra, the Malay states, Siam, Java, Sulu, Liu-kiu, and Borneo. Towards the end of the 16th century the armies of the great Japanese Napoleon, Hideyoshi, overran Korea, his ultimate aim being to conquer China; the Ming dynasty, though


© E. M. Newman, from Publishers Photo Service

Tombs of the Early Manchus at Mukden, Guarded by Curious Stone Animals already decrepit, rendered signal aid in driving out the Japanese. It also waged a long war with Burma and the Shan states under Burma's protection, on the whole successfully. It maintained a preponderating influence in Annam, Siam, Ciampa, and Cambodia; but, in the main, Chinese influence in Tibet and all places west of it and of the Yellow River was fitful and feeble.

It was during the Ming dynasty that the Manchus first came into prominence. In 1618 the great Manchu chieftan T'ien-ming invaded China, routed the opposing force, and in 1619 conquered Liao-tung; the following year he proclaimed independence as Emperor T'ien-ming. In 1627, Ts'ung-chêng, the last Ming emperor of China, ascended the throne. Under him the empire fell into a state of anarchy. Two chiefs finally formed the rebel bands into two great armies for permanent rule; one, Li Tsze-ch'êng, overran the north, amid frightful destruction, and captured Peking. The emperor committed suicide, but his general on the northern border, Wu San-kwei, engaged the Manchus to help drive out the rebels. They routed Li, occupied Peking, and proclaimed T'ien-ming's ninth son emperor as Shun-chi, the dynasty Ta-ts'ing, or 'Great Pure.' On Shun-chi's death, in 1661, he was succeeded by his son, K'ang-hi, an indefatigable administrator, an able general, and a patron of literature and science. He superintended the preparation of a Chinese dictionary, and added Tibet to China.

By the time of the Emperor K'ien-lung (1736–95) the Chinese Empire had reached its climax. The necessity of completely subduing the Eleuths and Zungarian Kalmucks led to the conquest of Ili and Kashgaria, while wars with Tibet led to the conquest or pacification of Nepal. There were also long wars with Annam and Burma, resulting in a more or less genuine recognition of Chinese suzerainty. The Manchus left Japan severely alone, but in Liu-kiu they found a faithful vassal (equally complaisant to Japan) until the year 1880, when Japan, in consequence of disputes about Formosa, unceremoniously gave the Chinese notice to quit.

Notwithstanding the activity of the Nestorians, the Arabs, the papal emissaries of Marco Polo's time, and the Mongol conquerors in the Danube region, China was without any real knowledge of Europe until the arrival of the Portuguese in 1517. Even then it took a considerable time to differentiate these 'Franks' from the others (Spaniards and Frenchmen) who followed.

The Manchus furnished the most intellectual succession of emperors that ever ruled continuously over China. At first these rulers were decidedly well disposed toward the superior culture of the mixed Europeans with whom they were brought into contact at Peking—the more so that modern guns and astronomy assisted them to conquer and survey the empire, and to improve their records of time.

Meanwhile, by Manchu diplomacy, all foreign commerce had been practically diverted from the northern ports on the eastern coast to the one southernmost port of Canton (including Macao). The position of European and American traders at Canton was humiliating; but the semi-independence of Portuguese Macao in some measure furnished a base from which foreigners and mandarins alike could arrive at political and pecuniary compromises, hoodwink their rulers, and trade or farm taxes at a profit. The Emperor Tao-kwang (1821–51), awakening to the disastrous results to China of draining out silver, tea, silk, and other profitable products in exchange for an enervating and expensive drug, set vigorously to work in order to suppress the opium trade. But he was badly served by his own agents, most of whom had an interest in perpetuating the traffic. This led to the so-called Opium War (1840–2), which brought about the opening to general trade of the ports of Shanghai, Ningo-po, Fu-chou, and Amoy, besides Canton, and to the cession to Great Britain in perpetuity of Hong-kong. Extended rights were also granted to missionaries, a measure which gave rise to disputes with the French in Kwang-si province.

The result of all this disintegrating activity was the war of 1857–8 with Great Britain and France, and the Taiping Rebellion (q. v.) of 1852–64. Russia took advantage of this distraction to rectify her frontiers on the Amur and Ussuri; and the Mohammedans in Yün-nan (Panthays) and the Turkestan region (Dungans) threw off the Chinese yoke. In this way the venerable Chinese Empire was actually brought to the point of dissolution, when through the generosity of Great Britain, aided by France and the United States, the efforts of 'Chinese' Gordon and his band of European officers succeeded in wresting Nanking from the rebels, and in destroying all vestiges of the Taiping 'Christian' empire.

In 1861–2 the French established themselves securely in the southernmost part of Annam; while in 1871 the Russians checked the advance of the Dungans by occupying Ili. In 1874 the Japanese sent an army into Formosa, then formally annexed the Liukiu archipelago. In 1880, after an obstinate campaign of reconquest extending over ten years, China was successful in coaxing the Russians out of Ili; in 1884 in keeping the French from encroaching upon her southern frontiers; also in recovering Formosa and the Pescadores Islands from the grasp of the Japanese.

A new centre of disturbance was meanwhile created in Korea, which was opened to the trade of the world in 1882–4. The worst class government in the world had impoverished and stagnated that country till it had no future save in conquest by China or Japan, of which the first had civilized it, and both had formerly conquered it. Fresh efforts of both led, in 1894, to war between them. China was defeated, and obliged to conclude a treaty of peace, ratified at Chefoo on May 8, 1895, by which Formosa was ceded in perpetuity to Japan, together with certain portions of the Liao-tung Peninsula. New treaty ports were also opened to foreign trade, at the instigation of the Western Powers. (See KOREA.) Meanwhile Russia, France, and Germany joined in ejecting the Japanese from Liao-tung.

China now set feverishly to work to reorganize her military system. In this she was aided by the Western Powers, who set up a brisk trade in arms, a keen competition for the honor of drilling Chinese armies, and eager offers to develop arsenals and arms factories. There was, also, a zealous increase in missionary propaganda, both Catholic and Protestant. In 1897, Kiao-chau was seized by the Germans, and in 1898 they secured a ninety-nine years' lease of the port from the Chinese (see SHANTUNG). Russia proceeded to occupy the very territory from which Japan had been so disinterestedly removed; and on March 27, 1898, China leased to her for twenty-five years, or longer if required, Port Arthur, Ta-lien-wan, and the adjoining territory.

As her share of the spoils, Great Britain obtained from China, on April 2, 1898, the concession of Wei-hai-wei, to be occupied as long as Russia held Kwang-tung; and further obtained a ninety-nine years' lease of territory on the coast of the southern province of Kwang-tung, immediately opposite the island of Hong-kong, with the right to fortify. France, at the same time (April, 1898), secured a ninety-nine years' lease of the coast of the Bay of

Kwang-chau-wan, to the north of Hainan—a position still further strengthened by the cession, in November 1899, of the two islands dominating the bay.

Roused by these external dangers, rendered desperate, also, by the failure of imperial heirs and consequent family squabbles, the anti-foreign Manchu element surrounding the old Dowager Empress took advantage of the anti-missionary 'Boxer' rising in Shantung province in 1900, and organized a campaign of extermination against all Europeans, Japanese, and Americans. (See Boxers.) The chief Western Powers (the United States, Great Britain, Germany, France, Russia), with Japan, whose legations were besieged in Peking, occupied the city on Aug. 14–15, 1900, and remained over a year. Enormous indemnities were exacted by all (with some difficulty) until outbreak of the World War. As a condition of entering the conflict on the side of the Allies, China was authorized to discontinue payments to Germany and Russia, and after the War the remaining Powers voluntarily surrendered their claims for further indemnities. Meantime, Manchuria opened war on its Russian neighbors; and after dreadful atrocities, Russia overran and practically annexed it till ousted by Japan in 1905, when China also recovered Mongolia.

China was plainly doomed to extinction and partition unless radical changes were made. Two chief parties struggled for the next decade; one of these, 'Young China,' 'China for the Chinese,' sought to abolish all foreign influences—capital, advisers, and concessions—but to improve administration; the other endeavored to study and adopt foreign methods—of education, finance, military science, even administration—to prepare for representative government. This latter involved (although it was not so stated) the abolition of Manchu privileges, and in the end of the monarchy founded and existing on them. Such was the aim of a group of revolutionists headed by Sun Yat-sen, a proscribed refugee physician who, from Tokyo, Japan, formed an organization joined by progressive Chinese all over the world.

The imperial court was aroused; in 1905 a commission was appointed to study foreign institutions; and a report was presented the following year. Some of the princes favored the movement, with leading viceroys like Yuan Shih-kai (q. v.). A number of edicts were issued in 1906–8 by the Dowager Empress, who shrewdly swam with a current she disliked; and in 1908 a parliament was set for 1917. The Empress, however, died on Nov. 13, 1908, and the Emperor on the next day. The liberal young Prince Ch'un was made regent, and on Dec. 2 his infant son Pu-yi was styled Emperor Hsuan-tung.

In 1910 a National Assembly of two hundred was created. This sat from Oct. 3 to Jan. 11, 1911; but it was only advisory, mostly Manchu, and by no means representative of the country. In January 1911, elections were ordered for a real parliament to meet in 1913. In the fall of 1911, however, a terrible famine in the Yang-tse valley, which made the age-long official corruption unbearable, enabled Sun Yat-sen's revolutionists to swing much of the South into line; a cabinet was formed at Shanghai; and on Nov. 6 Wu Ting-fang (q. v.), former Minister to the United States, was made Director of Foreign Affairs.

In great alarm the National Assembly again met at Peking; on Oct. 30 issued two edicts in the Emperor's name, 'acknowledging errors' of policy, and promising early and complete reforms; rushed through a draft constitution at one sitting, which the throne accepted (Nov. 3); and made Yuan Prime Minister, and several revolutionaries cabinet ministers. But on Nov. 14 a second republic was set up in Shantung; the politic Yuan refused to aid further resistance; the Regent resigned; and the new dowager, the sole ruler left, could only rely on Yuan. After conferences with the revolutionists, he counselled her to permit a national convention. This convention met at Nanking on Dec. 29, and elected Sun Yat-sen president of the first Chinese Republic.

Helpless, the aged dynasty abdicated on Feb. 12, 1912, with the following declaration: 'We hand over the sovereignty to the people. We decide the form of government to be a constitutional republic. We appoint Yuan Shih-kai to organize a provisional government.' Yuan announced the abdication, and asked the Powers to recognize the republic (Feb. 13); but only the United States and Mexico acceded. Dr. Sun, for the Nanking government, refused to recognize the royal appointment of an 'organizer'; but rather than have civil war, he resigned to let his party elect Yuan president in his place (Feb. 15). Yuan was installed on March 10, and formed a cabinet and an advisory council pending a national assembly.

The Republic.—The most formidable task before the new republic was to quell, reorganize, or disband the million unpaid troops throughout the country, whose chiefs were uncertain which allegiance meant safety or profit. Actual rebellions were frequent; while money for all uses was scant, since the rebel leaders intercepted the revenues and plundered the provinces, which themselves were separatist, and their taxes. Some mutinies were crushed, but one leader at Yenchow-fu collected 15,000 men and defied the government.

Primary elections in September and December finally fixed a vote for Jan. 10, 1913, when a parliament of 870 was elected, 677 of whom assembled on April 8. For the ensuing six months this parliament was in deadlock as to whether a president should be created first, and dictate the constitution, or a constitution drawn up first, with the president a figurehead. At last, on Oct. 6, Yuan was elected president for five years, with the privilege of reelection once. The remaining Great Powers thereupon recognized the Republic, which was thus enabled to raise a loan of over $100,000,000 in ready cash.

A new rebellion broke out in the South; and as the Kuomingtang, or Nationalist Party, was hopelessly for State Rights, Yuan expelled the entire parliamentary contingent, some 300, for alleged complicity, thus leaving no quorum and ruling alone. On Jan. 14, 1914, the parliament was formally abolished by presidential decree; and in March a constitutional convention gave Yuan the unchecked powers he already used *de facto*. He replaced his now meaningless parliamentary cabinet by one responsible to himself; replaced the Premier by a Secretary of State; and named his own Advisory Council. In order to strengthen his position still further, he appointed military governors, or Tuchuns, over the provinces, a step which, under his successors, was to involve the country in chaos. For the immediate present, however, the rebellions were put down, the revenues brought up.

All through 1915 a powerful reaction toward the old system was taking place; and the elections held on Oct. 11 in nearly all the provinces went overwhelmingly for royalist candidates. The new Assembly, by 1,993 to 50, voted for a constitutional monarchy, and besought Yuan to head it. He refused at first, as breaking his oath; but on Dec. 11, 1915, he conditionally accepted the crown. But China was not to revert to monarchy so easily. Hardly had Yuan's proclamation been made when rebellion broke out in Yün-nan, spreading first to Kwang-si and Kwei-chau and then to other provinces. In March 1916 Yuan, yielding to the inevitable, declared that the demand for a monarchy was not unanimous throughout China, rejected the position of emperor, and resumed the presidency of the Republic.

Yuan died June 6, 1916, and in accordance with the provisions of the constitution, the Vice President, Li Yuan-hung, became president. The provisional constitution of Nanking, of March 1912, was restored, and parliament was revived and opened in August. The year 1917 was marked by a continual struggle to adopt a permanent constitution and by disagreements between the president and the cabinet, headed by Tuan Chi-jui. One ground of dissension was China's attitude in the World War. Tuan Chi-jui favored the abandonment of Chinese neutrality, hoping thereby to secure suspension of the Boxer indemnity payments and to give China a voice in the Peace Conference, while the president, supported by certain of the older officials, clung to the policy of passive neutrality. A ministerial crisis ensued, and the president eventually yielded. Relations with Germany were severed on March 14, 1917. China's actual entrance into the war was postponed, however, until August 14.

Following the severance of diplomatic relations, the Tuchuns, or military governors, assembled in Peking and voted by a considerable majority for an immediate declaration of war. Parliament refused to take this step at the dictation of the premier, whereupon the military governors demanded its dissolution by the president—a demand which he countered by the dismissal of Tuan and the appointment of Wu Ting-fang to fill the premiership. After a futile attempt to secure Tuan's reinstatement, the governors declared the withdrawal of eleven provinces from the Republic, under the dictatorship of the monarchist Hsu Shih-chang. A compromise was eventually effected, however, parliament was dismissed (in June), Li Ching-hsi was called to head a coalition cabinet, and the revolting provinces resumed relations with the Republic.

But further trouble was brewing. Chang Hsun, one of the most powerful of the military governors, chose this time as opportune for the restoration of the Manchu power. On July 1, he declared the president deposed and proceeded to make preparations for the re-enthronement of the young emperor. In this he received little support even from the out-and-out monarchists. Tuan Chi-jui assumed command of the Republican army, marched upon Peking and completely defeated Chang. Li Yuan-hung thereupon resigned the presidency and Feng Kuo-chang became acting president with Tuan again as premier. Elections were held and a new parliament was assembled. A declaration of war against Germany and Austria-Hungary was issued on Aug. 14. On Sept. 4, 1918, Hsu Shih-chang was chosen president.

Meanwhile, the more radical members of the dissolved parliament had met in Canton under the leadership of Sun Yat-sen, set up an independent government, which proclaimed itself the real government of China, and declared war upon the Peking government. Fighting went on intermittently between the two governments until November 1918, when Hsu-Shih-chang ordered a cessation of hostilities, to which the Canton parliament agreed. The following year various unsuccessful efforts were made to bring about a settlement between the rival governments. Japan had loaned large sums of money to the northern provinces to carry on the struggle, a fact to which General Wu Pei-fu, one of the northern generals, widely known as a liberal, an anti-militarist, and a scholar, was opposed. This caused a division of the northern government into two factions, one known as the Anfu (or Anhui) party, which was in control of the Peking government, and the other, headed by Tsao-kun, Tuchun of Chih-li, and General Wu Pei-fu, known as the Chih-li faction. In 1920 Wu Pei-fu attempted to overthrow the Anfus, or pro-Japanese government, and, aided by Chang Tso-lin, a former bandit chief who had become Tuchun of Manchuria, succeeded in occupying Peking. Chang immediately assumed control, but his high-handed methods alienated Wu, and within a short time the former allies were declared enemies. The actual clash came in 1922. Chang, having entered into an alliance with Sun Yat-sen, mustered an army of some 95,000 men, while the forces of Wu numbered about 75,000. After several weeks of fighting (April–June), the former bandit chief was forced to retire to Manchuria, whence, at a safe distance, he hurled defiance at the government.

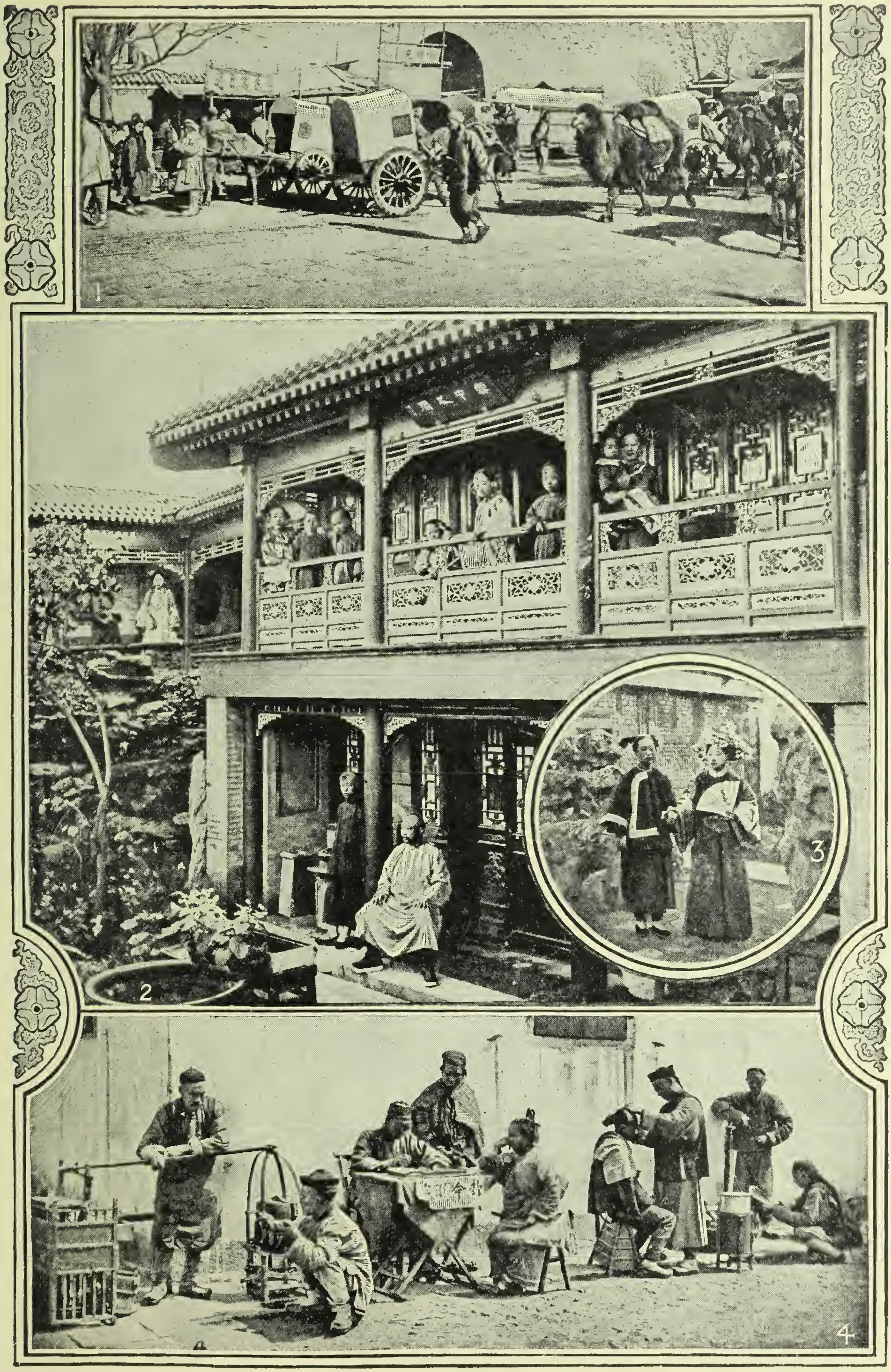
In June 1922 Hsu retired as president and Li Yuan-hung, former president, was again elected (June 10), though Wu Pei-fu remained the real power in Northern China. In the South Sun Yat-sen suffered a serious blow in the defection of General Chen Chiung Ming, who succeeded in capturing Canton and forcing Sun to seek refuge in Shanghai (Aug. 22).

The closing months of 1922 and the year 1923 were marked by serious disorders throughout China. To political chaos and civil strife were added suffering from famine and great loss of life and property from a typhoon and tidal wave at Swatow. Reports of brigandage and banditry were frequent, culminating on May 6, 1923, in the derailing of the Shanghai-Peking express on the borders of Shantung and the capture of 136 passengers, including 36 foreigners, who were held for $1,000,000 ransom. The captives were eventually released but the government refused to consider the policing of the railways under foreign supervision.

In June 1923 Li Yuang-hung fled from the capital before the threats of the military party and was succeeded in the presidency by Tsao Kun, who was inaugurated Oct. 10, 1923. On the same day the first constitution of the Republic was promulgated.

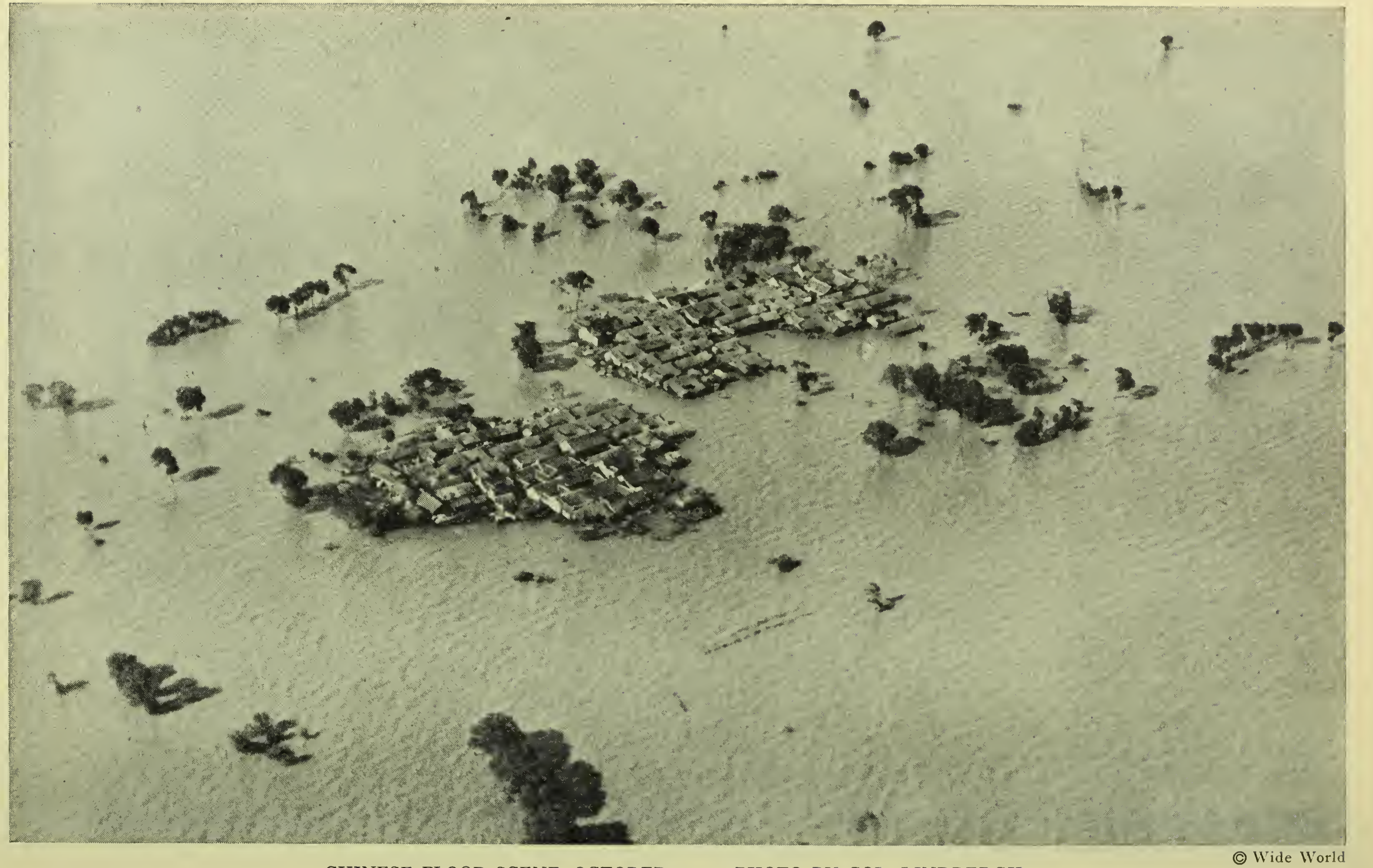
In the meantime Sun Yat-sen had returned to his capital in the south and issued an appeal to the foreign powers to withhold recognition of the Peking government. Little improvement occurred in the general situation. Fighting continued without any decisive results and attacks upon foreigners were of frequent occurrence.

A new outbreak of hostilities, near Shanghai, came in September 1924, between two rival Tuchuns—Gen. Lu Yung-Hsiang of Che-kiang, one of the old Anfu party, and Marshal Chi Hsieh-yuan of Kiang-su, of the old Chih-li faction. General Wu Pei-fu aligned himself on the side of Chi Hsieh-yuan and Chang Tso-lin of Manchuria espoused the cause of General Lu. On Sept. 17 he proclaimed his intention of making war on President Tsao Kun and his old enemy Wu Pei-fu. Fighting ensued in which General Wu had at first the support of General Feng Yu-siang, widely known as a Christian general. On October 23, however, General Feng deserted his superior, returned to Peking, and demanded the immediate proclamation of peace, as well as the abdication of the president and the punishment of General Wu. Tsao Kun resigned, and Wu, after a brief attempt at further resistance, withdrew to the Yangtse region. The cabinet was dismissed and a conference called in which General



SCENES OF CHINESE LIFE.

1. At one of the inner gates, Peiping. 2. Courtyard of a mandarin's house—a Chinese family at home. 3. Manchu bride and her maid. 4. Street scene, Che-kiang: street caterer—scribe—hairdresser.



© Wide World

CHINESE FLOOD SCENE, OCTOBER 1931. PHOTO BY COL. LINDBERGH.

Chang and General Feng were joined by Tuan Chi-jui, who had headed the cabinet in Li Yuan-hung's first administration (see above). As a result, Tuan assumed the office of chief executive and promulgated a provisional government with the object of 'reorganizing the government on new lines.' On Dec. 9 recognition of the provisional government was extended in a joint note by envoys at Peking of the United States, Great Britain, Belgium, France, Italy, Japan, and the Netherlands.

In 1914, shortly after the beginning of the World War, Japanese forces seized Kiao-chau, which had been held by the Germans since 1897 (see SHANTUNG), took over the German railway, and proceeded to occupy important points throughout the province of Shantung. This action they followed with the presentation, in January 1915, of their famous 'Twenty-one Demands' on China, designed to assure them a predominant position in Shantung and in Manchuria and Inner Mongolia; to strengthen Japanese control, through the Hanyehping Company, of the important coal and iron resources of Hu-peh and Hu-nan; to prevent the cession or leasing to a third power of any harbor, bay, or island on the Chinese coast; and to secure certain other very important privileges, including permission to maintain Japanese hospitals, churches, and schools in the interior of China, a share in the policing of important places in China, important railway concessions in the Yangtse Valley, and the right of missionary propaganda. These demands, somewhat modified, were accepted by China in May and constituted the so-called Sino-Japanese treaty of 1915.

It was the hope of securing the nullification of this treaty, particularly as regards Japanese occupation of Kiao-chau, that very largely influenced China in joining the Allies. Japan, however, had entered into secret pacts with Great Britain, France, Russia, and Italy, to insure her retention of Kiao-chau, and the terms of the Treaty of Versailles were drawn up accordingly, Japan succeeding to all 'the rights, title, and privileges' of Germany in the Shantung peninsula. In spite of Japanese assurances (oral) that full sovereignty would eventually be restored to China, economic privileges only being retained, China refused her signature to the treaty.

The Far Eastern question was one of the outstanding problems before the Washington Conference on the Limitation of Armaments in 1921–22, and important steps were taken toward clarifying a difficult situation. The notable achievements in this respect were the Nine-Power Treaty on Chinese Integrity approved Feb. 5, 1922 (for terms in detail, see LIMITATION OF ARMAMENTS); the treaty providing for a revision of the Chinese tariff, with a view to increasing the revenues of the Chinese government; the resolution agreeing to the withdrawal of foreign post offices in China; a resolution for full publicity for all treaties, notes and other international agreements with China or concerning China; and the Shantung Treaty between China and Japan providing for the restoration to China of Kiao-chau.

This restoration was effected in January, 1923, and Great Britain restored the port of Wai-hai-wei, on the west coast of the promontory of Shantung, in October, 1930.

On May 31, 1924, an agreement was signed by Chinese and Russian representatives whereby unconditional recognition was granted Soviet Russia. According to this agreement, Russia recognized Chinese sovereignty over Outer Mongolia and agreed to the withdrawal of Russian troops from that region on terms and at a date to be determined by further negotiation. Russia further recognized China's right eventually to purchase the Chinese Eastern Railway, providing in the meantime for joint control, and agreed to the abolition of extraterritorial rights, and of special tariff privileges, and to relinquishment of the remainder of the Boxer indemnity.

Meantime, however, the unfortunate policy of Sun Yat-sen and his rival government in Canton continued to disrupt internal affairs. In 1923 he enlisted the aid and advice of Soviet Russia. The Soviet leaders sent him a brilliant diplomat and counsellor, Michael Borodin, who worked hand in glove with Dr. Sun to promote nationalism and patriotism as the sole means of Chinese salvation.

Although both were apparently striving for the same goal, their ultimate purposes were diametrically opposed. Dr. Sun was motivated by purely Chinese ideals, to build a free and united China, a democratic, constitutional republic, entirely liberated from foreign domination or interference. Borodin, on the other hand, planted the seeds for a Soviet Communistic China. Under his influence—at variance with the desires of Dr. Sun, the Kuomintang (Nationalist) Party was remodelled on the Russian plan of party government, the army was reorganized by Russian instructors, and Russian arms and munitions were imported in large consignments.

While Communism was undoubtedly a mighty factor in Chinese history, not a few competent observers in the country, Europeans and Japanese, claimed that Chinese Communism was less a Russian than a purely native product, born of continuous civil warfare and the suffering of the masses. As a matter of fact, the pure Soviet brand of Communism was first imported by Chinese students who had witnessed its early operations in Russia. At that time, it looked like the 'exaltation' of the lowly and the oppressed, but whereas the Bolshevists made of Communism a more or less scientific doctrine and elaborated out of it a system of organization, the Chinese type of Communism was held to be distinctly a peasant revolt, combined with banditry in so far as necessity compelled it to subsist by dispossessing landowners and pillaging towns and villages, a mere struggle for existence. Thus one need not necessarily invoke Russian influence as responsible for a state of affairs which the irresistible driving-force of hunger was equally competent to create. Chinese history shows several examples of peasant revolts overturning established dynasties; it was the untrained military strength of the peasantry in revolt against high taxes and famine that broke the power of the Ming dynasty (1368–1644) and enabled the Manchu invaders to drive it out. In 1911, two hundred and sixty-seven years later, it was again the peasants in revolt who paved the way for the revolution which ended the Manchu dynasty. But since that time China has hardly known a peaceful week. With each consecutive year internal warfare became more widespread, more expensive and destructive. While the coastal cities suffered but little and had, to a considerable extent, become modernized by the adoption of Western comforts, conveniences, education and entertainments, the interior of the country presented a melancholy spectacle.

After decades of a 'republican' career, millions of Chinese continued to dwell exactly in and by the same manners and methods as did their forefathers two or three thousand years ago. Only an infinitesimally small percentage of the people had even a remote conception of the difference between autocratic monarchy and the democracy of a republic. For most of the people the all-absorbing problem was that of raising enough rice and vegetation to prolong an existence usually unhappy. Extortion by officials, plunder, and massacre continue to be the commonplaces of their existence. Representative government by votes soon proved impossible among a population with so high a percentage of illiterates. Dictatorships and the successive military rules of various 'war lords' were the inevitable result.

The chaotic condition of the country eventually persuaded all Chinese leaders that unity must be attempted, and late in 1925 Sun Yat-sen accepted an invitation to meet rival leaders in Peking. Unfortunately, he died in that city before negotiations had advanced far; the bright hopes for internal peace were dashed, and the struggle for supreme control began anew. Chiang Kai-shek succeeded Sun Yat-sen as leader of the Kuomintang (Communist) party, and at the head of their victorious troops he entered Nanking in March, 1927.

Then occurred one of those swift changes so common in Chinese political life. Patriotic parties successfully persuaded Chiang Kai-shek that the ousting of radical elements was essential in order to secure unity; Borodin was banished from the country, and Communists were ruthlessly suppressed. The new leader proved himself an able military commander, and led his forces, now imbued with new political philosophies, to the gates of Peking, whence they drove Marshal Chang Tso-lin in June, 1928. As the latter sped northward to Manchuria in his private train he was killed by bombs planted by Nationalist spies or, as Chang's son and successor Chang Hsueh-liang averred, by Japanese.

Chiang Kai-shek now announced that 'the military phase of the revolution has been completed.' A new government was founded in the three principles of Sun Yat-sen—nationalism, democracy and the people's freedom. Chiang was inaugurated president of China on Oct. 10, 1928; Peking was renamed Peiping ('Northern Peace'); and the capital was removed to Nanking. The powerful northern war lords Feng Yu-hsiang and Yen Hsi-shan gave their support to the Nanking government, and Chang Hsueh-liang, governor of Manchuria, declared his friendship. At the beginning of 1929, China was more nearly unified than it had been for a decade.

However, the new president was soon beset by many difficulties. Famine on a disastrous scale ravaged the Yangtse Valley; banditry was prevalent in many parts of the country; and numerous surviving Communists succeeded in maintaining strife. The northern generals, who had given promise of promoting harmony, revolted and revived civil war; 'Reds' seized Changsha, capital of Hunan; and Tsinan, capital of Shantung, was held by northern rebels during June–July, 1930.

To these internal difficulties were added those occasioned by the designs of Russia and Japan upon the territories of China. The Manchurian authorities raided the Soviet consulate-general in Harbin on July 10, 1929, and in consequence of that they arrested over one hundred employees of the Chinese Eastern Railway, seized control of the line and closed all Russian organizations in that country. Reprisals were undertaken by the Russian government in November by the capture of some border cities, and as a result the Chinese were forced to retrace their steps.

Although the superior possession of money and supplies enabled the Nationalists to defeat the northern coalition of Feng Yu-hsiang and Yen Hsi-shan, the Communist revolters in the south continued their successful resistance in 1931, holding, in March, 200 miles of both banks of the Yangtse River from a point near Sinti, 100 miles above Hankow, to a point about 40 miles from Shasi. On May 4 the Nationalist government announced the abolition of extraterritoriality, to begin from January 1, 1932. The Chinese People's Convention, meeting from May 5 to 17, adopted a new Provisional Constitution increasing the powers of the President of the State Council (in effect, the President of the country). Opposition to this measure, and charges that President Chiang was endeavoring further to increase his powers, led to increased hostility on the part of the southern faction. This took the form finally, on May 28, of a new 'National Government of China' established in Canton.

In August a catastrophic flood in the valleys of the Yangtse and Hwai Rivers, in the area centering at Hankow, left 15,000,000 persons homeless and facing starvation, and seriously affected another 50,000,000. In the north, in the same month, an abortive revolt by the forces of General Shih Yu-san was quelled and the Communists in Kiangsi, to the south, were being beaten by the Nationalists.

By this time the border provinces of Mongolia, Sinkiang and Manchuria were not merely self-governing but practically independent, as also was Tibet, and were functioning either along communistic lines or under Japanese guidance. Japanese 'peaceful penetration' exasperated the Chinese, but because of their troubles nearer to the center they were unable to do anything except to institute a boycott against Japanese merchandise entering the country.

It was estimated that by the end of 1931 the economic boycott had cost Japan nearly $150,000,000. Japan felt the pinch. Her military party wanted war, or at least drastic measures to stop a process that threatened to strangle her economic life. In January, 1932, therefore, Japanese forces were landed at Tsingtao, the port of Shantung, to destroy the plant of an anti-Japanese newspaper and to raid the local offices of the Kuomintang, and when, shortly thereafter, five Japanese monks were attacked by Chinese, excuse was found for more drastic measures. Before the month was out, Rear Admiral Koichi Shiosawa, commanding the Japanese fleet off Shanghai, demanded an apology and an indemnity, together with cessation of the boycott and suppression of all anti-Japanese organizations. All these measures were promised, yet the Admiral decided to attack Chapei, the Chinese-administered district north of the International Settlement. His ships opened fire and Japanese planes dropped bombs, setting Chapei on fire. Meanwhile Chinese troops fought off the Japanese at Shanghai and also repelled an attack on the Woosing forts, 16 miles distant. Before the League of Nations and individual neutral Powers were able to arrange an armistice on May 5, 1932, thousands of innocent lives had been lost and property damage had been inflicted to a cost exceeding $350,000,000.

Chiang Kai-shek had resigned the presidency late in 1931 in the hope that thereby unity might be effected between the rival groups within the country, and in February of the following year, when the fighting at Shanghai was most acute, he was appointed commander-in-chief of the military, naval and air forces of the country. Developments at this time on the outer limits of the republic made strong military action imperative, if such were indeed possible.

Coincident with the events narrated above, in September, 1931, Japanese forces had bombarded and then occupied Mukden, the great commercial capital of the Liaoning province, and within a few weeks, while the League of Nations was endeavoring to make up its mind what to do to prevent the theft of territory of one of its members, the Japanese flag was raised over Harbin. Generalissimo Chiang Kai-shek, head of all China's forces, was virtually a passive spectator of these events, and when, on Feb. 18, 1932, Manchuria was proclaimed the State of Manchukuo, the unhappy Chinese people appeared to be helpless in the face of the designs of her rapacious neighbors (see MANCHUKUO).

Chiang Kai-shek was succeeded as president of the republic in 1931 by Lin Sen, who was reelected to the office in 1932 and again in 1934. The former relinquished his military appointments in 1935 to become president of the Executive Yuan, a post practically equivalent to that of premier, and giving him virtually the powers of a dictator. These men, despite the disturbances in many parts of the country, were able to direct many movements for the modernization of the more settled area. Such cities as Peiping, Tientsin, Nanking and Canton were largely rebuilt; roads and motor highways were constructed; irrigation developments were extended; and, in 1931, the corner stone of a national stadium was laid in the capital.

Under the direction of C. W. Bishop, of the Freer Gallery of Art of the Smithsonian Institution, archaeologists excavated one of the principal shrines of Hou Tsu, earth goddess of the ancient Chinese; stone knives, iron arrowheads and shell and bone implements afforded valuable evidence of prehistoric religious practices. In the Tan district of the Shantung province, workers under the auspices of the Academia Sinica and the Shantung Antiquity Study Association found a tomb containing life-sized stone images of Confucius and of Lao Tse, his great rival philosopher; on no previous occasion had one tomb been found containing images of both of these men.

After forty years of rule, Ngawang Lopsang Tup-den Gyatso, Dalai Lama of Tibet, died in December, 1933. His spiritual authority extended as far as Peiping, Lake Baikal, Mongolia and to the northern frontier of India, although his temporal sphere was limited to Tibet proper. After two years of search, a priestly commission discovered an infant bearing certain distinctive marks who had been born at the exact moment the Dalai Lama stopped breathing, and proclaimed him as the fourteenth reincarnation of Buddha; the head Lama of Reting Lamasery was appointed regent until the boy should reach eighteen years of age.

Foreign advisers had been sent to China in 1931 to promote agricultural and administrative reform, to assist in road and water undertakings, and the like, and two years later Dr. Rajchman was appointed technical supervising officer to coördinate the work of these experts with those of the National Economic Council of China. Col. John H. Jouett, U.S.A., ret., headed a corps of American aviation experts and technicians at the Hangchow aviation school, and in 1933 the Curtiss-Wright Corp. erected a five-million dollar airplane plant in China to turn out annually 60 military planes for the Nanking government. The British government lent two naval instructors, and Germany and Italy provided military advisers.

Following the failure of the Nanking government to take effective action against the puppet state of Manchukuo, a revolutionary nationalist movement swept Chinese Inner Mongolia. Under the control of powerful princes, this huge territory comprised six major Leagues (or groups of tribes) known as the Djerin, Dlosotu, Djouda, Silingol, Ulan-Tsab and Tehedzu. The former three were dominated by Manchukuo, and the latter three combined under Prince Teh Wang, head of the Silingol League. In September, 1933, representatives of the central government were despatched from Nanking to endeavor to come to terms with Teh Wang, but succeeded only in securing a nominal adherence in return for recognition of autonomy. The new administration of Inner Mongolia, therefore, came into being in April, 1934, with the acquiescence of the Chinese republic, the ancient city of Pailingmiao being selected for its capital.

Meanwhile a revolt broke out in the Sinkiang province (known also as Kashgaria, Chinese Tartary and Turkestan), but here the government of China was less pliant. Gen. Sheng Shih-tsui fought Ma Hung-ying's rebels, recaptured most of the large cities by the end of 1933, and reëstablished nominal Chinese sovereignty throughout the entire region by July of the following year.

The continued pressure exerted by Japan on the most distant of the republic's provinces brought realization to leaders of all parties in China that unity could be established only on the basis of a common anti-Japanese platform. On the opening of a Kuomintang plenary session in Nanking on Nov. 1, 1935, Premier Wang Ching-wei was shot and seriously wounded by opponents of the government's foreign policy. The government announced two days later that the traditional silver standard (taels) of the country would be abandoned in favor of a managed currency, and this was followed within a month by a complete reorganization of the government. Most of the new cabinet posts were filled by friends of Chiang Kai-shek, who, as noted above, became virtual dictator, but the promise of a firmer stand against Japanese encroachments continued unfulfilled.

During 1935 Japan had forced China to install a pro-Japanese politician at the head of the administration in Peiping; anti-Japanese troops in the vicinity were either disbanded or transferred; and anti-Japanese political organizations were suppressed. While Peiping and Tientsin were not formally occupied by Japanese troops, Japanese military missions kept careful watch throughout Inner Mongolia and North China, and in November, 1935, the Japanese Maj. Gen. Kenji Doihara, of the Kwangtung army, proclaimed that the five provinces Chahar, Suiyan, Shansi, Hopei and Shantung would assume autonomy, with subservience to Tokio.

Communism once more became a most serious threat to the Nanking government during 1936, particularly in the northern part of Shensi, in west central Szechuan and in Hunan. On the whole these bands of Communists were shifting and unstable, but nevertheless they constituted an added perplexity to the government at a time when all its energies were required to stem Japanese encroachments.

In October, 1936, following the murder of seven Japanese subjects in scattered parts of China, Japan presented a new set of 'demands' to the Chinese government; the principal of these were that the autonomy of North China should be recognized, and that more drastic steps should be taken to check the growth of communism.

Reports reached Nanking early in December, 1936, that Marshal Chang Hsueh-liang, vice commander-in-chief, had become leader of a revolt in the Shensi province; Chiang Kai-shek went to investigate for himself and was taken prisoner by his colleague at Huachengchi, the latter demanding as the price of release of his captive that the Nanking government should declare war upon Japan and that Communists should be admitted to the Kuomintang. Chiang Kai-shek's wife, May Ling Soong, sister-in-law of Dr. Sun Yat-sen and educated in the United States, procured release of her husband on

Dec. 25, 1936, and returned to Nanking with both him and his captor. The former twice offered his resignation to the government, who refused it; and the latter was tried for his coup, sentenced to ten years in jail—and pardoned.

During January, 1937, negotiations were conducted in Shensi with Generals Yang Fu-cheng and Yu Hsueh-chung, former aides of Chang Hsueh-liang, who eventually agreed to abide by the orders of the Nanking government. The latter administration consented to permit Yang Fu-cheng undisputed possession of Sian and all southern Shensi and abandoned campaigns against Communists.

Undeclared war against China was begun by Japan July 7, 1937. China was neither equipped nor prepared for such a war; her difficulties mounted each year; her industry suffered through the loss of her coastal cities; and the enemy blockade shut off China from her world communications and supplies. Inflation developed to disastrous proportions, war costs progressively increased, and casualties in battle were estimated at close to 3,000,000, in addition to heavy loss of life from enemy atrocities, disease, starvation, malnutrition, and the effects of the chaotic conditions prevailing. The war was fought by China for her preservation as a nation, but the struggle may be considered as a phase of the greatest revolution in China's history, having for its objective the elevation of China to an independent democracy and a leading member of the family of nations. The war dragged on into 1945, and events assumed a more favorable complexion, culminating in the end of hostilities in August and the formal surrender of Japan on September 2 to the United States, Great Britain, China, and Russia.

Bibliography.—Consult A. J. Brown, *New Forces in Old China* (1904); T. R. Jernigan, *China in Law and Commerce* (1905); E. H. Parker, *China and Religion* (1905); P. H. Kent, *Railway Enterprise in China* (1907); W. A. P. Martin, *Awakening of China* (1907); F. Hirth, *Ancient History of China* (1908); H. B. Morse, *Trade and Administration of the Chinese Empire* (1908), and *International Relations of the Chinese Empire* (1910); J. O. P. Bland, *China under the Empress Dowager* (with E. Backhouse, 1910); *China and the Far East* (ed. G. H. Blakeslee, 1910); E. H. Parker, *Studies in Chinese Religion* (1910).

M. E. Burton, *The Education of Women in China* (1911); W. E. Geil, *Eighteen Capitals of China* (1911); H. A. Giles, *Civilization of China* (1911); W. E. Griffis, *China's Story* (1911); M. Hooker, *Behind the Scenes in Peking* (1911); A. J. Little, *Gleanings from Fifty Years in China* (1911); A. E. Moule, *My Half Century in China* (1911); H. A. Giles, *Confucianism and Its Rivals* (1912); P. H. B. Kent, *Passing of the Manchus* (1912); L. F. Lawton, *Empires of the Far East* (2 vols., 1912).

J. S. Thomson, *China Revolutionized* (1913); E. Backhouse, *Annals and Memoirs of the Court of Peking* (with J. O. P. Bland, 1914); S. Chen, *System of Taxation in China in the Tsing Dynasty, 1644–1911* (1914); M. Gaunt, *Woman in China* (1914); E. H. Wilson, *Naturalist in Western China* (2 vols., 1914); Y. K. Leong, *Village and Town Life in China* (with L. K. Tao, 1915); A. S. Waley, *Remaking of China* (1915).

J. W. Bashford, *China, an Interpretation* (1916); E. T. C. Werner, *China of the Chinese* (1919); T. T. Lew, *China Today through Chinese Eyes* (1922); R. Van Bergen, *The Story of China* (1922); E. T. Williams, *China Yesterday and Today* (1923); H. T. Hodgkin, *China in the Family of Nations* (1923); E. L. Hovelaque, *China* (1923); J. P. Donovan, *Yesterday and Today in China* (1923).

S. H. Hsu, *China and her Political Entity* (1926); H. H. Gowen and J. W. Hall, *An Outline History of China* (1926); G. N. Steiger, *China and the Occident* (1927); Chao Chuwu, *The Nationalist Programme for China* (1929); T. M. Z. Tyau, *Two Years of Nationalist China* (1930); E. T. Williams, *A Short History of China* (1928); H. A. Van Dorn, *Twenty Years of the Chinese Republic* (1932); H. C. Thomson, *The Case for China* (1933); E. D. Harvey, *The Mind of China* (1933); R. H. Tawney, *Land and Labor in China* (1933); G. B. Cressey, *China's Geographic Foundations* (1934); L. A. Lyall, *China* (1934); G. Clark, *The Great Wall Crumbles* (1935); H. L. Stimson, *The Far Eastern Crisis* (1936); Isaacs, *Tragedy of the Chinese Revolution* (1938); Snow, *Red Star over China* (1938); Bisson, *Japan in China* (1938); Bigland, *Into China* (1940); Goodrich and Fenn, *Syllabus of the History of Chinese Civilization and Culture* (1941); Michael, *Origin of Manchu Rule in China* (1942); Snow, *Battle for Asia* (1942).

Chinandega, city, Nicaragua, capital of Chinandega dept.; 24 m. N.W. of Leon, and 13 m. N.N.E. of the Pacific port of Corinto. It has trade in sugar and cotton. Pop. 14,415.

Chinan or **Tsinan,** city, China, capital of the province of Shantung in north China, lies to the south of a range of hills and slopes gradually upwards from N. to S. It is connected by rail with Tsingtao (Kiaochau), Tientsin and with Pukow on the Yangtse, and by canal and river with Yang Chiao Kou on the Gulf of Chihli. There are numerous temples, a Roman Catholic cathedral, and a mosque; military school, agricultural college, university, public library, and a huge examination hall. In the western part of the city are a number of geyser-like springs, highly valued for their medicinal properties.

Chinan is noted for its silk and glass manufacture, and for its imitation precious stones. In 1904 it was opened to international trade, and has become the commercial center of Western Shantung. It has flour and cotton mills, paper, iron and brass goods, soap, dye, leather, needles, match, wine and cloth factories. Pop. (1944) 367,000.

China Sea, a western division of the Pacific Ocean, lying east and south of China. It is divided into three portions—(1) the Yellow Sea (Chinese, *Hoang-Hai*), between Korea and Northern China, with the gulfs of Pe-chi-li and Liao-tung, and Korea Bay; (2) the Eastern Sea (*Tung-hai*), between China on the west and Japan and the Liu-kiu (Riu-kiu) archipelago on the east; and (3) the South China Sea (*Nan-hai*), between China on the north, Tong-king, Annam, Cochin-China, and the Malay Peninsula on the west, and the Philippines and Borneo on the east and southeast, and forming the great Gulfs of Tong-king and Siam. The Strait of Formosa connects the East and South China Seas. All are visited periodically by typhoons and are rich in fish.

Chinch Bug, a small, blackish bug (*Blissus leucopterus*) with white wing covers, belonging to the family Lygaeidae. It is widely distributed in the United States, Central America, and the West Indies, and is extremely destructive to grain plants. It hibernates in clumps of bunch grass, and in the spring deposits hundreds of eggs on the stems of grasses and grains, near the roots. Minute red larvae soon emerge, suck the juices of the plant, and cause its death. The damage done by this pest in the United States is estimated at $20,000,000 annually. The chinch bug is best combated by close burning of bunch grass and stubble in the fall, rotation of crops, and artificial cultures of a fungoid disease (*Sporotrichum globuliferrum*), which proves fatal to the young insects.

Chin-chew. See CHUAN-CHOU.

Chin-chiang, chin-ki-äng, or CHINKIANG, city and treaty port, China, situated on the south bank of the Yangtse about 150 miles from its mouth, and near the entrances of the southern and northern sections of the Grand Canal. It is connected by rail with Nanking and Shanghai, and by river and canal with the surrounding country. The chief exports are silk, rice, wool, hides and goatskins; imports include cotton goods and sugar.

Chin-chiang was taken by the British on July 21, 1842, and by the Treaty of Tientsin (1858) was opened to commerce in 1861. It was almost demolished during the Taiping Rebellion (1851–64); and has been the scene of several uprisings. Pop. (1931) 199,776.

Chin-chou. See CHUAN-CHOU.

Chinchilla, chin-chil'*a* (*C. lanigera*), a South American rodent, well known for its soft gray fur. It is about ten inches in length, with long hind legs and bushy tail. They feed on roots and grasses, and when eating they sit on their haunches, holding their food in their forepaws. It is an extremely active animal, climbing among the rocks with great agility. Chinchillas have been killed in thousands for the sake of their fur.

Chinchilla

Chinchona. See CINCHONA.

Chinda, COUNT SUTEMI (1856–1929), Japanese diplomat, was graduated from DePauw University, in the United States, in 1881. He entered the Japanese Foreign Office in 1885; became consul at San Francisco in 1890, and consul-general at Shanghai in 1895. Between 1899 and 1901 he served as minister to Brazil, Holland, and Russia. From 1901 to 1908 he was Vice-Minister for Foreign Affairs, and for this service was invested with the First Class Sacred Treasure and Rising Sun, and raised to the peerage. He became Ambassador to Germany in 1908; was made viscount in 1911; and was Ambassador to the United States from 1911 to 1916. He was Ambassador to Great Britain, 1916–20, and became a count in 1920. In the same year he became privy councilor and grand steward to the Prince Regent.

Chinde, town (municipality), Portuguese East Africa, at the mouth of the Chinde branch of the Zambezi. It is a European settlement (Portuguese and English) and the chief port of the Zambezi valley. There is considerable traffic in sugar and cotton. In 1922 the town was almost destroyed by a cyclone. Pop. about 1,400.

Chinde River, Portgeuse East Africa, the only navigable mouth to the Zambezi (q. v.), which it joins 20 miles inland.

Chindwara, chind-wä'ra, or CHHINDWARA, district, Central Provinces, India, with an area of 4,630 square miles, and a population of 500,000. The chief town, Chindwara, 70 miles northwest of Nagpur, is situated on a plateau 2,200 feet above the sea, and has a healthful climate. Pop. about 13,000.

Chindwin River, a tributary of the Irawaddy, has its source in Upper Burma. It flows south for 500 miles, for much of which it is navigable in the wet season.

Chindwin, Upper and **Lower,** two districts in the N.W. division of Burma, India. The mountainous upper district (area, 16,037 square miles) is covered with jungle, and yields teak. The western half of the lower district (area, 3,480 square miles) is rugged and thickly wooded; the eastern portion is a fertile plain, in which rice is cultivated.

Chinee. See CHINU.

Chinese Art. The springs of national life, often disguised by political accidents, are nowhere so truly seen as in its art. Solidity of sensation, prosaic ideals, and stagnancy of ideas are the popularity accredited marks of the Chinese: much of it false, much temporary and modern, all flatly belied as intrinsic by their older art creations. These naturally begin in prehistoric times with pottery and metal work; in bronze the Chinese artists of 1000–500 B.C. yield to none in massive force of conception and perfect craftsmanship. Less powerful but more graceful work was done till some 400 A.D. An oddly blank period follows, then a revival with the Sung dynasty in 960, a period of richly decorative work but less forceful and sincere in the Ming period (1368 onward), thence a swift decline.

In *sculpture*, albeit closely related to bronze relief work, the Chinese have done little; nor in engraving, despite the instinct for line shown in their painting. Both probably result from the spiritual basis of their art; a passion for the poetic and mystic elements (in their proverb, 'a picture is a poem without words') which seeks to prevent distraction from inner idea by outer over-realism. Hence they slight all that expresses solidity, as relief and chiaroscuro, use only water color, prefer landscape to mere human form, and sparse expanses to spaces crowded with figures in action. No other national art, as a body, has so worshipped at once the vast and savage sublimities of nature, its peaks and gorges and storms, and its dreamy solitudes and poetic haunts, though usually as a theatre for humanity.

Painting is the glory and true expression of China. Its history, either on wood or walls, or with its delicate, penman-like brush work on silk or less often paper, dates back to the third century B.C. Almost at the outset appear the great Chinese *motifs* of Tiger and Dragon, explained as symbolizing Nature and Spirit. But no named painter emerges till the second century A.D.; in the fourth we have the first great artist, and still a chief one—Ku K'ai-chih, by eminence a portraitist. The art was now mature enough to find a critic—Hsieh Ho, who laid down its canons, to which of course artists paid no attention.

In the early T'ang dynasty (from 618 A.D.), Buddhism flooded China, becoming the same dominant influence in art as Christianity in Europe. The great name in Chinese art is Wu Tao-tzü, the one master in all fields, though no certain work of his is extant; only Japanese copies preserving even his supreme religious painting, Buddha's Nirvana. In this age landscape was firmly delimited. Two natural schools developed: the romantic and suggestional one of the South, headed by the poet-painter Wang Wei; and the realistic one of the North, whose great name is Li Ssü-hsun. The anarchic Five Dynasties (907–960) nourished two exquisite nature painters, Hsü Hsi and Hsuang Ch'uan.

The reunion under the Sung dynasty (968–1280) ushered in China's Periclean age, of freedom and varied personal greatness, 'glorious in art as in poetry and philosophy.' Landscape painting rose to its height of feeling and expression: the Southern romantic school included Ma Yuan, Hsia Kuei, and the Emperor Hwei Tsung; the Northern realistic school, Kuo Hsi and Li Ch'eng. Muh Ki for ink sketches, Chao Tan Lin for tigers, Li Ti for landscape and flowers, Mao I for still life, are also memorable. But supreme among Sung artists is Li Lung-mien, the religious painter. This greatness lasted through the Mongol dynasty (1280–1368), Chao-Meng-fu belonging to both and ranking with the greatest names. In the Ming era (1368–1644), some great men, chiefly Lin Liang, still maintained the grand old traditions; but on the whole their force and simplicity were gradually replaced by elaboration and elegance, as with Kiu Ying. The late Tsing dynasty showed no degeneration from a high Ming average, though no new schools arose. The four masters of landscape, called 'the four Wangs,' along with Yun Shou-p'ing and Wu Li, bear high rank.

For Chinese architecture, see the article Architecture.

Consult, H. A. Strong, *Chinese Art and Crafts* (1926); R. L. Hobson, *Chinese Art* (1927); W. Cohn, *Chinese Art* (1930); H. G. Porteus, *Background to Chinese Art* (1935).

Chinese Immigration. See Immigration.

Chinese Language and Literature. ***Language.***—The speech and the written words of the Chinese differ more widely than those of any other people. The former addresses itself, like all other languages, to the mind through the ear; the latter speaks to the mind through the eye, not as words, but as symbols of ideas. All Chinese literature might be understood and translated though the student of it could not name a single character. The words and the names of the written characters are all monosyllabic, and are inconjugable and indeclinable, without inflection or change of any kind, and at the same time so versatile that there are few of them which may not perform the *rôle* indifferently, according to their position in a sentence, of most of what we call Parts of Speech.

Chinese has never advanced to anything like agglutination even (see Philology); but its written characters existed probably more than 5,000 years ago. These characters are divided into six classes: (1) pictorial characters, originally rude pictures of objects; (2) indicative characters, intended by their form and the relation of their parts to suggest to the reader the idea in the mind of their makers; (3) composite characters, made up of two or more characters; (4) inverted characters, formed from others by inversion; (5) borrowed characters, used in other than their proper signification; and (6) phonetic characters, of which one part has a phonetic use, and indicates, exactly or approximately, the name of the compound, and the other part the category of meaning which it conveys. The sixth class is beyond comparison the most numerous, and embraces well on to 40,000 of the 43,000 characters found in the *Kang-hsî* dictionary of 1704.

The monosyllabic utterances available to name the 43,000 characters are few indeed. In Pekingese they are only 426. In the *Syllabic Dictionary* of Dr. Williams, containing only 12,527 characters, placed under 552 syllables, there are about 150 characters placed under the monosyllable *î* (= *ee* in see). To the eye there is no difficulty in distinguishing all these *i*'s: but to the ear such discrimination, unassisted otherwise, is impossible. To assist it, there is a system of *tones*, the number of which varies in different dialects. According to the tone in which the monosyllable is pronounced, its meaning is different; and this renders what we call a 'good ear' desirable in learning the speech of China. There are other devices by which the difficulty occasioned by the slender syllabary of Chinese speech is overcome, such as the combination of synonyms, and the multiplication of particles hardly to be found in dictionaries.

After the Buddhist missionaries came to China, and scholars acquired some familiarity with the use of the Sanskrit alphabet, they began to devise a method of spelling (so to speak) their characters, dividing each monosyllable into an initial and a final sound, and then joining two other characters together, one to give the initial, and the other, always in the same tone as the character thus spelt, to give its final sound. This method, though cumbrous, might have been of use to the student if the same characters had always been employed for the same initial and the same final sounds. But every lexicographer adopted his own characters at his pleasure.

In 1917 an important step in the cause of popular education in China was taken by the abolishing of the old classical language and the adoption, of the *pei hua* ('spoken language') for all literary purposes. This has greatly facilitated the study of the language.

A paragraph may here be allowed to what is called *Pidgin English* (q. v.), a sort of *lingua franca,* which grew up between Chinese on the seaboard and foreigners, for the purpose of intercommunication. 'Pidgin' is a Chinese attempt to pronounce our word 'business'; and the materials of the lingo are nearly all English words similarly represented or misrepresented, and called 'broken English.' The idiom, on the other hand, is that of colloquial Chinese. Foreigners get to master it in a short time, so as to carry on conversation by means of it, and to transact important affairs of business.

Literature.—The vastness and variety of the Chinese literature may be realized from a brief analysis of the contents of the catalogue *raisonné* of the works collected by an order of the Kien-lung region in 1722, to be printed or reprinted as a great national library. The catalogue is arranged in four divisions under the name of *Kû,* 'arsenals,' or 'magazines': the first, in 44 chapters, containing works on the classics and dictionaries necessary in the study of them; the second, in 46 chapters, works on history; the third, in 57 chapters, works on philosophy and the arts; and the fourth, in 53 chapters, works on poetry and *belles-lettres.*

The *Classics* are the Confucian books, and a few others, on which an amount of commentary has been expended certainly not inferior either in voluminousness or in patient care to what has been put forth on the Christian sacred Scriptures; and it still goes on without abatement. A collection of books on them by a multitude of scholars of the last dynasty was published at Canton in 1829 in 1,400 chapters.

The *Histories* are those of China itself, and are divided into four classes, according to the different methods of the authors. The first place is given to the 'Correct' and 'Authoritative,' or the 'Dynastic,' which form a collection of twenty-four different works. In general, each dynastic history contains an account of the several reigns, followed by treatises on chronology, rites, music, jurisprudence, food and goods or political economy, state sacrifices, astronomy, the five elements, geography, and especially topography, and the literature. After these treatises come a host of biographies of the most remarkable individuals of the dynasty; and the history concludes with an account of the foreign peoples with which there has been any intercourse. These notices of the dynastic histories occupy only two of the forty-six chapters of the division.

The *Philosophy and Arts* division deals with the works of the class of the *literati,* both orthodox and heterodox; of writers on military affairs; on legislation; on agriculture, horticulture, and the mulberry tree; on medicine; on astronomy and mathematics; on divination; on painting, music, engraving, and other arts; on ink and inkstones; on tea and the tea plant; and concludes with works of Taoism and Buddhism.

The *Belles-Lettres* division has the general name of *Tsî*, 'collections' or 'compilations.' It comprehends the various classes of polite literature, poetry, and analytical or critical works. Chinese poetry has no epic; but it is rich in ballads, lyrical and descriptive pieces, rhythmical effusions and songs, eulogies and elegies, and monumental inscriptions. There is no pleasanter reading than some of the historical romances, such as the *Expanded Narrative of the Period of the Three Kingdoms* (168–245 A.D.), by a *raconteur* of extraordinarily graphic power, written in our thirteenth century. Some of the best novels have been translated into European languages—*e.g.*, *The Fortunate Union*, by Sir J. F. Davis; *The Rambles of the Chang-Teh Emperor in Kiangnan*, by James Legge; *Les Deux Cousines* and *Les Deux Jeunes Filles Lettrées*, by S. A. Julien; and condensations of several of the most powerful and charming stories by Robert K. Douglas.

The last four centuries have been very productive of novels, hundreds of which have been preserved and reprinted in cheap editions. Many of these have little literary value, but the best of them—*Shui Hu Chuan*, *Hsi You Chi*, *Ju Lin Wai Shi* ('The Literati'), and *Hung Lou Mung* ('Dream of the Red Chamber')—rank among the world's masterpieces. Near the close of the Manchu dynasty a number of social novels were produced, many of which attacked Chinese officialdom in outspoken terms.

The literary revolution which took place in China in 1917, when it was declared that *pei hua* ('the spoken word') should be the literary medium for the future, was the beginning of a new era of creative and constructive literature. Practically all of the most recent publications have been in the vulgate and the opposition to *pei hua*, at first violent, has gradually so died down as to be negligible. Consult H. A. Giles, *History of Chinese Literature*; F. Brinkley, *China; Its History, Art and Literature*.

Chinese Turkestan. See Turkestan.

Chinese Wall. See Wall, Great, of China.

Chinese Wax. See Wax.

Chinese White. See Pigments.

Chin Fly (*Gastrophilus nasalis*), a species of bot fly, a parasite of the horse, mule, and other equines. It is covered with fine, dark hairs and has small, transparent wings. The eggs, nearly black in color, are deposited on the hairs of the horse's mouth and nostrils, within reach of the tongue, and are thus taken into the stomach and intestines. They hatch very quickly, causing more or less serious digestive disturbances. See Bot Fly.

Ching, one of the nine *chou* or divisions of the Chinese empire under the Hia or Hsia dynasty (2205–1766 B.C.), comprising modern Hu-nan, Hu-peh, and parts of Kwang-si, Kwei-chou, and Kwang-tung.

Ching-chou, or Tsing-chou, city, Shantung, China. It derives its chief importance from the coal mines in the vicinity. It is connected by rail with Tsingtao and Tsinan, and is near Pohshan, noted for its pottery. Pop. 35,000.

Ching Ikuang, Prince (1839–1917), Chinese statesman, was born in Peking. He was the grandson of the 17th son of the Emperor Chien Lung, who adopted him and gave him royal prerogatives. His first public office was the presidency of the Board of Foreign Affairs (1884). In 1891 he became president of the Admiralty Board, and in 1894 was created Prince of the First Order. After the Boxer uprising, he was associated with Li Hung Chang (q. v.) in the negotiations with the Powers, and for two years was president of the ministry created by the peace protocol. From 1903 to 1912 he was president of the Grand Council, when the abdication of the Manchus brought about his retirement from public life.

Ching′leput (Chengelpat), district on the coast of the Bay of Bengal, Madras Presidency, India, including within its limits the city of Madras (q. v.). There is little trade except with Madras city. The district headquarters is Saidapet, which has a government agricultural college. Area, 2,824 square miles. Pop. about 1,500,000.

Chingleput, Chingalput, or Chengalpat, town, Chingleput district, Madras, 36 miles southwest of Madras city, near the Palar River. The Madras Reformatory School (1881) is located here. A sixteenth-century fort is of historic interest as the active scene of the struggle between the French and the English under Clive. Pop. 12,000.

Ching-te. See King-te-chen.

Ching-tu. See Cheng-tu.

Chin-hai, chin-hī′, or Chen-hai, town and fortress at the mouth of the Ning-po River, China; lat. 30° 1′ N.; long. 120° 40′ E. It is the outer port of Ning-po (q. v.). Pop. 35,000.

Chiniot, chin′i-ut, town, India, in the Jhang district, Punjab, 80 miles northwest of Lahore. It is famous for its wood carving, masonry, and brasswork; and carries on an extensive trade in wheat and cotton. The town is very old. Pop. 17,000.

Chinkara, chin-kä′rȧ, or Indian Gazelle (*Gazella bennetti*), a species of gazelle known as the ravine-deer, found on the plains of Central and Northwestern India. It is a light chestnut in color, measures about two feet in height at the shoulders, and is exceedingly swift. It furnishes good sport for Anglo-Indian hunters.

Chingkiang. See Chin-chiang.

Chin-ling′, a branch of the Kwen-lun Mountains in China, running west by north and east by south through Shen-si, and dividing the higher waters of the Wei and Han Rivers. Its main pass is southeast of Sian-fu, *viâ* Shang-chou, to Lung-chü-chai. There is also an important pass west of Feng-hsiang-fu, passing by Feng Hsien (7,100 feet) to Kuang-yuan Hsien, in Sze-chuen. The highest peaks, Ta-pai-shan and Kwang-tang-shan, are over 12,000 feet high.

Chinnampo, chē-näm′pō, city and port, Chosen (Korea); situated on the north bank of the Taitong inlet about 20 miles from its mouth, in the extreme s.w. of the province of Pyeng-yang, and about 40 miles distant by water from Ping-yang. The harbor is deep and wide, affording good anchorage to large steamers, and has a large dock to which vessels can be moored during the coldest weather, when the harbor is blocked by ice. The chief exports are rice, beans, wheat, maize, cowhides and timber; imports include cotton and silk piece goods, matches, kerosene, porcelain, iron and hardware. Pop. (1933) 43,844.

Chinon, shē-nôn, town, France, in the department of Indre-et-Loire, on the bank of the Vienne, 31 miles southwest of Tours. It is an ancient town, with a castle which formed a royal residence from the twelfth century until the time of Henry IV. It has manufactures of rope, serges, wine and druggets. Rabelais was born here, and here Joan of Arc had her first meeting with Charles VII. Pop. about 6,000.

Chinook, chi-nŏŏk′, the warm, dry wind encountered on the leeward side of mountain ranges, common in the Rocky Mountains, and in Switzerland, where it is known as the föhn. As the air rises on the windward side of the mountain it expands, cools, and loses moisture with the decrease in pressure. This dry, cool wind, as it descends on the leeward side of the range, regains its heat through the contraction due to increased pressure. The high temperatures are confined to the valleys, and occur in streaks or pockets, so that a traveler frequently passes suddenly from a very warm to a very cold atmosphere.

Chinooks, an Indian tribe formerly numerous and powerful in British Columbia and as far south as Oregon. The small number now remaining (not more than 300) are on reservations in Washington and Oregon. The Chinook language served as the basis of the so-called 'Chinook jargon,' which became the *lingua franca* throughout a great part of Oregon, Washington and British Columbia. Consult Curtis' *North American Indian* (vol. VIII, 1911).

Chinquapin (*Castanea pumila*). See CHESTNUT.

Chins, a people of Burma, living near the borders of Assam, Manipur, and Bengal. They are a barbarous and turbulent people, divided into many tribes and clans and have proved the most troublesome of all the border races. The southern clans have a curious habit of tattooing the women's faces with closely set blue lines. They number about 300,000.

Chin-sha, chin-shä', or KIN-SHA-CHIANG ('River of Golden Sand'), the name given by Chinese to that part of the Yangtse-Kiang River (q. v.) which forms the boundary between China and Tibet.

Chinsura, chin-sōō'rä, town, British India, on the Hooghly River, near Calcutta. It was established by the Dutch in 1856 and ceded to Britain in 1825. It is included in the Hooghly-Chinsura municipality. Pop. 29,958.

Chintz, the English word, whose French equivalent is cretonne, for drapery prints. The Hindu word *chint,* meaning many colors, was originally applied to painted or stained calicoes imported from India. In present usage, the English prints in small floral or faunal designs of many colors are generally known as chintzes, while the French prints of larger design and heavier fabric are called cretonnes. In England chintzes are usually glazed and not less than five colors are employed in their design.

Chinu, or CHINEE, town, Columbia, capital of the province of Chinu, in the department of Bolivar; 100 miles southeast of Cartagena. It is situated in the midst of fertile plains which afford good pasturage for large herds of cattle. It was founded in 1534 on the site of an ancient Indian town. Pop. 12,551.

Chinwangtao, a treaty port, China, situated on the western coast of the Gulf of Liao, about 10 miles w.s.w. of Shanhaikwan. The port is accessible throughout the year. As a trade distributing center, its position as an open port on the main line of the Peking-Mukden Railway gives it a great advantage. The port was first opened to foreign trade in 1901. Pop. 19,100.

Chioggia, kyod'jä (Chiozza), fortified seaport and episcopal see, Italy, in the province of Venice, on the island of Chioggia, 18 miles south of Venice. It is connected with the mainland by a stone bridge and is protected against the Adriatic by a gigantic stone mole (*murazzi*) built in 1774–82, at a cost of $3,900,000. The principal buildings are the cathedral (1633) and the Board of Trade. Pop. 35,600.

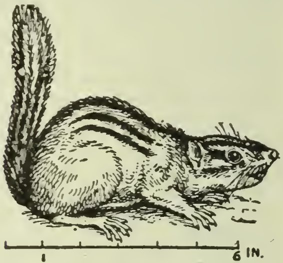
Chios, kī'os, KHIOS, or SCIO (Turkish *Sakiz-adasi*), Greek island in the Ægean Sea, about 40 miles west of Smyrna, Asia Minor. The island is mountainous (St. Elias, 4,100 ft.), picturesque, and fertile. Much attention is given to the cultivation of fruit and nuts. There are marble quarries and antimony mines. Leather, oranges, lemons, almonds, olives, olive oil, wines, wool, and gum mastic are exported. Area 318 square miles. Pop. 75,680.

Originally colonized by Ionian Greeks, the island was independent and prosperous until its conquest by the Persians in 494 B.C. On the repulse of Xerxes (479), it recovered its liberty, and until 412 was in close alliance with Athens. In the fourth century it joined the Second Athenian League, but revolted, and was again independent in 357 B.C. Chios shared the fate of the Byzantine empire, and was conquered by the Turks in 1566. In 1822 it revolted against its masters, but the rising was ruthlessly crushed and the population decimated. As a result of the Balkan Wars (q. v.), in 1913 Chios was given with other Ægean Islands to Greece, who at the close of the World War was allowed to retain it.

Chios, KASTRO, CASTRO, or LIMNO, capital and chief seaport of the island of Chios, on the east coast. The harbor has a depth of 12 to 18 feet. There are manufactures of velvet. The town was practically laid waste by an earthquake in 1881. Pop. 22,122.

Chipewy'ans, a tribe of North American Indians, members of the Athabascan family, of which they constitute the central and most important division. All the groups between the Rocky Mountains and Hudson Bay, as far south as the parallel of the Churchill River, are, strictly speaking, Chipewyans. They number about 1000.

Chip'munk, an American name for the ground-squirrels of the genius *Tamias.* They are small animals characterized by the possession of cheek pouches, and by their coloration, the back being marked by alternate light and dark bands. The tail is not bushy, but flat or feather-like in form. Chipmunks are lively, noisy, and amusingly active. They dwell by preference in rocky places, or in thickets, where they can hide quickly. In the fall they dig long burrows, enlarged and occupied by successive families for several years. Here they store supplies of small nuts, kernels of corn, and the like, to serve as winter food. When cold weather comes they retire to these underground homes and there remain till spring, venturing out occasionally on warm days.



Chipmunk

Chippawa, chip'â-wā, village, Welland county, Ontario, Canada, on the Niagara River, at the mouth of the Chippawa, about 2 miles above Niagara Falls. Pop. (1931) 1,266.

Near Chippawa, along the bank of the Niagara River, on July 5, 1814, about 1,900 Americans under the immediate command of Gen. Winfield Scott defeated about 2,100 British under Gen. Sir Phineas Riall. The American loss was 60 killed and 248 wounded; the British, 138 killed and 319 wounded.

Chip'pendale, THOMAS (c. 1710–1779), English cabinet maker, was probably born in Worcestershire. He moved to London with his father, also a cabinet maker, about 1727, and by 1753 had established a large cabinet-making and upholstery business. In 1752 he published the first edition of his book, *The Gentleman and Cabinet Maker's Director.* After his death, his son carried on his work.

Elaboration of ornament, lightness combined with solidity of design, and harmony of proportion are the distinguishing features of the best Chippendale furniture. Characteristic details of the style in chairs, upon which Chippendale's fame chiefly rests, are cabriole legs (from Holland), often finished with claw and ball feet; the strap or ribbon back (from France), and lattice-work designs (from China). His favorite wood was dark mahogany. Consult O. Brackett, *Thomas Chippendale* (1924).

Chippenham, chip'*en-am*, town, England, in Wiltshire, on the Avon; 25 miles east of Bristol. It is famous as a cheese and grain market. About 3 miles southeast is Bowood Park, the seat of the Marquis of Lansdowne, with a famous picture gallery. Three miles to the south is Lacock Abbey, founded in 1232, now used as a private residence. Pop. (1931) 14,487.

Chip'pewa Falls, city, Wisconsin, county seat of Chippewa county, on the Chippewa River, 133 miles S.E. of Duluth, Minn. Its manufactures include shoes, gloves, bags, beet sugar, flour, woolen goods and foundry products. Settled in 1837, Chippewa Falls was chartered as a city in 1870. Pop. (1930) 9,539.

Chip'peways. See Ojibways.

Chiquinquira, chē-kēn'kē-rä', town, Colombia, in the department of Boyaca, 8,600 feet above sea level; 80 miles northeast of Bogotá. It contains one of the finest churches in the country, whose miraculous image of the Virgin makes it a resort of pilgrims. The chief occupation is cattle-grazing, and there is considerable trade. Pop. 13,000.

Chiquitos, chē-kē'tōs, collective name of a large group of South American Indians in Bolivia. There are as many as forty tribes, grouped into seven divisions, each with its own language—Tapacuraca, Napeca, Paunaca, Paiconeca, Quitemoca, Zuracariguia, and Moncoca. They are a merry, light-hearted people, given to singing and dancing. They cultivate white and yellow cotton and indigo, with which they prepare their striped particolored garments. They are communists.

Chiriqui, chē-rē-kē', a lagoon in the Mosquito Gulf of the Caribbean Sea, on the coast of Panama, about 35 miles long from east to west, and about 12 miles wide. The most important part commercially is the Almirante Bay, on the west, which is entered by the narrow Boca del Drago, 9 fathoms deep, on the west of Colon (Columbus Island), and the Boca del Toro, 5 fathoms deep, between Colon and Provision Island.

Chiromancy. See Palmistry.

Chiron, kī'ron, the wisest and kindest of the Centaurs, was the son of Cronos (q. v.) and Philyra, and dwelt on Mount Pelion. He won such renown for his skill in the arts, wherein Apollo Artemis instructed him, that many of the Greek heroes, including Hercules, Jason, Peleus, and Achilles, came to him for instruction. He saved Peleus from the wrath of the other Centaurs and aided him in his marriage to Thetis. Hercules accidentally wounded Chiron with a poisoned arrow, causing him such torture that he resigned his immortality to Prometheus. Zeus placed him among the stars.

Chiropractic is the science of restoring health by locating and correcting interference with nerve transmission and expression without the use of drugs or surgery. The practice of Chiropractic is based on the premise that normal function results from normal delivery of nerve impulses to all organs and tissues and that disease results from interference with such delivery. The Chiropractic premise holds that all vital organs are supplied with two sets of nerves. One of these conveys activating nerve impulses while the other conveys inhibiting nerve impulses to each organ. Any imbalance which results from interference with transmission in either of these sets of nerves leads to functional imbalance, thus resulting in either increased or decreased function. The Chiropractor contends that this functional imbalance may, if continued, lead to pathology in the organ or organs involved.

The Chiropractor diagnoses his cases, employing the usual and accepted diagnostic procedure. This he does for the purpose of learning which organs or parts of the body are affected. With his knowledge of the nervous system he knows the paths followed by the nerves supplying the organs involved and through his manipulative methods he proceeds to correct such interference.

The Chiropractor works chiefly on the spine and its immediately adjacent tissues for the purpose of relieving any pressure or tension on nerve fibers which exist between the vertebrae. However, he holds that every procedure which serves to locate and correct nerve interference is proper Chiropractic procedure. He contends that when this is done, normal function is restored and when this takes place the disease which has resulted will automatically be eliminated through the natural healing power within the body. The Chiropractor holds that his theory concerning the importance of inhibiting and activating nerve fibers in the maintenance of normal function is in harmony with the facts of physiology which have been definitely proved by scientists in no way connected with the Chiropractic Profession.

This system of healing was instituted in 1895 by Daniel D. Palmer (1845–1913), who first began to teach his doctrines and knowledge of body mechanics in Davenport, Iowa.

Consult J. A. Bombard, *The Doctor within the House* (1935); B. J. Palmer, *The Science of Chiropractic* (1917); J. M. Loban, *Technic and Practice of Chiropractic* (1920); J. S. Riley, *Science and Practice of Chiropractic* (1920); and *Chiropractic Textbook* (1927); A. A. Erz, *The Verdict of Science on Chiropractic* (1925); E. A. Thompson, *Text on Chiropractic Spinography* (1923). H. E. Vedder, *President, Lincoln Chiropractic College, Indianapolis, Ind.*

Chiroptera. See Bat.

Chiru, chē'ro͞o, Orongo, or Tibetan Antelope (*Pantholops hodgsoni*), an antelope nearly allied to the saiga (q. v.), is found at great elevations in Tibet and East Turkestan. It is about 30 inches high and has thick close fur of a pale fawn color.

Chisholm vs. Georgia. See Supreme Court, Famous Decisions.

Chislehurst, chiz'l'-hûrst, or Chiselhurst, urban district, Kent, England, 11 miles southeast of London. Camden Place, in the vicinity, was occupied by the exiled Napoleon III (1871–3) and the Empress Eugénie (1871–80). Pop. (1931) 9,876.

Chistopol, town, in the Tartar Republic, U.S.S.R., situated on the left bank of the Kama. In the town is a Russo-Tartar Pedagogical Institute, an Agricultural School and a Biological Station of the Kazan University. Pop. 17,500.

Chiswick, chis'ik, urban district, Middlesex, England, 6 miles southwest of Hyde Park. It contains some historic residences, including Chiswick House, Walpole House, the prototype of Miss Pinkerton's School in *Vanity Fair,* and the house occupied by Hogarth. The experimental gardens of the Royal Horticultural Society are situated here; also marine engineering and steam-launch works and breweries. In the churchyard are buried William Hogarth, William Kent, the Duchess of Cleveland and James McNeil Whistler. The former urban districts of Chiswick and Brentford were united by the Ministry of Health by the Middlesex Confirmation Order, 1927. Pop. (1931) 62,617.

Chita, chē'tä, town, Colombia, in the department of Boyaca, at an altitude of over 9,500 feet; 130 miles northeast of Bogotá. It has saline springs (112° F.) and rock-salt mines. Pop. about 11,000.

Chita, or TCHITA, district town and capital of the Far Eastern Democratic Republic, U.S.S.R.; situated on the bank of the Tchita River at its junction with the Inogda River. Chita was founded in 1653. After the Decembrists insurrection in 1825, the majority of the leaders were exiled here (see RUSSIA: *History*). Pop. (1933) 81,900.

Chit'aldrug', or CHITALDROOG, district in Mysore, India, with an area of 4,022 square miles. Insufficient rainfall and stony soil make the district liable to periodic drought and famine. Pop. 574,179.

Chitaldrug, chief town of Chitaldrug district, India. Blankets and cotton cloth are manufactured. The town has extensive fortifications, dating from the eighteenth century, and a series of ancient subterranean chambers containing shrines, baths, and pedestals. Pop. 8,520.

Chitambo, chē-täm'bō, CHITAMBO'S, or TSHITAMBO'S, former village in the country of Ilala, 50 miles to the southeast of Lake Bangweolo, Africa. Livingstone died here in 1873.

Chitin, kī'tin, a skeletal substance present in all arthropods, and described also in some other animals—e.g. in the shell of the brachiopod Lingula. It is an amorphous white substance, containing nitrogen but free from sulphur. Its resistance to acids and alkalies is very great; it is unaffected by digestive ferments, by water, hot or cold, by alcohol or ether. It may be dissolved by strong mineral acids (hydrochloric or sulphuric).

Chiton, a genus of marine molluscs, type of an important sub-class which may be regarded as introductory to gasteropods. The body bears eight dorsal shell-plates, usually so jointed that the animal can roll itself up.

Chitra, the AXIS DEER (q. v.).

Chitral, chi-träl', a native state in the Northwest Frontier Province, India, on the northwest frontier of Kashmir. It covers an area of about 4,500 square miles. Spurs from the Hindu-Kush spread over the whole country, which is inhabited by turbulent hillmen. The cultivation of the soil, order, and general prosperity have greatly increased under British supervision. Grain is the chief crop; iron and copper are found, and carpets and daggers are manufactured for local use. The capital is Chitral.

Chitral commands the easiest and most important passes over the Hindu-Kush, and in 1876 Kashmir secured the suzerainty of the state. On the death of the chief of Chitral, in 1895, complications arose, and the British agent, Sir George Robertson, found himself besieged in Chitral fort, but was relieved by Colonel Kelly after a brilliant march from Gilgit. Pop. about 75,000.

Chittagong, chit-*a*-gong', district, Bengal, India, consisting of a narrow strip of country lying between the Bay of Bengal and the Chittagong Hill Tracts. Area, 2,567 square miles. Pop. 1,450,000

Chittagong, town, Bengal, India, in Chittagong district, a few miles above the mouth of the Karnaphuli River, near the head of the Bay of Bengal. It is an important port, shipping rice, jute, and tea. Pop. 28,800.

Chittagong Hill Tracts, district in the Chittagong division of Eastern Bengal and Assam, India. It is covered with dense jungles, the haunt of the elephant, rhinoceros, and tiger; but the interior is gradually being opened by roads. Area 5,413 square miles. Pop. 175,000.

Chittagong Wood, the wood of the *Chickrassia tabularis,* a tree indigenous to the Chittagong Hill Tracts, India. It is called Indian mahogany and is much used in India for furniture, being light, cheap, durable, and handsome.

Chittem Bark. See CASCARA BARK.

Chit'tenden, RUSSELL HENRY (1856–1943), American chemist and educator, was born in New Haven, Conn. He was graduated (1875) from the Sheffield Scientific School, Yale, and continued his studies at Heidelberg. In 1882 he was appointed to the chair of physiological chemistry at Yale, and in 1898 became director of the Sheffield Scientific School. He retired as director and professor emeritus in 1922. Publications include *Nutrition of Man* (1907); *Development of Physiological Chemistry in the United States* (1930); and editor of *Studies in Physiological Chemistry* (4 vols. 1884–1901).

Chiung-chou, kyōōng'-chou', or KIUNG-CHOW; treaty port and capital of the island of Hainan, Kwang-tung, China. The port is Hoihow. The city is famous for the excellence of its paper. Pop. 45,757.

Chiusi, kyōō'sē (ancient *Clusium*), town, Italy, in the province of Siena, 55 miles southeast of Siena. It was one of the twelve leading cities of the ancient Etruscans, and has extensive tombs, with many Etruscan inscriptions; also an Etruscan museum, a tenth-century cathedral, and remains of mediæval walls. Pop. 6,000.

Chivalry, shiv'*a*l-ri, the knightly system of the Middle Ages, particularly in its more ideal aspects. It is practically synonymous with knighthood, but with this difference—that as generally employed it denotes the ideas and customs prevailing among the noble caste rather than the estate itself. It embraced the knight's duty to God, to his lord, and his lady. War was his chief business, honor and religion the sanctions of his actions, and to do the pleasure of his lady, his chief joy and solace. With obligations to dependents chivalry did not concern itself, the knight's attitude toward the peasant being merely that of an owner toward a chattel.

Chivalry was based upon the military and territorial system of the Teutonic nations which distinguished between men of noble birth and the rest of the world; but though its usage and honors were not allowed to any of low degree, its maxims, alike in what they enjoined and what they condemned, were felt as a vital force in the entire social structure. It was powerful both for good and evil. In so far as it tended to foster a contempt for inferiors its influence was bad; in so far as it upheld courtesy, honor, and religion, it was good.

In England the term chivalry was used in a technical sense to denote military tenure, or tenure by *knight's service.*

With the introduction of new and foreign elements into war and society, the employment of artillery and infantry which reduced mail-clad cavalry to an inferior position, the disappearance of the tournament, and the rise of democracy, came the decline of chivalry. With the decay of feudalism, it too passed away. See FEUDALISM; KNIGHTHOOD.

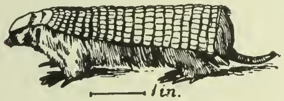
Chivasso, kē-väs'sō, town (fortified until 1804) and episcopal see, Italy, in the province of Turin, on the River Po, 18 miles by rail northeast of Turin. It has a cathedral, a mineral spring, and baths. Pop. 10,932.

Chive, or CIVE (*Allium schœnoprasum*), a perennial plant native to Europe and the Northern United States, allied to the leek and the onion. It grows to a height of six or eight inches, bearing narrow, hollow leaves and violet-colored flowers. The green leaves are used in soups, salads, and for seasoning. Chives are easy to cultivate, the clumps only requiring to be divided every three or four years.

Chizerots. When the Moslem Army under Abdur-Rahman was routed by Charles Martel at Tours (732), many Saracens remained in certain districts of France, where their descendants are still found. The inhabitants of the village of Uchizy, in the department of Saône-et-Loire, claim Saracenic origin, and call themselves Chizerots; while the inhabitants of the villages of Boz, Ozan, Arbigny, and Sermoyer, on the opposite bank of the Saône, claiming similar descent, call themselves Burins, being distinguished by tall, slender figures, dark complexions, and melancholy aspect.

Chladni, Ernst Florens Friedrich (1756–1827), German physicist, was born in Wittenberg. He devoted himself to the study of acoustics. His work on *Sound* (*Akustik*) is the basis of the mathematical theory of vibrations yielding musical tones. 'Chladni's figures,' so well known in the physical laboratory, exhibit the vibrations of metal or glass plates.

Chlamydophorus ('cloak-bearer'), a genus of small armadillos, remarkable for the peculiar nature of their armor. The best-known species is the pichiciago (*C. truncatus*), which has the head and body covered by a dorsal shield made of four-sided, horny plates, beneath which lie thin plates of bone. This shield is only attached along the median line of the back, and is free at the sides. The posterior end of the body is abruptly truncated, and is protected by a strong, vertical, bony shield, covered with horny plates, through a hole in which the tail passes out. It is a burrowing animal about five inches long, and inhabits the western part of Argentina.



Chlamydophorus.

Chlamys, a short, oblong mantle, generally of wool, worn by the ancient Greeks, and adopted to some extent by the Romans of the Empire.

Chloasma, Liver-spot, or Melanoderma, a condition of the skin characterized by the presence of yellowish-brown patches. It is not an uncommon result of continued irritation of the skin, as in the use of certain drugs—*e.g.*, iodine—or it may be an after effect of various skin diseases, such as pediculosis, psoriasis, and syphilides. In other cases it is associated with increase of the uterine substance, either during pregnancy or with the growth of tumors; while often no cause can be discovered. As the treatment must be directed toward the removal of the cause, in many cases nothing can be done.

Chlopicki, Josef (1771–1854), a Polish soldier and patriot, was born in Galicia. He took part in the campaign of 1792–4 against Russia and Prussia. After the fall of Poland he joined (1797) the French Army, serving under Napoleon with great distinction in Italy (1799–1801), at Eylau and Friedland (1807), Spain (1808–11), and Russia (1812). At the second Polish insurrection (1830) he was made dictator of Poland, but resigned after six weeks' tenure. He fought as a private soldier at Grochou, where he was wounded.

Chloral ($C\,Cl_3\,C\,H\,O$), chemically Tri-chlor-aldehyde, known commercially under this name in the form of its hydrate ($C\,Cl_3\,CHO.H_2O$) — *i.e.*, Chloral Hydrate. Chloral was discovered by Liebig in 1832, and introduced into medicine by O. Liebreich of Berlin in 1869. It is prepared by passing chlorine for several weeks through alcohol, kept cold, until the gas ceases to be absorbed. The alcohol is next heated gently to 60° c., and further saturated with chlorine. The resulting impure product (chloral alcoholate) is then shaken with sulphuric acid, whereby chloral separates as an oily fluid, which is rectified over calcium carbonate. Pure chloral, when mixed with the necessary quantity of water, yields the crystalline hydrate. Anhydrous chloral forms a colorless, oily fluid of penetrating odor; specific gravity, 1.512 (20° c.); boils at 96 to 97° c., and is soluble in most volatile solvents. It readily unites with water to form chloral hydrate; with alcohol, to form chloral alcoholate ($C\,Cl_3\,CH.OH.O\,C_2H_5$); with alkali bisulphites, to form crystallized aldehyde sulphites ($C\,Cl_3\,CH.OH.MeSO_3$); with ammonia, to form chloral ammonium ($CCl_3.CH.OH.NH_2$), and with numerous other bodies.

Chloral Hydrate, commonly called and sold as *chloral*, occurs in colorless crystals or white cakes, of pungent odor and taste. When heated it melts, boiling at 97.5° c. When heated with caustic alkalis, chloral and its derivatives yield chloroform ($CCl_3\,CHO + KOH = CHCl_3 + HCOOK + H_2O$). The tests for chloral are the same as for chloroform (q.v.). It is a hypnotic, to be used under the guidance of a physician. The sleep produced is frequently attended with hallucinations and other disagreeable symptoms. Chloral is known among the criminal class as 'knock-out drops.' It possesses antiseptic properties, and will preserve animal tissues from putrefaction.

Among the various compounds of chloral used medicinally are *Chloralamid* (CCl_3-$CH.OH.NH.CHO$)—chloral formamid—obtained by action of formamid ($HCONH_2$) on chloral; colorless prismatic crystals fusing at 115° c.; used as a succedaneum for chloral. *Chloral-ammonium* ($CCl_3CH.OH.NH_2$-OH), a compound of chloral and ammonia; used like chloral. *Chloralamid* ($CCl_3OH.NH$), obtained by heating chloralammonium; a crystalline powder used as a hypnotic. *Chloral Camphor*, an oily fluid obtained by triturating chloral hydrate with camphor; is decomposed by water; is employed locally as a counter-irritant in neuralgia, etc. *Carbolated Chloral*, a solution of phenol (14 parts in chloral, 10 parts); used as a local anæsthetic and counter-irritant.

Chlorates. See Chloric Acid.

Chloric Acid ($HClO_3$ or $ClO_2.$-OH), known only in its forty-per-cent. aqueous solution or its salts. It is prepared by decomposing a concentrated solution of barium chlorate with sulphuric acid, filtering off the insoluble barium sulphate, and concentrating the filtrate in vacuo. If concentrated above forty per cent., the solution decomposes into perchloric acid, chlorine, and oxygen. Chloric acid oxidizes sulphur and sulphides, phosphorus and phosphides to their acids, and decomposes hydrochloric acid into chlorine and water ($HClO_3 + 5HCl = 3H_2O + 3Cl_2$). Care must be exercised on mixing the acid or rubbing its salts (chlorates) with readily oxidizable substances as sulphides, alcohol, sugar, tannin etc., owing to violent explosions which readily take place.

When hydrochloric acid is heated with chlorates, chlorine with a little chlorine oxide is generated ($KClO_3 + 6HCl = KCl + 3H_2O + 3Cl_2$); the acid should always be in excess. Sulphuric acid should never be used in this connection, owing to the generation of chlorine peroxide (ClO_2), which explodes when warmed. Chlorates are now chiefly prepared by the electrolysis of a hot solution of potassium chloride ($6KCl + 3H_2O = KClO_3 + 5KCl +$-$3H_2$), platinum electrodes being used and the solution kept slightly alkaline during electrolysis. (See Potassium Chlorate).

Chlorates (chiefly potassium) are used in preparing oxygen, in pyrotechnics, for detonators, in making matches, and in general as an oxidizing agent. See Electro-chemistry.

Chloride of Lime, Chlorinated Lime. See Bleaching Powder.

Chlorimetry, the estimation of free or available chlorine (loosely combined) present in chlorine water, Javelle water, or Labarraque's solution ('bleach') or bleaching powder (chlorinated lime). *Bunsen's Method* consists in adding an excess of potassium iodide to a weighed quantity of the solution, well diluted, followed by a diluted acid which liberates the chlorine (not necessary in chlorine water). This, in turn, liberates a molecular equivalent quantity of iodine, which is then determined by gradually adding a decinormal solution of sodium thiosulphate until the color of the mixture (due to free iodine) is discharged. Each c.c. of the thiosulphate solution = 0.003546 gm. Cl. Since $2Cl + 2KI = 2KCl + I_2$, $-2I + 2Na_2S_2O_3.5H_2O = 2NaI + Na_2S_4O_6 + 10H_2O$; then $Cl_2 = I_2 = Na_2S_2O_3.5H_2O$.

In *Penot's Method* a standard decinormal solution of arsenious acid is gradually added from a burette to a weighed and well-diluted quantity of the chlorine solution. A drop of the mixture is brought in contact with paper which has been moistened with potassium iodide and starch solution. As long as chlorine is present in a utilizable condition, iodine is set free from the potassium iodide, and forms a blue compound with the starch; but when all the chlorine has been used up to oxidize the arsenious acid, the reaction ceases; and by noting the quantity of arsenious-acid solution required to effect this, the quantity of available chlorine can be calculated from the equation $H_3AsO_3 + CaOCl_2 = H_3AsO_4 + CaCl_2$. Each c.c. of arsenious-acid solution equals 0.003546 gm. chlorine.

Chlorine (Cl, 35.45), an element of the halogen group, discovered by Scheele in 1774. It occurs in nature in the combined state only, chiefly with sodium as common salt, less extensively as carnallite ($K.Mg.Cl_3.6H_2O$) and sylvin (KCl); also in still smaller quantities in the form of chlorides of silver, copper, and magnesium. Owing to the ready solubility of sodium chloride, this accumulates in sea water and brine deposits.

Chlorine is usually prepared on a small scale as follows: (1) By heating manganese dioxide with hydrochloric acid ($MnO_2 + 4HCl = MnCl_2 + 2H_2O + Cl_2$). The resulting manganese chloride may be reconverted for use by mixing with lime and blowing air through it, whereby calcium manganite ($CaMnO_3$) is formed; this can be used over again (Weldon Process). (2) By heating sodium chloride with manganese dioxide and sulphuric acid ($MnO_2 + 2NaCl + 2H_2SO_4 = MnSO_4 + Na_2SO_4 + 2H_2O + Cl_2$). On a large scale, chlorine is now exclusively prepared by the electrolysis of solutions of either sodium chloride (brine) or potassium chloride, as carried out in the manufacture of caustic soda or potash by the Castner-Keller, Rhodin, Hargreaves - Bird, and Aussig - Bell processes; also through the electrolysis of fused salt by the Acker process. (See Alkali.)

Chlorine (χλωρός) is a greenish-yellow gas, 2.5 times heavier than air; of suffocating, irritating odor, attacking the respiratory organs and producing, when inhaled in sufficient quantity, symptoms of pneumonia. It can be liquefied at –40° c., or at 15° c. under 6 atmospheres pressure; its specific gravity at 14.6° c. equals 1.4278. It boils at –33.6° c. One liter of chlorine (0° c. and 760 mm.) weighs 3.2038 gm.; or 1 gm. equals 312 c.c. At 10° c., one volume of water dissolves 2.58 volumes of chlorine; at 25° c., 1.95 volumes. Liquid chlorine does not attack iron; hence it is stored in iron cylinders or tanks.

Chlorine combines directly with all elements excepting argon, helium, nitrogen, carbon, and oxygen. With hydrogen, it combines slowly in diffused sunlight, and explosively when exposed to direct sunlight. Most metals combine at ordinary temperature with chlorine — copper leaf, phosphorus, powdered bismuth, arsenic, and antimony igniting. It is by means of this gas in solution that gold and platinum are dissolved (*aqua regia*). A hydrogen flame burns in an atmosphere of chlorine, and *vice versâ*, with the production of hydrogen chloride. Chlorine displaces iodine and bromine from their compounds with the metals; and it liberates oxygen from water when exposed to the light, or in the presence of substances which combine with oxygen. On this, the bleaching action of chlorine on organic colors depends.

With alkaline hydroxids, chlorine forms hypochlorites if the solutions be kept cold ($2KOH + Cl_2 = KCl + KClO + H_2O$), or chlorates if heated ($6KOH + 3Cl_2 = KClO_3 + 5KCl + 3H_2O$). The hypochlorites are extensively used under the name of 'bleach' (usually the sodium hypochlorite). Medicinally, the sodium compound is known as Labarraque's solution, while the potassium hypochlorite is called Javelle water. On passing chlorine gas over slaked lime, bleaching powder is produced, also known as chlorinated lime (Ca.-OCl [Cl]). This should contain 30 per cent. of available chlorine. Liquid chlorine is prepared in large quantities, and used in detinning iron for making stannous chloride; also in the extraction of gold from its ores.

Medicinally, chlorine is administered in solution as chlorine water, which is defined by the U. S. Pharmacopœia, under *Aqua Chlori*, as an aqueous solution, containing, when freshly prepared, about 0.4 per cent. of free chlorine. It should be prepared fresh, as needed, since upon standing decomposition ensues. Chlorine is a powerful disinfectant, and is usually employed in the convenient form of chloride of lime (chlorinated lime). See Hydrochloric Acid. Consult Lunge's *Manufacture of Sulphuric Acid, Alkali, etc.*: Vol. iii., *The Chlorine Industry* (1911).

Chlorite, a soft, dark-green, scaly mineral which sometimes occurs in such abundance as to form rock masses. These, known as chlorite schist, are usually fissile and slaty, and often contain crystals of magnetite and tourmaline. They are found principally in regions of metamorphic rocks, with hornblende schist, mica schist, and so on.

Chlorite is a secondary mineral produced by the alteration of other minerals, such as biotite, amphibole, and pyroxene, and often replaces them completely. The old term 'greenstone' was applied to dark green decomposed rocks, which owe their color to secondary chlorite. The green color is due to ferrous iron. Chemically, the chlorites are hydrated silicates of alumina, iron, and magnesia. In cleavage, they resemble mica, differing chemically through the presence of water (about 13 per cent.) and in not containing alkalis. Quantitatively, the chlorites contain about 20 per cent. of alumina, and up to 36 per cent. of magnesia, which is often replaced by ferrous oxide (up to 30 per cent.).

Chloroform ($CHCl_3$), as used in medicine, consists of 99 to 99.4 per cent., by weight, of absolute chloroform, and from 0.6 to 1 per cent. of alcohol. Its specific gravity should be not below 1.476 at 25° c.; boils at 60 or 61° c. It possesses a hot, sweetish taste, and pleasant odor. It is not inflammable. It was discovered simultaneously by Guthrie of Sackett's Harbor, N. Y., Soubeiran of France, and Liebig of Germany in 1831, and was first used as an anæsthetic by Simpson of Edinburgh in 1848.

Chloroform is now prepared by the action of chlorinated lime upon acetone: (*a*) $2CH_3CO.CH_3 + 3Ca(OCl)_2 = 3Ca(OH)_2 + 2CH_3CO.CCl_3$; (*b*) $2CH_3.CO.CCl_3 + Ca(OH)_2 = 2CH\,Cl_3 + Ca(C_2H_3O_2)_2$. After washing with sulphuric acid and alkali carbonate it is mixed with about 1 per cent. of alcohol, which serves to prevent possible decomposition, with liberation of phosgene, chlorine, and hydrochloric acid, through the influence of light. The presence of these impurities renders administration of chloroform, through inhalation, dangerous. To test for these and other possible impurities, chloroform, when shaken with distilled water, should not affect either litmus paper, a solution of silver nitrate, or potassium iodide.

Chloroform possesses excellent solvent properties for rubber, resins, fats, and oils. It also prevents alcoholic, lactic, and other fermentations. As test, chloroform when heated with caustic soda and aniline develops a sickening odor (isobenzol nitril); also when warmed with a solution of caustic soda containing resorcin, a pink color results. When heated with caustic alkalis it is decomposed into the alkali formate and chloride.

Medicinally, chloroform is used in aqueous and alcoholic solution, in emulsions, and in liniments. Externally it is an irritant, causing blistering if confined on the skin. Small doses produce warmth and burning in the stomach; larger doses, gastro-enteritis. As an anæsthetic it first produces excitement of the brain centres, followed by gradual unconsciousness; then of the spinal cord centres, followed by paralysis, loss of sensation and of the reflexes. The lower centres, or those parts of the brain chiefly concerned in involuntary actions, as breathing and heart movements, are only slightly affected. If administered too long or excessively, the vasomotor system becomes paralyzed, and death ensues.

Chlorophyll, to which the green color of leaves and the other exposed parts of plants is due, occurs in minute green spherical or lenticular granules (3 to 10 *u* diameter), or star or ribbon shaped mosses (in algæ). It belongs to the class of vegetable pigments called chloroplastids, which occur in roots, leaves, and fruits of a yellow or orange (chromophyll) or green (chlorophyll) color. These plastid pigments are distinguished from all other color-bodies present in plants by their insolubility in water and solubility in ether, chloroform, petroleum ether, etc.

Chlorophyll is made up of carbon, hydrogen, oxygen, nitrogen, and magnesium, the latter being in complex organic combination. The formation of chlorophyll seems to depend upon the presence of magnesium and iron, although the latter is not present in the pure substance.

Chlorophyll plays a very important part in the synthetic processes of plant life, its functions being, under the influence of sunlight, to assimilate the carbonic acid of the atmosphere, converting it into carbohydrates with simultaneous evolution of oxygen. When the carbonic-acid assimilation is active, starch is stored; and when it ceases at night, diastase is produced, while the starch is dissolved. It is possible that the magnesium serves as a catalytic agent. The possible reactions involved are of a complex nature. Flowers give off carbonic acid, while leaves absorb this. A chemical transformation of chlorophyll causes the color changes which take place in leaves in autumn.

Aqueous solutions of chlorophyll give characteristic absorption bands in the spectrum, their position depending on the dilution of the solution. Solutions of chlorophyll in ether, alcohol, or benzol are bright green in transmitted light, while in reflected light they show a red to blue-red fluorescence. It may be prepared by extracting ground leaves with wood spirits. The extract, after concentrating, is shaken with water and petroleum ether. The latter, which dissolves the chlorophyll, is separated and distilled off, leaving a dark green, amorphous mass, which constitutes the commercial article.

Chlorophyll is largely employed in coloring foods, candies, and liqueurs.

Chlorosis (Greek *chloros*, 'green') is a form of anæmia occurring in young girls that gets its name from the characteristic tinge of paleness which accompanies it. 'Green sickness' was the name formerly applied to it. Pathologically, it is marked by a deficiency of hæmoglobin, often to 40 or 50 per cent. of the normal amount, and a consequent failure of nutrition in all parts. The disease is most likely to show itself between the fourteenth and seventeenth years, soon after puberty is reached; but any special strain on the system may bring it on at a later date. Lack of proper exercise and of fresh air, the use of improper food, and emotional and nervous disturbances are important factors.

SYMPTOMS.—The patient probably complains first of breathlessness. Her heart troubles her with palpitations and irregularity. There may be puffiness of the face and swelling of the ankles. The hands and feet are often cold. If the case is one of long standing she may complain of gastric pains after food, and possibly of sickness and vomiting. Constipation is a common symptom. With this she has a sickly complexion of a yellow-green tinge, and her conjunctivæ and lips are pale. The subcutaneous fat is well retained, however. She may be troubled with dizziness, or even fainting, and is likely to be mentally heavy and stupid. She tends to suffer from amenorrhœa, due to the anæmia. Gastric ulcer is a frequent complication.

TREATMENT consists of rest, fresh air, and sunlight, with all the exercise that can be borne without tiring; with easily digested, nutritious food, the avoidance of constipation, and the use of some form of iron, commonly the ferrous carbonate, in pills or capsules. It is important to persist in the use of iron for at least three months; and, if necessary, subsequently to resume it in smaller doses, as recurrences are common. Arsenic is sometimes given with the iron, with great benefit to the patient. Tincture of strophanthus is recommended by some practitioners, while others rely on regulation of diet.

Chlorosis is not dangerous in itself, but the general weakness which accompanies it makes the patient liable to any prevalent disease. See ANÆMIA.

Choate, JOSEPH HODGES (1832–1917), American lawyer and diplomat, cousin of Rufus Choate (q.v.), was born in Salem, Mass. He was graduated from Harvard (1852) and from the Harvard Law School (1854). In 1859 he was admitted to membership in the famous firm which subsequently became Evarts, Southmayd & Choate — William M. Evarts (q.v.) being the senior partner — and he eventually won a position at the American bar comparable to that of his kinsman before him. He appeared as counsel in many noted cases—*e.g.*, the Income Tax Case, before the U. S. Supreme Court, the Tilden and A. T. Stewart cases, and the

Leland Stanford, Vanderbilt, and Stokes will cases. He joined the Republican Party soon after its organization, and was a frequent and most effective speaker in political campaigns, though he never held elective office. He was a leading member of the Committee of Seventy which crushed the notorious Tweed Ring (1870–1) in New York. He was president of the New York State constitutional convention (1894), and was U. S. Ambassador to Great Britain (1899–1905), where he gained immense popularity, and did much to cement the kindly feeling between this country and Great Britain. He was U. S. Ambassador and First Delegate of the United States to the International Peace Conference at The Hague in 1907. He was an LL.D. of Cambridge, Edinburgh, Glasgow, St. Andrews, Harvard, Yale, Amherst, Williams, Pennsylvania, and Union, and D.C.L. of Oxford; and served as president of the American Bar Association, trustee of the Equitable Life Assurance Society, and trustee of the Metropolitan Museum of Art. He published: *Abraham Lincoln and Other Addresses in England* (1910); *American Addresses* (1911).

Joseph H. Choate.

Notwithstanding his advanced years, Joseph H. Choate took an energetic part in the entertainment of the British and French war envoys to America in May, 1917; and these activities hastened his death, which occurred suddenly, from heart failure, on May 15, 1917. He ranked as one of the noted orators of his times, and both his public speeches and legal battles attracted wide attention.

Choate, RUFUS (1799–1859), American lawyer and political leader, was born in Ipswich, Mass. He was graduated from Dartmouth College, at the head of his class, in 1819; studied law at Harvard and in the office at Washington of Attorney-General William Wirt; was admitted to the bar in 1823; and became one of the ablest and most eminent lawyers in the history of the American bar. Though he generally refused to accept public office, he was deeply interested in public affairs, and was often called into consultation by political leaders, with some of whom, such as Daniel Webster, he was intimate. He served in the lower house of the Massachusetts legislature (1826); in the State senate (1826); in the National House of Representatives (1831–4), and in the U. S. Senate (1841–5). He took high rank as a brilliant debater on the Whig side; was conspicuous particularly as an advocate of protectionism, and vigorously opposed the annexation of Texas. He subsequently supported the Compromise Measures of 1850; and in 1856 advocated the election of Buchanan rather than of Frémont. Consult *Works of Rufus Choate, with a Memoir* (2 vols., ed. by Brown); Whipple's *Recollections of Rufus Choate;* J. H. Choate's *American Addresses.*

Chobe, chō'bē, river, South Africa, rises in the east of Angola, and flows southeast and then east for about 600 miles, under the names of Kwando, Linvanti, and Chobe, to join the Zambesi.

Choco, chōkō, intendency, Northwest Colombia, bounded on the west by the Pacific Ocean and Panama, on the north by the Gulf of Darien. Gold, platinum, rubber, ivory, lumber, and cocoanuts are exported. Area, 18,610 square miles. Pop. 65,000.

Chocolate. See COCOA.

Choctaws, chok'tôz (properly CHAHTAS), an Indian nation, one of the chief members of the Muskhogean family. Akin to and formerly in alliance with the Chickasaws (q.v.), these two nations originally occupied the eastern side of the Mississippi, between its Ohio and Yazoo affluents. The Choctaws were more to the south, holding both banks of the Yazoo till the year 1830, when they ceded their hunting grounds to the United States. They are now settled chiefly at Union Agency, Oklahoma, where they number about 16,000.

Chodowiecki, kō-dō-vyets'ki, DANIEL NIKOLAUS (1726–1801), Polish painter and engraver, called 'the German Hogarth.' Nearly every new artistic book of his time was illustrated by him, notably several of Shakespeare's plays, *The Vicar of Wakefield, Don Quixote,* the works of Voltaire, Lavater, Schiller, etc.

Choëphori, a Greek tragedy by Æschylus.

Chœropus. See BANDICOOT.

Choga, chō'gä, or KIOGA, a lake in Uganda Protectorate, extending, at an elevation of 3,320 feet, from about 32¼° to 33° east long. Area, 800 sq. m. It is traversed by the Victoria Nile, and receives the waters of the Seziwa.

Choir. Properly, that part of a church appropriated to the singers. In the earlier buildings it extends from the apse into the nave, and is architecturally a part of the latter, distinguished only by a slightly raised platform and a low barrier; it was occupied by the lower clergy. Later it included the entire upper end of the church, and as an architectural term it usually has this meaning, regardless of the use to which the space is put. It was reserved for the canons, priests, monks, and choristers. In cruciform churches the choir is sometimes beyond the transepts, sometimes between them, and in a few cases extends into the nave.

The term choir is also applied to the body of singers assisting in, or entirely performing, the vocal music of a church service, whether of four parts or a chorus. A choir singing unaccompanied is termed *a cappella*, the method employed in the Eastern Church. In the Lutheran churches in Germany it is the custom for the choir to sing alone *a cappella*, and the congregation to sing alone, with organ accompaniment.

Choiseul-Stainville, ETIENNE FRANÇOIS, DUC DE (1719–85), French statesman, was born in Lorraine, and, after fighting in the Austrian Succession War, became French Ambassador at Rome, and at Vienna. He was Minister of Foreign Affairs from 1758 to 1761; Minister of War and the Marine from 1761 to 1766; and again Minister of Foreign Affairs from 1766 to 1770. He adopted a vigorous policy, and secured the alliance of Charles III. of Spain against the naval supremacy of England and her predominance in America. But the Peace of Paris (1763) concluded a war disastrous to both France and Spain. Choiseul's policy during the years 1763 to 1770 was to strengthen the bonds between France and Spain, to unite all Bourbons, and, after careful preparations, to recover from England some of the territories ceded by the Peace of Paris. He also aided Madame de Pompadour and the Parliament of Paris to expel the Jesuits from France. When, in 1770, Spain quarrelled with England over the Falkland Islands, Choiseul proposed to support Spain; but Louis XV. dismissed him. During his tenure of power, Lorraine was united with France and Corsica was annexed. See Daubigny's *Choiseul* (1892); Maugras's *Le Duc et la Duchesse de Choiseul* (1902).

Choisy-le-Roy, town, department Seine, France, on left bank of Seine, 7 m. S.E. of Paris. Rouget de l'Isle, author of the *Marseillaise*, died here in 1836. The town has manufactures of porcelain, earthenware, felt hats, gloves, etc. Pop. (1906) 12,000.

Choke-cherry. See CHERRY.

Choke-damp, or AFTER-DAMP, is the name given to carbon-dioxide gas when present in the air of caves, wells, and mines. In such circumstances it is chiefly produced in dangerous quantities by the explosion of fire-damp (methane) of coal dust with air, and, as it is irrespirable and poisonous, is the main cause of the deaths following an explosion. See CARBON; MINING.

Choking, suffocation by obstruction in the windpipe, preventing the passage of air to the lungs. The cause of obstruction may be a substance drawn directly into the windpipe, or it may be a substance lodged in the gullet, or a growth in the surrounding tissue that compresses the windpipe. The choking caused by compression from outside is more particularly known as strangling (see STRANGULATION). The face becomes a dusky blue, breathing ceases, and the heart stops. (See ASPHYXIA.)

Treatment.—Removal of the obstruction, when possible, is of course the first remedy. If this cannot be done, the windpipe below the obstruction should be opened by laryngotomy or tracheotomy (qq.v.). After removal of the obstruction, artificial respiration or bleeding, to relieve pressure on the paralyzed heart, may be advisable.

Cholagogues are drugs that increase the flow of bile. See PURGATIVES.

Cholelithiasis. See GALL STONES.

Cholelithotrity, the operation of crushing gall stones.

Cholera, Asiatic, a deadly parasitic endemic and epidemic disease, characterized by acute diarrhœa, vomiting, feeble circulation, coldness, cramps, and collapse. The parasite is the *comma bacillus*, discovered in 1883 by Koch, and so called on account of its shape; it is of microscopic size (about 1.5 micromillimetres in length), is motile, has one terminal flagellum, and is frequently linked with others of its kind, so that the microscope shows circles and spirals in addition to single commas. It flourishes in a damp, warm soil. Long drought kills it, or so diminishes its number that an epidemic dies away, to return perhaps with the next rainy season. Some hold that the home of cholera is in Lower Bengal, about the delta of the Ganges; others regard it as endemic in every province in India. In China, about the delta of the Yang-tse-kiang, it appears every year with perfect regularity; and it often arises about the delta of the Nile at a corresponding period. From the places named it spreads epidemically, its spread corresponding with the lines of commerce and pilgrimage, such as the routes to Mecca, and it proves fatal in 50 to 55 per cent. of those affected. It is principally a water-borne disease. The bacilli flourish in the intestine and in the intestinal contents; but as a rule they do not continue alive there more than ten days. There are, however, cholera carriers—*i.e.*, healthy persons whose stools show the cholera vibrio. They are voided with the fæces, and then usually stay alive only two or three weeks; but under exceptional conditions they may continue active for five or six months. The usual cause of an epidemic is the entry of the bacilli into water which is used for drinking purposes or to wash cooking utensils. The disease is also spread by infected articles of food, and the germs may be carried by flies.

The incubation period varies usually from two and one-half to five days, but in epidemics the disease sometimes appears twenty-four hours after the opportunity for infection, and sometimes not until ten to fourteen days later.

The victims of cholera are those whose intestines are weakened by previous illness, bad feeding, exhaustion, or excess in eating or drinking. Thus, in affected areas, the European population suffers vastly less than do the natives, owing to its cleaner habits and its better sanitary arrangements; and of those Europeans who are attacked, an undue proportion belongs to the visiting seafaring population. In an epidemic, cases vary from those rapidly fatal to those of hardly recognizable diarrhœa; but with the typical pronounced case, in the course of a few hours after diarrhœa begins the stools have the typical 'rice-water' appearance—*i.e.*, they are thin, watery, and colorless, except that they contain quantities of floating white particles like rice, which are shreds of intestinal mucous membrane. Vomiting begins, at first of the stomach contents, and later of 'rice-water' material. Then the surface of the body becomes very cold, while the temperature of the intestine, as shown by the thermometer in the rectum, rises much above normal. The appearance of the patient changes rapidly, the skin becomes wrinkled and gray, the nose thin, the eyes sunken, and the cheek-bones prominent. The patient suffers severely from intense cramps of the limbs and unquenchable thirst; and unless reaction soon takes place, he falls into a collapsed condition, unable to help himself in any way, although generally quite clear headed. The dryness of mouth and throat and the general weakness make the voice hoarse and low—the characteristic *vox cholerica;* the breath is cold, 'as if passed over ice.' If a favorable reaction takes place, the patient falls into a deep, natural sleep. After that, recovery is generally rapid. Reaction may, however, be incomplete, and the patient may relapse, and die in a typhoid state—*i.e.*, a state resembling typhoid fever. This is particularly common in heavy drinkers. The attack may begin and end in death or recovery in less than twelve hours. On the other hand, if a typhoid state follows, it may last as long as ten days before death. If the patient holds out beyond that time, he may be expected to recover. It is noticeable that where there is an epidemic of cholera, it is far more virulent among early than among later cases.

TREATMENT may be divided into prophylactic and curative. *Prophylactic treatment* consists in care of the general health while in districts where cholera is endemic, or during the course of an epidemic elsewhere. All water for drinking and cooking purposes should be boiled, and all unripe and overripe fruit should be avoided.

All matter coming from choleraic patients should be disinfected with carbolic acid (1 to 20) until it can be mixed with sawdust and burned, or mixed with chloride of lime (1 to 50), or milk of lime (1 to 5), and buried far from all sources of water supply. All bed-linen, clothing, etc., used by patients must be thoroughly disinfected by boiling or by dry heat, or must be immediately burned; and utensils which have had any chance of infection must be purified with strong disinfectant solutions and dried in the sun. The purification of wells by the addition of permanganate of potash has been suggested, and it is said that if a sufficient quantity of permanganate is cast into a well at night it will settle by the morning, and the water will be fit for drinking. Quarantine is generally believed to be possible and effective. In the United States and in Germany, all persons arriving from infected districts are quarantined five days. Troops infected in barracks are put under canvas; or if already under canvas, their camp is shifted, dry and high ground being chosen.

The first step in the *curative treatment* of cholera is to stop the initial diarrhœa. This is the general practice, and for that purpose astringent and soothing drugs are used—chalk mixture, tannic-acid enemata, sulphuric acid, opium, morphia, etc. Some recommend starting treatment with a dose of castor oil or calomel; this is sound practice, as likely to help the removal of the irritant. Lead and opium pills are strongly recommended later. Large mustard poultices covering the abdomen help to keep up surface heat, and to relieve the abdominal cramps. Hot-water bottles are used for the feet, and cramps in the limbs are relieved by rubbing. The intense thirst and the vomiting are best treated with quantities of ice, sucked in small pieces. Sometimes the vomiting can be stopped by an emetic, in the shape of a tablespoonful of mustard in a pint of warm water. In the very early stage of mere diarrhœa, and in the late stage of collapse, stimulants are often useful. Subcutaneous injections of normal salt solution are also used. Hot soups and broths should be tried, and every means employed to save the sufferer's strength, for the fight against an attack of cholera is entirely a question of endurance. See Wendt's *Treatise on Cholera.*

Cholera Infantum (cholera of children). An infectious, usually fatal, disease, resembling Asiatic cholera, and generally attacking the bottle-fed infants of the poor. It is one form—the severest, but not the most frequent—of acute intestinal poisoning. The infection commonly comes from impure milk, and may be due to some poison developing in the milk before digestion, or in the stomach or intestines after the milk is taken. It may have a specific origin, but this has not yet been demonstrated. As a rule, the disease follows ordinary diarrhœa; but it may begin with startling prostration, temperature of 103° to 108° F., continuous vomiting and purging, rapid emaciation, haggard and anxious face, insatiable thirst, nervous irritability, and coma or convulsions.

TREATMENT.—Stomach and bowel washing, morphine (except when the purging has ceased or when there is stupor), stimulants, cool baths, and hypodermic injections of saline solution constitute the normal treatment. See Holt's *Diseases of Infancy and Childhood* (1907).

Cholesterin is a complex compound of an alcoholic character found in bile, gall stones, nervous tissues, and wens. It forms pearly crystals, which melt at 145° C. and boil at 360° C.

Cholet, town, department Maine-et-Loire, France, 32 m. S.W. of Angers. It has manufactures of linen and cotton cloth, lace, shoes, paper, and trade in cattle, grain, and timber. Cholet was the scene, on Oct. 17, 1793, of a disastrous defeat of the Vendéan army. Pop. (1906) 20,000.

Choliambus, or halting iambus, is a line of poetry in which the iambic movement is continued up to the last foot, and there replaced by that of a spondee or trochee. The term is applied chiefly to ancient prosody.

Cholmondeley, MARY, English novelist, great-niece of Bishop Heber, the hymn writer, was born in Shropshire, England. Ill health prevented her from receiving regular schooling, but she read widely and wrote stories and history even when a child. Since the age of nineteen, when her first book was published anonymously, she has been producing novels of considerable strength of style and characterization. Important among them are *Red Pottage* (1899); *Prisoners* (1906); *The Lowest Rung* (1908).

Cholon, province and municipality, French Cochin-China, 4 m. S.W. of Saigon. Trade in rice. Population of province, 130,000, of whom 42,000 are Chinese; of municipality, 40,000.

Cholula, ancient Aztec town, Puebla, Mexico, on the tableland of Anahuac, at an altitude of 7,500 ft., 6 m. W. of La Puebla. It had in the time of Cortes a population of over 150,000; now the district contains 40,000, and the town 10,000. There are several ruins, the most interesting being the truncated pyramid (177 ft. high, and 1,423 ft. on the E. side of base), crowned by a church of Spanish-American design, occupying the site of the oldest and highest *teocalli* ('God's house') in Mexico.

Chondrodite is red or brown mineral sometimes developed in crystalline limestones at igneous contacts, and having much the appearance of garnet. Composition, $H_2Mg_{19}Si_8O_{34}Fl_4$. Brewsters, N. Y., is a noted locality.

Chonos Archipelago, group of a thousand islands, rocks, and reefs, mainly uninhabited, off the W. coast of Chile, between the islands of Chilöe and Taytao, and separated from the mainland by the Moraleda Channel.

Chontals (*Lencas*), a widespread people of Central America, whose domain formerly comprised the eastern parts of Honduras and Nicaragua, with ramifications in Guatemala, Chiapas (S. Mexico), and Costa Rica. They are still numerous in the northeastern parts of Nicaragua and the neighboring districts of Honduras. Although despised by the Aztecs, who called them Popoloca ('aliens,' 'barbarians'), the Chontals were a more or less civilized people, as is shown by the ruins and objects found in and about the graves in districts known to have been occupied by them.

Chopin, FRANÇOIS FRÉDERIC (1809–49), Polish musical composer and pianist, born near Warsaw. He first appeared in public when nine years of age, and at nineteen started on a concert tour, later (1831) settling in Paris, where he enjoyed till his death the intimate friendship of the *élite of* that city, among others George Sand (Mme. Dudevant). As a pianist, with the exception of Liszt, Chopin was without a peer, though he seldom performed at public concerts. In his method of fingering he was among the first—if not the first—to use the thumb freely on black keys, an innovation which had an important influence on modern piano technique. As a composer for his instrument Chopin stands alone, the peculiar bias of his genius causing him to produce works incomparable with those of any other composer. Though tinged with characteristics amounting to mannerisms, his compositions are replete with a wealth of poetic imagery and beauty which renders them indescribably fascinating. He used dance forms and rhythms largely, notably that of the mazurka. Of Chopin's works the best edition is that by Karl Klindworth, published at Moscow. See his *Life*, by Karasowski (Eng. trans. 1879); Liszt's *F. Chopin* (4th ed. 1890); Huneker's *Chopin, the Man and his Music* (1900); and *Frederic Chopin as a Man and Musician*, by Niecks (1888).

Chopra, or CHOPDA, tn., Khandesh dist., Bombay, India, 105 m. s.w. of Indore; exports cotton and linseed. Pop. (1901) 18,612.

Choptank River, a river in Delaware and Maryland. It rises in Kent co. in the former and flows into Chesapeake Bay. It is navigable to small vessels for 50 m.

Chorale, a name given to words and music of a species of composition introduced by Luther into the services of the German Reformed Church and sung by the entire congregation in unison. The words were in the form of hymns, often written in the vernacular. The music, when not original, was frequently adapted from hymn tunes of the Roman Catholic Church, while secular melodies were often used. The first important collection of chorales was published at Wittenberg in 1524, by Luther and his friends Walther and Senfl.

Chord, in music, the harmonious union of notes of different pitch sounded simultaneously. See HARMONY.

Chord, in geometry, a line joining the extremities of an arc. In any conic the mid-points of a series of parallel chords lie on a straight line, called a diameter, passing through the centre of the conic. A scale of chords (geometrical drawing) is sometimes used instead of a protractor to plot out angles.

Chordata, a term sometimes preferred to the more restricted Vertebrata as a general name for the forms of life currently known as backboned animals. The term refers to the presence, at some period of life, of a dorsal supporting rod, the notochord, or *chorda dorsalis*. In all the more familiar types this notochord is early replaced by a backbone, or chain of vertebræ; but in certain of the lower forms it persists throughout life, or, as in the tunicates, disappears without being functionally replaced by any other structure. See VERTEBRATES.

Chorea, or ST. VITUS'S DANCE. Common chorea, or chorea minor, is a nervous disorder, in which there are constant uncontrollable jerking movements of the face, head, body, or limbs, and sometimes of all these. In slight cases the movement may be temporarily controlled by an effort of will, and it usually, though not always, ceases during sleep. Any excitement tends instantly to exaggerate the trouble; also weakness is shown in all voluntary movements involving the affected limbs. This is often the first thing noticed, and paralysis, not chorea, is feared. Common chorea is generally a disease of childhood, most frequent between the ages of eight and fifteen, and about thrice as common in girls as in boys. It is especially associated with rheumatism and endocarditis, often following, or being immediately followed by, acute rheumatism, and being almost always accompanied by the heart-sounds of endocarditis (inflammation of the lining membrane of the heart). In very severe cases speech and the power of swallowing may be interfered with, and the patient may need to be bound to the bed, lest the body become bruised or otherwise injured. Ordinarily an attack may last a couple of months, and will then entirely cease, leaving no ill effects; but it not uncommonly returns. Death is possible either from exhaustion or from the heart complications of rheumatism; but a fatal case is very uncommon.

The rheumatic tendency is no doubt the predisposing cause, and given that, the exciting causes are various. Malnutrition, exhaustion, and fright have each been found to be the cause in many instances.

In slight cases great good is done by complete rest from school work, which must be stopped, and by massage and passive movements. In any but the least serious cases the child is best in bed. Various sedatives have been recommended, and in severe and old-standing cases, some advocate large doses of chloral, with the aim of producing a long-continued sleep. Arsenic is one of the first remedies tried, and many cases of cure within a few weeks by large doses of Fowler's solution are recorded. These, if unsuccessful, cannot be long continued. Others recommend five-drop doses of Fowler's solution thrice daily, after food, for a five-year-old child, increasing the dose by one drop every two days, until symptoms of poisoning show themselves. A wet pack has been recommended when sleep fails, but in using this the rheumatic tendency must be remembered. Solares of Barcelona claims to have used horse serum with great success in chorea minor, and believes it to be a strong nerve tonic. It is suggested by Dana of New York and others that chorea may be truly infectious.

There is a hereditary adult chorea which is considered incurable. Chorea in adults always tends to be more severe than in children. There are other varieties described, such as the 'chronic progressive,' the 'electrical,' and 'post-hemiplegic.' Chorea gravidarum (*i.e.* of the pregnant), the only other form of any importance, tends to last during pregnancy, once started, and ceases after confinement, but at times takes a very serious form, and may recur with later pregnancies. See Halt's *Diseases of Infancy and Childhood* (1904).

Choregus (lit. 'leader or master of the chorus'), a person who at Athens supplied the expenses of the chorus in the dramas and other musical contests. This duty was connected with the state religion, all such performances being religious in nature, and was one of the regular state taxes, called 'liturgies,' which fell upon the richer classes alone. The choregus paid and maintained the chorus during the period of training, and, if his chorus were victorious, received as prize a tripod, which he consecrated, and usually built a monument on which it was placed. One such monument, that of Lysicrates, still stands at Athens, but there was a whole street of them. See Haigh's *Attic Theatre* (1889).

Choreography, the art of dancing notation—*i.e.* a system of signs used to indicate movements in dancing, just as in music the sounds are represented by notes. This art was developed by Beauchamps, the dancing-master of Louis XIV. One of the best works on the subject is Saint-Léon's *Stenochorégraphie ou l'Art d'Ecrire promptement la Danse* (1852).

Choriambus, a metrical foot of four syllables, consisting of a trochee (or choreus) followed by an iambus (- ◡ ◡ -).

Chorley, munic. bor., mrkt. tn., and par. in Lancashire, England, 8 m. N.E. of Wigan. Cotton spinning and weaving, bleaching, cotton-printing, and the manufacture of chemicals are leading industries; and there are also iron and brass foundries, boiler works, and breweries. Area (munic. bor.) 3,614 ac. Pop. (1911) 30,317.

Chorley, HENRY FOTHERGILL (1808–72), English musical critic, born at Blackley Hurst, in Lancashire. In 1833 Dilke engaged him on the *Athenæum*, where he soon became chief musical editor, holding the post till he retired in 1866. He produced several unsuccessful novels, and had three dramas acted. His best works undoubtedly are his *Music and Manners in France and Germany* (1841), *Modern German Music* (1854), and *Thirty Years' Musical Recollections* (1862). A narrow but honest conception of music made him a strong opponent of such innovators as Wagner and Berlioz. See *Autobiography* (ed. by H. G. Hewlett, 1873).

Choroid. See EYE.

Chorokh, or ZHOROKH, riv. of Transcaucasia; rises on the slopes of the Kazan Mt., N. of Erzerum; is about 215 m. long; drains 10,500 sq. m. of country, and enters the Black Sea near Batum. Its principal tributary is the Olti-chai, 90 m. long.

Chorotegans, one of the prehistoric cultured peoples of Central America, whose territory extended from Fonseca Bay round to the E. side of Lake Nicaragua. At present nearly all are absorbed in the Hispano-American populations of Nicaragua and Honduras, of which they form one of the chief constituent elements. Under Aztec and Maya influences the Chorotegans had acquired a considerable degree of culture. But by the early Spanish missionaries their temples were levelled with the ground, their idols overthrown, and their graves desecrated. The colossal basalt monoliths in the islands of Lake Nicaragua have been attributed to the Chorotegans. They mostly affect the form of rudely-carved human figures.

Chorum, tn., vilayet of Angora, Asia Minor, 100 m. N.E. of Angora. It stands on the road between Kaisarieh and the seaport of Samsun, and accordingly is a place of commercial importance. It has manufactures of leather, earthenware, etc. Pop. 12,500.

Chorus, a name given to a body of singers; also applied to a form of composition for a number of voices. In ancient Greece the chorus was a band of singers and dancers who performed on occasions of ceremony and rejoicing, and who, during representations of comedy or tragedy, remained in front of the stage, singing or dancing to fill up pauses in the acting. (See CHOREGUS.) A modern chorus divided into two choirs is termed *double;* composed of male and female voices, *mixed.* The music may be written in any number of parts, but from four to eight is the usual number. Choral compositions are varied in form. Simple, imitative, or contrapuntal harmony, recitatives for solo or chorus, or solos with choral accompaniment may all be introduced, while some composers employ antiphonal writing. See CHOIR AND CHORAL SINGING.

Chose in Action, in English law, the name given to personal property which is not actually in possession, but can only be reduced into possession by means of an action. Such things are debts, legacies, stocks, shares, patents, copyrights, and the like. At common law, a chose in action, except a bill of exchange, was not assignable so as to enable the assignee to sue upon it in his own name; he was obliged to sue in the name of the assignor or his representatives. Now, however, all choses in action are assignable in writing, and, unless assigned by way of charge only, can be sued upon by the assignee in his own name, provided express notice in writing of the assignment has been given to the debtor, trustee, or other person liable. In equity an assignment of a chose in action was often enforced when unrecognized at law, provided the assignment was made in good faith and for value. The assignability of choses in action in general corresponds to the survival of the action itself; if it is such that a man s representatives may sue upon it, it may be assigned, whereas a right of action that dies with him cannot be assigned. See ASSIGNMENTS.

Choshi, tn., Japan, on the E. coast of Honshiu or Nippon, 72 m. by rail E. of Tokyo. The inhabitants are chiefly engaged in fishing. Pop. 36,500.

Chos-Malal, cap. of the Neuquen territory, Argentina, at the junction of the Neuquen and Leubu, the highest navigable point of the former. Alt. 2,590 ft.

Chosroes I., or KHOSRAU, THE GREAT, called ANOSHIRVAN, Persian king (531–579 A.D.) of the Sassanian dynasty. An enlightened sovereign, he fostered education and intellectual pursuits amongst his people, promoted agriculture, carried out extensive public works, regulated the taxes, and encouraged commerce. In 540 he invaded Syria and Mesopotamia, and sacked and destroyed Antioch. Then, after securing his northern and eastern frontiers, the former against the new enemies the Turks, and making the distant province of Yemen in Arabia subject to his sway, he once more came (571) into conflict with Byzantium, with which he disputed the possession of Armenia. War was still waging when Chosroes died.

Chosroes II. (590–628 A.D.), called PARVEZ, grandson of the former, married the daughter of the Byzantine emperor Maurice, who aided him against insurgents. To avenge Maurice's murder by Phocas he invaded (604) the Byzantine empire; seized the frontier fortress of Dara, Damascus, and Jerusalem (614), carrying away from this last 'the true Cross'; conquered Egypt; and carried his victorious arms as far as Chalcedon, over against Byzantium. But in 622 the Byzantine emperor Heraclius was able to turn the tables by invading Armenia and Pontus, and then for six years he marched to and fro through the Persian dominions, often defeating his enemies, more often outwitting them, but never suffering defeat. At last Chosroes was deposed, and eventually killed, by his own nobles, who raised his son Kavadh to the throne.

Chouans, a name applied to the royalists of Brittany during their revolt against the first French republic. Scarcely to be distinguished at first from brigandage, the skill and devotion of Cadoudal raised it almost to a holy war; while the passionate loyalty of the Breton peasants enabled the leaders, who had about 10,000 fighting men, seriously to menace the republic, especially in 1795. The Chouans were quelled by Lazare Hoche, and after the disaster of Quiberon (July 20, 1795) the leaders were killed or obliged to surrender. An attempt made in 1799 to revive the movement was crushed, and though secret disaffection manifested itself in 1814 and 1830, such efforts came to nothing. See Kérigant's *Les Chouans* (1882); Daudet's *Emigrés et Chouans* (1895).

Chou-chia-kou, mrkt. tn., Ho-nan, China. Its position at the point on which numerous rivers (giving access to all the N. part of the province) converge makes it a very important trade depot. About lat. 33° 40′ N.; long. 114° 15′ E.

Chough (*Pyrrhocorax graculus*), a European crow of a glossy black color, with the bill, legs, and feet a bright cherry-red. It is rather smaller than the rook and frequents rocky districts. Its diet consists chiefly of insects.

Chough.

Chouquet, ADOLPHE GUSTAVE

(1819–86), French musical writer, was born in Havre. He went to the United States in 1840, where he lived for the following twenty years, returning to Paris in 1860. He wrote several light musical compositions, but is best known as a writer on the history of music, his principal book being *L'Histoire de la musique dramatique en France* (1873). From 1871 he was keeper of the collection of musical instruments belonging to the Museum of the Conservatoire, of which he published an illustrated catalogue in 1875.

Chow-chow, a breed of dog imported from China where there are two types, the smooth and the rough. The smooth type has never been popular in England or the United States. The rough type, or common chow, is a medium size dog of 'whole' color, red, black, brown, cream or white, red being the most popular. The coat is thick and dense, the tail curly and always carried over the back, head square and massive, nose short, and tongue black.

Chow-chow

The Chow is distinctly a 'one man' dog, exceedingly aloof to all but his master; he is playful and intelligent, a good watchdog, courageous but not quarrelsome.

Chrestomathy, kres-tom′*a*-thi (Gr. 'good learning'), an annotated collection of choice extracts from an author or authors, especially one compiled for instruction in a language, as a Hebrew *chrestomathy.*

Chrétien (or **Chrestien**) **de Troyes,** krā-tyaṅ′ d*e* trwä′, French poet of the 12th century, was born probably in Troyes. He enjoyed the patronage of the Countess Marie de Champagne and of Count Philip of Flanders (1169–88), guardian of the young King Philip Augustus of France (1179–82), to whom he dedicated respectively *Le Chevalier de la Charrette* and *Perceval* (*Li Conte del Graal*). Chrétien's poems are the oldest metrical romances (as distinct from *lais*) dealing with the Arthurian tradition. Modern scholars are much divided as to his relation to his sources—whether dependent on existing tradition, and retelling tales already popular, or whether the adventures were from his own imagination, and allusions to similar incidents in contemporary and later writers are to be refereed to him as the ultimate source. Chrétien's poems, by the excellence of their style, rank as French classics; he was the earliest writer in whom appear the special characteristics of French literature—lightness of touch, grace of expression, and literary style. Of his works we have *Eric et Enide; Cligès; Le Chevalier de la Charrette,* the latter part of which is by Godefroi de Laigni, working under Chrétien's instructions; *Yvain,* or *Le Chevalier au Lion* (all critically edited by Foerster); *Perceval,* or *Li Conte del Graal* (left unfinished by Chrétien, and continued by four different writers), a poem of the highest importance for the Grail student; *Vie de Guillaume d'Angleterre,* held by some scholars not to be the genuine work of the poet; *Ywain and Gawain;* Middle English translation of *Le Chevalier au Lion.*

Chrism, kriz′m, oil, sometimes mixed with balm, consecrated for use in certain sacraments of the Roman Catholic and Greek Churches. Children are anointed with it before baptism, and it is used in confirmation, in giving extreme unction to the dying, and also in anointing kings.

Chrisome, kriz′um, the robe worn by Roman Catholic infants at baptism to symbolize innocence. It represents the 'chrisome' cloth, which originally covered the head alone, and was placed there to prevent the chrism oil from being rubbed off.

Christ, the Greek *Christos* (from *chrio,* 'I anoint'), which is used in the Septuagint and the New Testament as equivalent to the Hebrew *Mashiyach,* Messiah —*i.e.* Anointed. Anointing with oil (*mashach*) was among the Hebrews the symbol of consecration to high and sacred office (*e.g.* priest, Ex. xxix. 7; king, 1 Sam. x. 1, xvi. 13; king and prophet, 1 Kings xix. 16); and in course of time the title 'anointed' came to be applied even to some who, without any special consecrative act, were believed to be the bearers of a divine commission: *e.g.* Cyrus (Isa. xlv. 1) is called the 'anointed of Yahweh.' The paramount interest of the name Christ lies in its application to Jesus of Nazareth (Matt. xvi. 16; John iv. 26). In process of time, the title, as applied to Him, became practically a proper name. See CHRISTIAN; JESUS; MESSIAH.

Christ, Disciples of, or CHURCH OF CHRIST, Disciples, an American Christian communion chiefly in the middle and western States. It is a union of two religious movements which arose early in the 19th century. The first was a revival movement in Kentucky, 1801, led by the Rev. Barton W. Stone, a Presbyterian minister. It advocated a liberal tendency for its time. Its leaders organized (1803) the 'Springfield Presbytery' and expressed their 'total abandonment of all authoritative creeds but the Bible alone as the only rule of faith and practice.' Later, the movement took the general name *Christian.* The second was a reform movement in Pennsylvania (1809) led by the Rev. Thomas Campbell and his son, the Rev. Alexander Campbell of the Seceder Presbyterian Church of North Ireland. In that year the Campbells published a Declaration and Address appealing to all Christians to unite on the plain teachings of Christ and the Apostles. They proposed to require for membership in the church only that for which a definite 'Thus saith the Lord' could be produced. This appeal led to the organization of the Christian Association of Washington, Pa., 'a society formed for the express purpose of promoting Christian unity in opposition to a party spirit.'

In 1832 the Campbell and Stone movements united, embracing all of the former and most of the latter, churches, though some of the Stone churches remained independent, later uniting with the movements led by the Rev. James O'Kelly and the Rev. Abner Jones, to form the *Christian Church,* which in 1929 united with the Congregationalists.

The principles of the Disciples are (1) Unity of the Church; (2) sufficiency of the New Testament as the only rule of faith and practice; (3) baptism of believers only by immersion; (4) every Sunday celebration of the Lord's Supper, open to all Christians; (5) the independence and autonomy of local church congregations; (6) salvation by personal faith in Christ and obedience to His commands. In 1932 the Disciples had 8,220 churches, 7,258 ministers, and 1,572,732 members in United States and Canada; and 882 churches and 135,127 members in mission fields of foreign countries. The Disciples coöperate with numerous other religious bodies.

Christadelphians, kris-t*a*-del′ fi-anz, a sect founded in the United States by Dr. John Thomas about 1850. They have no ordained ministers but meet for discussion. They reject the Trinity, believe in one supreme

God, in Jesus Christ and in His second coming to establish His kingdom on earth, and in one baptism—immersion. In 1933 they had 78 churches with a membership of over 4,000.

Christchurch, municipal borough, England, in Southampton, 5 miles northeast of Bournemouth. It is noted for its beautiful Priory Church, the longest parish church in England. Brewing and malting are local industries. Pop. (1931) 9,183.

Christchurch, city, New Zealand, capital of Canterbury provincial district, is situated on the Avon, 7 miles from its port, Lyttleton. It is a modern, well built city with broad shaded streets and handsome buildings. There are several parks and gardens, chief of which is Hagley Park of 460 acres, with its groves of stately trees and lovely flowers. Features of interest are the Cathedral, a handsome building in Early English, the Council Chamber, Christchurch Hospital, Canterbury College, the museum with a fine collection of natural history specimens, and the Supreme Court building. Sumner and New Brighton, suburbs of the city, are popular seaside resorts. Industries include foundries and manufactures of boots, shoes and agricultural implements. There is a large export trade in wool, timber and mutton. Pop. (1930) 126,040.

Christ Church College. See Oxford.

Christen, kris'ten, Ada (1844–1901), pseudonym of Christiane Breden, an Austrian poet, born in Vienna. She is the author of *Lieder einer Verlorenen* (1873), *Schatten* (1873), *Unsere Nachbarn* (1884), and *Jungfer Mutter* (1892).

Christening. See Baptism.

Christian, the universally-used designation of the followers of Jesus Christ. According to Acts xi. 26, it was first applied to the members of the church at Antioch. Baur, arguing from the fact that *ianus* is a Latin, not a Greek termination, believed that the name originated in Rome; but there is evidence to show that the form was adopted by Greek writers of a fairly early date. The word was sometimes written Chrestianos, from its resemblance to *chrestos* ('good'), and this form seems to have been favorably received by some Christian writers. The term was probably not of Christian origin, since Christians called each other 'brethren,' 'disciples,' or 'saints'; nor of Jewish, for Jews called Christians 'Nazarenes'; but of pagan, as a convenient name for a new sect.

Christian, the hero of Bunyan's *Pilgrim's Progress,* part i., who flees from the City of Destruction and journeys towards the Celestial City. His wife, Christiana, is the subject of the second part.

Christian I. (1426–81), king of Denmark and Norway from 1448, and of Sweden from 1457 to 1471. He was also elected Duke of Schleswig-Holstein (1460), whence dates the connection of this duchy with Denmark. In 1478 he founded the University of Copenhagen.

Christian II. (1481–1559), king of Denmark, Norway (from 1513), and Sweden (1520). His cruel massacre of the nobility of Sweden ('Stockholm Blood-bath,' Nov. 8, 1520) induced the successful revolt of that kingdom; and his partiality for the lower classes in Denmark and for the Catholic religion led to his dethronement by the Danish nobility (1523), and, after an unsuccessful attempt to recover (1531) the throne, to his imprisonment in the castle of Kallundborg till his death.

Christian III. (1503–59), king of Denmark (1534), and Norway. Under him the Lutheran reformation was completed.

Christian IV. (1577–1648), king of Denmark and Norway (1588–1648), founded the Danish navy and did much to promote commerce. Twice he fought with Sweden, the first war (1611–13) being concluded by the satisfactory peace of Knäröd; but the second (1643–5) led to the disastrous peace of Brömsebro. His interference on behalf of the German Protestants was equally unfortunate, ending in the rout (by Tilly) of Lutter (Aug. 27, 1626). Christian's enlightened attempt to emancipate the peasantry failed owing to the opposition of the nobles. In 1624 he founded Christiana, now Oslo, the present capital of Norway.

Christian VII. (1749–1808), a prince of weak intellect, the husband of the unfortunate Caroline Matilda, reigned from 1766.

Christian VIII. (1786–1848), the last absolute king of Norway, and king of Denmark from 1830.

Christian IX. (1818–1906), king of Denmark, succeeded Frederick vii., Nov. 15, 1863. By the war of 1864 he lost Schleswig-Holstein to the allied Prussians and Austrians. In 1842 he married Princess Louise, daughter of the Landgrave William of Hesse-Kassel, by whom he had six children. His second son, George, became king of Greece (1863); one daughter, Alexandra, was the wife of King Edward vii. of England; another, Dagmar, married Czar Alexander iii.; and a third, Thyra, married the Duke of Cumberland. Christian was succeeded by his son, Frederick (1843–1912), who took the title of Frederick viii., and was proclaimed king on Jan. 30, 1906, the day after his father's death.

Christian X. (1870–), king of Denmark, was born in Charlottenlund. He succeeded to the throne on the death of his father, Frederick viii. (1912). He married Alexandrine, Duchess of Mechlenburg-Schwerin, in 1898, and has two sons.

Christian, the Younger (1599–1626), Duke of Brunswick and bishop of Halberstadt (1616), was born in Gröningen. He fought as a Protestant leader in the Thirty Years' War, devastating the Central Germany Roman Catholic electorates and bishoprics, until defeated by Tilly at Höchst (1622). Then for some time he coöperated with another equally energetic but ill-regulated commander, Ernst von Mansfeld, under the direction of Christian iv. of Denmark, but died of fever at Wolfenbüttel.

Christian and Missionary Alliance, a Protestant body formed as the Christian Alliance in 1887 and united with the International Missionary Alliance in 1897 under its present name, with headquarters at 260 West 44th Street, New York City. Its objects are the diffusion of the Gospel and the work of evangelization in the United States and foreign lands. It has twelve districts with 416 branches in the United States and Canada, and twenty mission fields in different parts of the world. Its work is interdenominational in character and is sustained by voluntary contributions.

Christian Architecture. See Architecture.

Christianborg, kris'chanborg, town, West Africa, in the British colony of Gold Coast, situated immediately west of the Greenwich meridian.

Christian Brothers, a religious congregation founded in Ireland in 1802 by Edmund Ignatius Rice for the education of poor boys. Papal sanction was received from Pius vii. in 1820. The members devote their lives gratuitously to instruction and take the vows of obedience, chastity, and poverty. The first house was established at Waterford; branch establishments are now found in many towns of Ireland and in the British Dominions, United States and elsewhere. Most of the work of secondary education in Ireland is under their control. The

Christian Brothers are frequently confounded with a religious congregation of different origin but similar aim, known as the Brothers of the Christian Schools, founded at Rheims by the Abbé de la Salle in 1684. For centuries most of the elementary education in France was given in their schools. They spread to other countries, and now have flourishing schools in many of the British possessions, the United States and other countries. In Ireland they control many of the national schools, and manage the training colleges for male teachers. There are about 1,500 Brothers in the United States with more than 40,000 pupils under their instruction.

Christian Church, The, sometimes styled 'Christian Connection' or 'Newlights,' had its origin in 1792 in a protest against the alleged autocratic powers of the bishops in the Methodist Episcopal Church. At first the protesting party was known as 'Republican Methodists,' but in 1794 chose the name Christian. They take the Bible as their only creed, and in doctrinal teaching seek to use Biblical language as more satisfactory and less likely to cause divisions in the Church. They do not, however, exclude from their fellowship any true believer because of differences in opinion touching the interpretation of Scripture. Early in the nineteenth century similar movements sprang up among the Baptists of New England and the Presbyterians of the West. A few years later the three movements became one under the name originally chosen in 1794. In 1854 the Church divided over the slavery question, but in 1890 was reunited in a convention held at Marion, Ind.

The Christians have an ordained ministry, are congregational in government, practise open communion, and allow different modes of baptism, though the membership generally favors immersion. They have seven colleges, including one theological seminary, and maintain missions in Japan and Porto Rico.

Growing out of an overture made by this Church to several denominations in 1924, a union was effected with the Congregational Church. Publications have been combined and missionary administration united. A single organization administers the joint interests and a joint moderatorship presides over the merged denominations. The Christians have no connection with the Disciples of Christ (q. v.), with whom they are sometimes confused, or with the Christian Union and Christian Alliance Churches. Consult Burnett's *Origin and Practice of the Christians;* Summerbell's *Christians and Disciples; Centennial of Religious Journalism;* Morrill's *History of the Christian Denomination in America* (1912).

Christian Endeavor, Young People's Society of, an interdenominational world-wide organization founded in Portland, Me., in 1881, by Francis E. Clark, a Congregational minister. It originated in Dr. Clark's own church (1881) in a weekly meeting of young men and young women for prayer, testimony, and discussion of religious topics, while social, religious, and community service activities were related directly to the program. Within four years, the idea had spread to several other countries and to many parts of North America, mainly through the media of correspondence and magazine articles. Later the International Society of Christian Endeavor (first called the United Society) was formed, State and county and city unions organized, and a graded program established to parallel in an expressional and service program the age groups recognized in the Sunday Schools.

The objects of the Christian Endeavor society are to promote an earnest Christian life among its members, to increase their mutual acquaintance, and to make them more useful in the service of God. Its covenant for active members requires faith in Christ, acceptance of and allegiance to Christ, service for Christ, and loyalty to and fellowship in the Christian church. Though recognized generally by the evangelical Protestant churches, the movement itself is interdenominational and has been characterized by its insistence on church and denominational loyalty coupled with interdenominational coöperation and goodwill. Societies have also been formed in many community churches, in children's homes, in the army and navy, and in non-evangelical congregations as well, including an active unit in the Church of England. There are about three million members in North America; four million in the entire world, including sixty countries on all the continents.

The current program of the movement, known as the Witnessing for Christ program, presents objectives in the four fields of individual life, church membership, the social order, and the world at large, including international justice and goodwill.

Groups organized within the movement to give special emphasis to certain of its principles include the *Comrades of the Quiet Hour,* who devote a definite time each day to prayer and meditation; the *Tenth Legion,* who give a tenth or more of their income to religious work; the *Life Work Recruits,* who are preparing to make Christian work their full-time profession; and *Alumni,* former members organized for co-operation and counselling the Christian Endeavor active members in a given church or city or county union.

Christian Era. See Chronology.

Christiania, or Kristiania, for many years the name of the capital of Norway. It was changed in 1925, by vote of the Storthing (National Assembly), to Oslo, the city's ancient name. See Oslo.

Christianity. See Christian; Jesus Christ; Church.

Christian Missions. See Missions.

Christian Psychology. See Psychotherapy.

Christian Reformed Church. See Reformed Churches.

Christians, popular name of two religious bodies. See Christ, Disciples of; Christian Church, The.

Christiansand, town and seaport, Norway, in the southern part, at the mouth of the Otterao River; 150 miles southwest of Oslo. It is the seat of a bishop, and has a Gothic cathedral rebuilt in 1880. The chief harbor, which lies on the western side, accommodates large steamers. The town is an important fishing centre and has shipbuilding yards, sawmills, and wood pulp factories. Christiansand was founded by Christian IV. of Denmark in 1641. It suffered repeatedly from destructive fires and was practically rebuilt in 1892. Pop. (1920) 16,543.

Christian Science, a system of moral and religious instruction founded upon principles formulated by Mary Baker Eddy (q. v.) in her book *Science and Health with Key to the Scriptures,* the textbook of Christian Science, first published in 1875. In 1879 Mrs. Eddy organized in Boston, Mass., The First Church of Christ, Scientist, and was ordained its pastor. This church is now known as The Mother Church and has a magnificent building erected in 1906 at a cost of nearly $2,000,000. In 1881 Mrs. Eddy founded the Massachusetts Metaphysical College, later superseded by a Board of Education for equipping students to teach Christian Science.

Christian Science affirms that

God is the only cause and creator, that God is Person in the infinite sense but not in the humanly circumscribed sense; that the Holy Ghost is the 'Spirit of Truth,' and that Jesus Christ is the image of divine Mind, which is one with the Father. It teaches that sin, disease, and all the woes of mankind, though seemingly real, have no divine authority; that they are material, erring, mortal phenomena, and must be so recognized and overcome by spiritual understanding of divine reality. Christian Science recognizes no mind apart from God; in its practice the human will is stilled and the divine will governs. Christian Scientists believe in God, in Jesus Christ, and in the Holy Ghost, the divine Comforter. They believe in the Scriptures as the inspired word of God, in the crucifixion and resurrection of Jesus Christ, and in prayer unceasing.

In the Christian Science church, which now has over 2,600 branches throughout the civilized world, the lesson-sermon takes the place of the usual clerical address. This lesson consists of compilations from the Bible, with correlative passages from the Christian Science textbook. No individual holds the title of pastor, but the services are conducted by two readers, one reading from the Bible, and the other from the textbook.

Consult Mrs. Eddy's writings, especially *Science and Health with Key to the Scriptures,* the textbook of Christian Science, and *Retrospection and Introspection,* her autobiography.

Christians of St. Thomas. See Thomas.

Christianssund. See Kristianssund.

Christianstad. See Kristianstad.

Christian Temperance Union. See Woman's Christian Temperance Union.

Christian Union Churches, or Independent Churches of Christ in Christian Union, an organization formed in 1863–64 by seceders from five denominations on the basis of opposition to war and to the introduction of politics into the pulpit. The union is non-partisan, unsectarian, and undenominational.

Christie, Robert (1788–1856), Canadian historian and legislator, was born in Nova Scotia. In early manhood he removed to Quebec, studied law, and was called to the bar but seldom practised. In 1829 he was expelled from the House of Assembly for having advised the dismissal of certain magistrates on account of their political views. Electors returned him, and he was expelled a second time, remaining unseated until the Union (1841), when he became a member of the Canadian Assembly. He contributed vigorous but visionary articles to the Quebec *Gazette* and the Quebec *Mercury,* but his chief literary work is a *History of Canada* (6 vols. 1866), valuable as a compilation but badly arranged and lacking in clarity.

Christie's, famous art auction-room, in London, England, established about the middle of the eighteenth century by James Christie (1730–1803), and afterward carried on by his son James (1773–1831), well known as an antiquary. The present name of the firm is Christie, Manson, and Wood, and its home is at 8 King Street, St. James Square, where it has been since 1824. The best known dealers in art collections in the world, the firm has conducted many sensational sales. Among these was the sale of the Hamilton Palace collection (1882), lasting seventeen days and realizing a total of £397,562.

Christina, kris-tē'n*a* (1626–89), queen of Sweden from 1632 to 1654, was the only daughter of Gustavus Adolphus (q. v.), whom she succeeded on the throne. Her first act, on assuming the government on Dec. 17, 1644, was the treaty of Brömsebro with Denmark (1645), whereby Sweden acquired much territory; but her undue influence in the negotiations with Germany thwarted the designs of the chancellor, and caused the Peace of Westphalia to be less advantageous to Sweden than it might otherwise have been. Christina had received an excellent education and had gathered about her men of learning and culture, but financial distress, political embarassments, impatience of control, and a desire for complete independence led in 1654 to her voluntary abdication in favor of her cousin, Prince Charles. She spent some time in France, where she engaged in literary pursuits, but in 1657, having incurred the indignation of the French court by the murder of her trusted servant Monaldesco, she left France for Rome. On the death of Charles, in 1660, she returned to Sweden, and after an unsuccessful attempt to recover the throne went again to Rome, where she spent the remainder of her life.

Christine de Pisan, krēs-tēn de pē-zäṅ' (1363–1431), French author, said to have been the first woman in France who made a livelihood by literature. She wrote much, and in every genre. Her works in prose form one of the chief sources for the social history of the period, especially *Le livre des faits et bonnes mœurs du roi Charles V.* and *Le livre de paix.*

Christmas, originally *Cristes masse* ('the mass or church festival of Christ'), the English name for the season in which the birth of Christ is commemorated. It is apparent, however, that a festival was celebrated at this season long before it was held sacred as the birthday of Jesus of Nazareth. The Saturnalia of the Romans and the winter festival of the heathen Britons were both celebrated about Dec. 25; and later, the Roman festival in honor of the sun-god, Mithra (instituted 273 A.D.). From the latter the day came to be known as the 'Birthday of the Unconquered Sun'; and after its adoption by the Christian Church in the fourth century as the anniversary of Christ's birth, this name was given a symbolic interpretation.

A study of the customs associated with this period also reveals a pagan origin. The lighting of the Yule log (*la bûche de Noël*) on Christmas Eve, once a widespread European custom, is or was a function of such predominant importance among the Lithuanians and Letts that their words for Christmas Eve literally signify 'Log Evening.' The sports of the 'Lords of Misrule' in England are thought to be an inheritance from the Saturnalia. The decoration of churches with the once sacred mistletoe and holly is also a pagan survival, while the sending of gifts may be traced back to the Yule gifts of Northern Europe and ancient Rome.

The *Christmas tree,* a young spruce or similar tree with its branches gayly illuminated with colored candles, and hung with ornaments and with gifts, is of German origin. Father Christmas, or Santa Claus, who is supposed to come from the far north in his reindeer sledge, laden with toys, on Christmas Eve, is identified with St. Nicholas or Nicolas, and also with Knecht Ruprecht and Robin Goodfellow. Grimm notes that in some parts of Germany Knecht Nicolas is merely the attendant on the real gift-giver, who is sometimes the infant Christ and sometimes Dame Bertha, though he is frequently represented as an ugly hunch-backed dwarf, called Krampus, who carries off naughty children.

Tradition prescribes Christmas Eve as the proper time for putting up the Christmas greens and it was often considered unlucky to bring holly into the house before that time. Custom varies as to the time of removal of the decorations, but the Christmas season is usually considered to end with Twelfth Night, although by some it is prolonged to Candlemas.

Christmas Music occupies a large part in the season's celebration. Carol singing by the 'waits,' strolling street musicians, is an old British custom that has recently been revived in many towns and cities. Nativity plays or pageants are another ancient form of celebration which has been revived in modern times.

The *Christmas card* is of modern origin, the first one dating from about 1846. The custom of sending such cards has grown to huge proportions, and the making of the cards is now a flourishing industry. Some of the designs are the work of artists of high repute.

In the Roman Catholic, the Anglican, and the Lutheran churches, Christmas is observed as one of the great festivals of the Christian year. Other Protestant bodies are more and more tending towards a religious observance of the day. Consult Miles' *Christmas in Ritual and Tradition* (1912); Crippen's *Christmas and Christmas Lore* (1923).

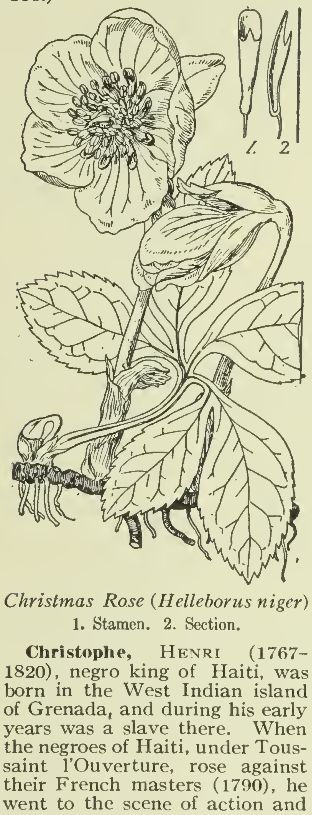
Christmas Island, largest atoll in the Pacific Ocean, in lat. 1° 57′ N., and long. 157° 27′ W., is about 100 miles in circumference. It was discovered in 1777 by Cook, was annexed by Great Britain in 1888, and included in the Gilbert and Ellice Islands Colony in 1919. It has been leased for a period of eighty-seven years, beginning Jan. 1, 1914, to the Central Pacific Cocoanut Plantations. The population is less than 100.

Christmas Island, an isolated island (12 miles long by 9 miles broad) in the Indian Ocean, 200 miles south of Java, surrounded by oceanic depths of 14,000 feet, while its own highest ground reaches more than 1,000 feet above sea level. It is a typical atoll formed upon the summit of a submarine volcano. The vegetation is tropical and dense, and both flora and fauna include numerous indigenous species. In 1888 it was annexed by Great Britain, and now forms a dependency of the Straits Settlements. A few hundred Chinese, Malays, Javanese, and a few Europeans are engaged in the shipping of phosphate of lime. Consult Andrews' *Christmas Island.*

Christmas Island, island in the Little Bras d'Or, Nova Scotia, 30 miles southwest of Sydney. Pop. 1,400.

Christmas Rose (*Helleborus niger*), a species of the genus Helleborus, of the order Ranunculaceæ. It is a hardy perennial plant, with handsome foliage and white flowers from two to three inches in diameter. See HELLEBORE.

Christ of the Andes, a bronze figure of Christ erected on the summit of La Cumbre, over 12,000 feet above sea level, on the boundary line between Chile and Argentina, to commemorate the treaty of peace and arbitration made between the two countries in 1903. The figure, cast from old Argentine cannon, is 26 feet high and stands on a granite pedestal. It is the work of an Argentine sculptor, Mateo Alonzo. (See illustration on page 116.)



Christmas Rose (*Helleborus niger*)
1. Stamen. 2. Section.

Christophe, HENRI (1767–1820), negro king of Haiti, was born in the West Indian island of Grenada, and during his early years was a slave there. When the negroes of Haiti, under Toussaint l'Ouverture, rose against their French masters (1790), he went to the scene of action and soon became one of the leaders of the movement. In 1802 he defended Cape Haiti against successive generals who came to regain the island for France. He at first swore allegiance to Dessalines, the negro leader, who had usurped the title 'Emperor of Haiti.' Having killed him, Christophe assumed his position, being first proclaimed president for life of the republic of Haiti (1806), and then king (1812). After a stormy reign, he found the republican negroes arrayed against him (1820), and, to avoid imprisonment, shot himself.

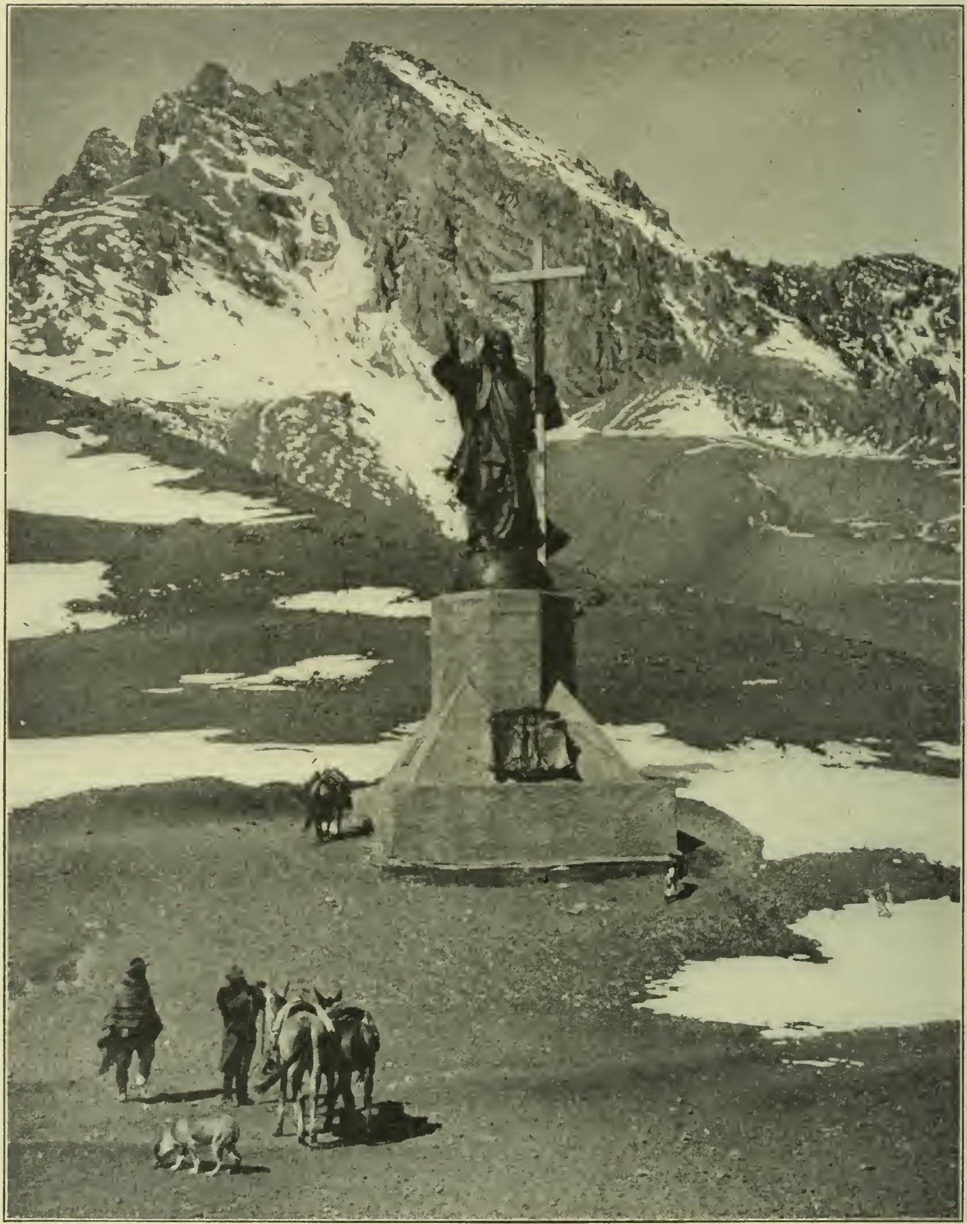
Christopher, SAINT, legendary martyr of the third century, was reputed to be a native of Palestine or Syria, and a giant in stature and strength. In his quest for one stronger than himself, he entered the service of the devil, but left him on hearing of Christ's greater strength. As a work of charity he stationed himself beside a river and carried travellers across on his shoulders. One night he started with a child, who steadily increased in weight until in midstream the giant's strength gave out, he was forced beneath the waves and thus baptized, and the child was revealed as the Christ. Christopher then became a great wonder worker, and encountered the enmity of 'King Dagnus,' who tortured him cruelly and ordered him to be shot with poisoned arrows, which, however, only rebounded and struck Dagnus himself. Christopher then suffered himself to be beheaded, that his blood might heal his enemy. He was one of the most popular saints in all Europe and the East, and was a frequent subject of Christian art. His festival is celebrated July 25 in the Roman Catholic and May 9 in the Greek Church.

Christopulos, ATHANASIOS (1772–1847), Greek poet and philologist, was born in Kastoria (Macedonia). He lived in Walachia as a tutor, and also filled several administrative posts. He wrote a grammar of the modern Greek language (1804), and other works on modern Greek philology (1853), but is specially remembered for his poems in the anacreontic style 'Ερωτικα, Βακχικα, 1811, 1833; trans. into German, 1880, 1893). He also composed a tragedy, *Achilles*, and translated the *Iliad* into modern Greek.

Christ's College. See CAMBRIDGE.

Christ's Hospital, an educational institution in London, England, more familiarly known as the Blue-Coat School. It was founded in 1552 by Edward VI. on the site of the Gray Friars Monastery in Newgate Street, as a refuge for orphans and foundlings. After a long controversy between the Schools Inquiring Commissioners and the Governors of Christ's Hospital, the removal of the institution to Horsham was finally ordered in 1890 and was accomplished in 1902. The buildings at Horsham accommodate about 820 boys and there is a girls' boarding school affiliated at Hertford. The school, which is one of the best of its kind in England, is conducted along the usual lines of an English public school and has preparatory, classical, and mathematical departments.

The boys still retain the original costume, almost coeval with the school itself, consisting of long blue gowns, red girdles, yellow stockings, and knee-breeches. No head-covering is worn, even in winter. The two



By Burton Holmes, from Ewing Galloway, N. Y.

CHRIST OF THE ANDES

The statue, cast from old Argentine cannon, commemorates the treaty of 1903 between Chile and Argentina. It was dedicated to the peace of the world. On the pedestal, in Spanish, are engraved the words: 'Sooner shall these mountains crumble into dust than the people of Argentina and Chile break the peace which they have sworn to maintain at the feet of Christ, the Redeemer.'

highest classes, known as Grecians and Deputy-Grecians, are prepared for the universities. There are also a number of King's boys, forming the mathematical school founded by Charles II. Among distinguished pupils at the school are Camden, Stillingfleet, Middleton, Dyer, Coleridge, Lamb, and Leigh Hunt.

© *Ewing Galloway, N. Y.*

Speech Hall, Christ's Hospital School, Horsham

Christ's Thorn, the name given to various plants supposed to have furnished Christ's crown of thorns. The most commonly named is a prickly shrub about 7 feet high, the garland thorn (*Paliurus aculeata*) native to the south of Europe and to the west of Asia, and growing abundantly in Palestine. In summer it bears yellowish flowers; its fruit is shaped like a head surmounted by a broad-brimmed hat; its branches are flexible and easily plaited, and each leaf has two sharp spines at its base.

Christy, kris'ti, HOWARD CHANDLER (1873–), American illustrator and writer, was born in Morgan County, O. He studied at the schools of the National Academy of Design in New York City and began work as an illustrator in 1895, at once gaining a high reputation for his illustrations of fiction characterized by spirit and grace. During the Spanish War (1898) he accompanied the army to Cuba on behalf of Scribner's Magazine and Leslie's Weekly, and contributed letters and sketches to those periodicals. Since 1920 he has devoted himself to portraiture and has painted portraits of many of the world's most famous men and women.

Chromatic, krō-mat'ik (derived from the name of one of the Greek tetrachords), in music, the term applies to notes, in melody or harmony, marked with accidentals which do not cause modulation. A scale proceeding by semitones only is called a chromatic scale. See INTERVAL.

Chrome Yellow, the chromate of lead ($PbCrO_4$) prepared by precipitating lead acetate with a soluble chromate or bichromate or by electrolysis, using a lead anode and an electrolyte containing soluble acetate and chromate. The color can be varied between a deep orange and a pale yellow by controlling the acidity or alkalinity of the solution. A neutral solution gives the normal chrome yellow color, which becomes paler with the addition of acid, or deeper with the addition of alkali. It can be made orange or red by partially converting it into the basic salt by treatment with caustic soda, or paler by admixture with lead sulphate. The chrome yellows are used in dyeing and as pigments; they cover well, but are liable to darken in time through the action of the hydrogen sulphide present in traces in the air.

Chromic Acid (H_2CrO_4) has been obtained in small red crystals by freezing a solution of chromic anhydride in water, but is chiefly important as the source of a series of salts called chromates. The ordinary 'chromic acid' of commerce is the anhydrous oxide, Cr_2O_3, and not the true acid. The chromates are of three classes—*viz.* normal chromates, bichromates, and basic chromates. The normal chromates, of which potassium chromate (K_2CrO_4), and lead chromate are typical, are yellow or red stable solids which, with the exception of those of the alkali metals, are insoluble in water. The bichromates are formed by the union of chromic anhydride with the normal chromates; and of these potassium bichromate ($K_2Cr_2O_7$) is the most characteristic, being a deep-red crystalline solid that dissolves in water to an acid solution, with poisonous and powerfully oxidizing properties. The alkali chromates, which are the chief source of the other chromates, are prepared on the large scale by heating chrome iron ore with quicklime and potassium or sodium carbonate in a current of air in a reverberatory furnace, whereupon potassium and calcium chromates are first formed. The residue is extracted with water, and any calcium chromate in the solution is converted into the alkaline chromate by the addition of the corresponding alkali carbonate or sulphate, precipitating calcium carbonate or sulphate. If a bichromate is desired, sulphuric acid is added to convert half the alkali to the sulphate, and on crystallization the chromic acid thus formed combines with the remaining chromate to form bichromate.

The basic chromates, or compounds of the normal chromate with excess of the base, are represented by the chrome oranges and reds. (See CHROME YELLOW.) The insoluble chromates of lead, barium, and zinc are useful as pigments; while the soluble ones, notably of potassium and sodium, are used in dyeing and calico-printing, and for the preparation of the others. A special use of potassium bichromate is due to its power of making gelatine that is impregnated with it insoluble when exposed to the light—a property that is much employed in photography and photomechanical printing processes.

Chromite, or CHROME IRON ORE, the only ore worked for the metal, is an oxide of iron and chromium, containing, when pure, 68 per cent. of chromic oxide; commercially it usually carries 35 to 55 per cent. Cr_2O_3; it is iron-black or sometimes brownish-black in color, with a brown streak and a hardness of 4½. It is a member of the spinel group of minerals, and often contains magnesia, alumina, and other impurities. It is of commercial importance as a source of the metal, of chromates and bichromates; and is also extensively used in the metallurgical industry as a refractory in high-temperature furnaces. The chief sources of supply are, in order of importance, Rhodesia, India, New Caledonia, Russia, Cuba, Turkey, Greece and South Africa; there is almost no production in the United States. Production has been rapidly increasing during recent years, due to increased demand for metallic chromium (q.v.) as well as for other uses. The world's production of chromite in 1928 was about 450,000 tons, an increase of 125 per cent. in five years.

Chromium occurs most commonly in serpentine rocks and is almost always present in small amount. All the serpentine belts of the Eastern States contain it.

Chromium (Cr 52.01), a metallic element closely related to iron and manganese. Its only commercial source is the mineral chromite (q.v.), a chrome iron ore, which when pure has the formula $FeO.Cr_2O_3$ and carries 68.0 per cent of Cr; ordinary commercial ores carry 35 to 55 per cent. Cr. The metal comes into the market either in the form of a ferro-alloy containing 65 to 70 per cent. Cr, or as a fairly pure metal with 97 to 98 per cent. Cr. The former is produced in the electric furnace by the reduction of high-grade chromite with coke; the latter is produced by the Goldschmidt thermit process, using a purified Cr_2O_3, with powdered aluminum as a reducing agent. The pure metal costs about 10 times as much as the same metal in the form of ferrochromium.

The chief uses of chromium are in low-chromium steels, high-chromium steels, high-chromium ferrous alloys, non-ferrous alloys, and in chromium plating.

The low-chromium steels are alloy steels containing 0.5 to 2 per cent. Cr, with usually some other metal, such as nickel, vanadium or molybdenum, in which the chromium is used to impart increased hardness and toughness to structural and machine steels.

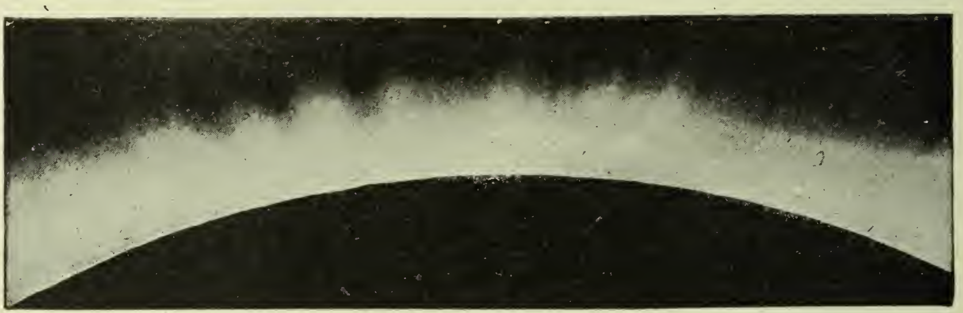
The high-chromium steels include the so-called stainless steels and irons, carrying usually 12 to 20 per cent. Cr, and sometimes nickel, the chromium being added to increase the resistance of the metal to atmospheric or chemical corrosion.

For special purposes the chromium content is sometimes increased to as high as 30 per cent., either with or without nickel.

There is a growing use of alloys of chromium with non-ferrous metals, particularly with high percentages of nickel and cobalt, for resistance to atmospheric corrosion at high temperatures, and for extreme hardness, for use as tools, or to resist abrasion; for the latter use, tungsten also enters into the composition.

Another important use of chromium of recent origin is in the plating industry, to replace nickel. It gives a plating that is whiter and harder, has better resistance to corrosion and abrasion, and therefore has a better appearance and better wearing qualities.

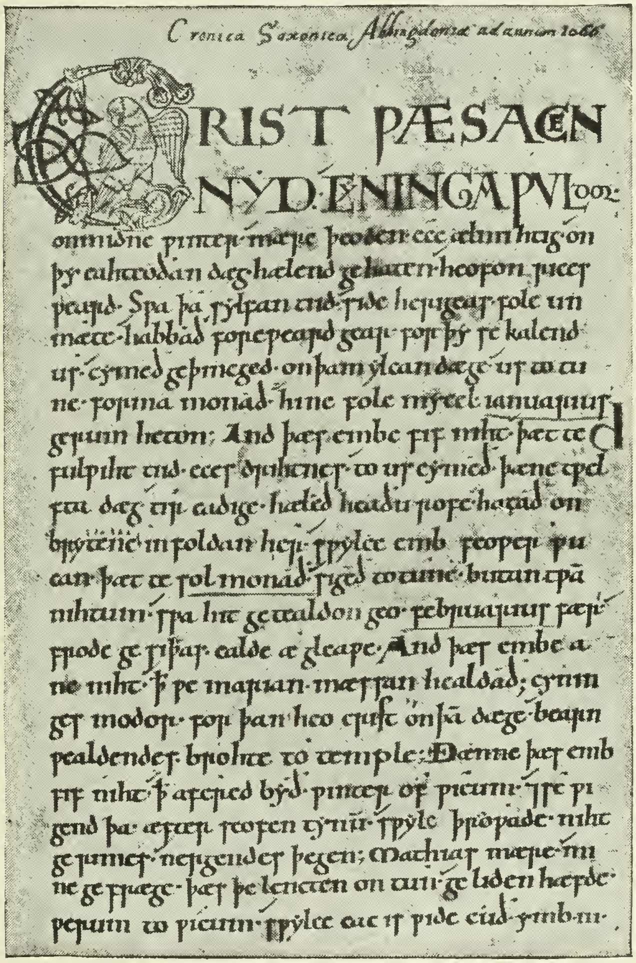
Chromosome. See EMBRYOLOGY; EUGENICS.



The Sun's Chromosphere
During the Total Solar Eclipse of May 28, 1900.

Chromosphere, krō'mō-sfēr, a solar appendage, thus designated by Frankland and Lockyer in 1868, mainly composed of glowing hydrogen, helium, and calcium vapor. During total eclipses it shows as a scarlet serrated border to the black lunar disc, and although visually effaced by daylight it comes at all times within the scope of spectroscopic observation. This is due to the fact that its spectrum consists of bright lines which retain undiminished strength, while the drowning glare of continuous radiance becomes more and more enfeebled by prismatic dispersion. The chromosphere may be described as a tumultuous ocean of fire completely enveloping the sun, and averaging about 6,000 m. in depth. From it rise to prodigious heights the filmy structures known as 'prominences.' They are divided into two classes—the 'quiescent' and the 'eruptive.' The former frequent high solar latitudes, and resemble cloud-banks or colossal forests. The latter are flamelike and evanescent. They spring up with extraordinary velocities to vast heights, then rapidly dissolve and disappear. Such explosions generally, but not invariably, occur in the vicinity of active spots. The chemistry of flaming is much more complex than that of cloud prominences. Their spectra, especially in the ultra-violet region, are crowded with rays emitted by titanium, chromium, scandium, barium, iron, and other metals. Prominences of both kinds are usually rosy or crimson; but white specimens of imposing size are sometimes visible during eclipses, and, since their light is continuous, they are inaccessible to daylight observation. The daylight photography of the chromosphere and its appendages was successfully initiated in 1891 by Professor Hale in the U. S. and M. Deslandres in France. Janssen's 'double-slit' method was employed by each investigator, a voilet ray of calcium serving as the agent of portrayal. The prominence forms delineated are, accordingly, those constituted by vapor of calcium, but they agree essentially with the shapes recorded in hydrogen light.

Chronicle, ANGLO-SAXON. The *Anglo-Saxon*, or, as it is usually called, the *Saxon Chronicle*, would be more correctly termed 'Chronicles.' For although for the earliest periods there was certainly one original chronicle, even for that period the extant MSS. differ considerably, and in the later periods the chief MSS.—(1), (4), and (5) below—differ so widely from each other, and have such a marked individuality, that they are entitled to rank as separate chronicles. The principal MSS. are as follows: (1) The Parker MS., usually denoted by the symbol A, ending with the year 1070 A.D., and connected with Winchester and Canterbury. The date when the first handwriting ceases in a MS. is often the date of its compilation, and it is therefore particularly noteworthy that the first hand in the Parker MS. ends with the annal for the year 891 A.D., in the reign of Alfred the Great. Manuscript A, ending with 1001, is a mere transcript of A to that point. (2) B extends to 977, and thus far differs little from (3) C, which ends in 1066, and is connected with Abingdon. (4) D ends 1079, and is probably connected with Evesham. (5) The Laud MS., E, ends 1154, or three-quarters of a century later than any other MS. The first handwriting ceases with the annal for 1121; hence the conclusion that this MS. was copied for Peterborough, in consequence of the loss of their own records through the disastrous fire of 1116; it is certainly a Peterborough MS. after 1121. (6) F, ending with 1058, is connected with Canterbury, bilingual—Saxon and Latin.


Cronica Saxonica Abingdoniæ ad annum 1066

The Anglo-Saxon Chronicle.
(From the MS. C in the British Museum.)

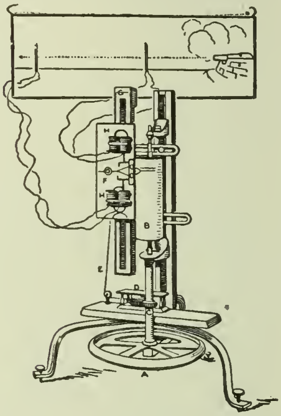
In the time, and doubtless under the inspiration, of Alfred the Great the annals not merely became 'a full record of events,' but attained to the dignity of history, and as such furnish the earliest historical prose in any European vernacular. Then a systematic chronicle was compiled, beginning about the birth of Christ, from what materials were available. This earliest chronicle was certainly copied — probably copies were made and sent to the principal monasteries by Alfred's orders, and these developed different characteristics in accordance with varying circumstances. Local entries were made, and even inserted among the earlier annals; Northern and Mercian records and fuller material from Bede were embodied in some copies; and thus each carefully-kept chronicle tended to acquire an identity and individuality of its own. A characteristic of the earlier years is the insertion of curious genealogies, such as those found in Parker, 755 (the most remarkable annal before Alfred's reign) and 855; of the later years, the insertion of poems, of which the first and best is the famous Battle of Brunanburh in 937. See C. Plummer's *Two of the Saxon Chronicles Parallel* (2 vols. 1889). The introduction to his second volume contains such a full and masterly treatment of the subject as to render all other books unnecessary. Thorpe's edition in the 'Rolls Series' contains the six MSS. in parallel columns, and a translation. For other English chronicles, see HOLINSHED; RAPHAEL; STOWE, JOHN; BAKER, SIR RICHARD.

Chronicles, THE FIRST AND SECOND BOOKS OF (in Heb. 'acts of days'—*i.e.* annals; in the Septuagint, *Paraleipomena*, 'things passed over'), really constitute a single work, intended to furnish a continuous account of the history of the chosen people from Adam till the return from captivity. It may be divided as follows: (1) 1 Chron. 1–9, mainly genealogies; (2) 1 Chron. 10–29, the history of David; (3) 2 Chron. 1–9, the reign of Solomon; (4) 2 Chron. 10–36, the period from the division of the kingdom till the restoration edict of Cyrus, but chiefly concerned with Judah. Chronicles thus finds its continuation in Ezra, and must have been composed after the exile. In spite of the suggestion implied in its Greek name, it is an independent and complete work, showing a clearly-marked style and a definite literary plan. The documents quoted by the author are many—the book of the kings of Judah and Israel (2 Chron. 16:11), the book (doings) of the kings of Israel (33:18), the story (midrash) of the book of the kings (24:27), the vision of Isaiah (32:32), the words of Jehu (20:34), the words of Samuel, Nathan, Gad, Shemaiah, the Seers, etc.; but these are all referred to as repositories of further information rather than as authorities. The omissions of Chronicles, notably in respect of the more reprehensible features of the reigns of David and Solomon, are remarkable, and have led some critics to suppose that the author was a falsifier. The chronicler had also a fondness for large numbers, and his main interest was ecclesiastical; the latter trait leads him to change the statements of kings in matters of sacrifice, and to make the priests offer them instead of the kings. But we must remember that his narrative was written in an idealizing age. For the rest, he seems to be a man of sincere and simple piety; and if he manifests a high appreciation of the external forms of worship, he is also possessed by an intense belief in God, and the motives of his whole work are manifestly of the purest. See W. H. Bennett, in *Expositor's Bible* (1894); C. J. Ball, in Ellicott's *Commentary; Expos. Times* (1882), viii. 316 *f*, and for the text *Chronicles* in the *Polychrome Bible* (1895).

Chronogram (Gr. 'time-writing'), a device by which certain letters in an inscription are made to stand out with special prominence, such letters indicating in Roman numerals a certain date which has to be commemorated. 'Thus we see on a medal of Gustavus Adolphus the following words: ChrIstus DVX, ergo trIVMphVs. If you take the pains to pick the figures out of the several words, you will find they amount to MDCXVVVII, or 1627, the year in which the medal was stamped' (Addison, *Spectator*, No. 60).

Chronograph, an instrument for registering mechanically intervals of time in such a manner that inspection of the record afterward enables the observer to measure these intervals with great accuracy. Its essential parts are generally a cylinder kept by clockwork in continuous revolution, and a marker which travels parallel to the axis of the cylinder and registers a fine spiral line on a sheet of paper wrapped round the cylinder. In some more elaborate forms there may be two markers—one for timing accurately the successive seconds, and the other for marking the instant of the occurrence of some phenomenon. Usually, however, the one marker serves both purposes. The marker is connected to the armature of an electro-magnet, the current through which is established momentarily by having the circuit suitably connected with the wheelwork of the clock. This momentary current gives the marker a jerk to the side, so that the spiral line traced on the revolving paper has a series of notches marked on it, the beginning of each notch marking a second of time. An observer meanwhile, noting the swing of the pendulum, the transit of a star, or the recognition of some physiological stimulus, presses a key, so as to establish the current independently of the clockwork. This makes the marker deviate; and by comparison with the neighboring notches, which mark the successive seconds, the true time of the occurrence of the phenomenon is measured.

It was by means of an instrument constructed on these principles as far back as 1864 that Bashforth carried out his great experiments on the flight of projectiles shot through the air with high velocities. In this case two markers were necessary—the one to note the successive seconds, and the other to note the instant at which the projectile passed a given point, or the successive instants at which it passed a series of points. The electro-magnet which governed the motions of the latter marker formed part of a circuit which included a set of screens placed at suitable intervals apart. A steady current flowed through this circuit; but when a projectile passed through any one of the screens, it cut through the suspension of one of the weights which kept the circuit complete. This broke the circuit for a moment, but about a fiftieth of a second later the circuit was automatically completed again, to be a second time broken in similar fashion when the projectile passed through the next screen, and so on until the last screen was pierced. At every break of the circuit the marker made a jerk to the one side, and subsequently a careful comparison of the notches on the two contiguous spirals gave the data for estimating the velocities and retardations of the projectile in its flight through the screens.



The Bashforth Chronograph.

A, Flywheel turning cylinder B on which the record is marked; C, toothed wheel driving drum D, which unwinds the spring E and allows the platform F to slide down the groove G; H, H, electro-magnets connected with the first and second screen respectively (shown in the small upper diagram).

The chronograph differs from the chronometer and chronoscope in being self-registering; all are instruments for measuring time. Many forms of chronoscope have been devised by experimenters for special researches, such as the revolving mirror of Wheatstone, for measuring the duration of electric sparks; and the revolving mirror of Fizeau and the revolving toothed wheel of Foucault, for measuring the velocity of light.

Chronology treats of arrangements and divisions of time whereby historical events may be placed in the order of their succession. Among primitive peoples the duration of a lunar month was sufficient for their few records; but with more advanced civilization a less variable division of time and a fixed starting-point or era became indispensable. The most convenient era is the one that precedes all historical events, and is termed 'the beginning of the world'—an arbitrary point, but giving an uninterrupted sequence. Other eras have the disadvantage that the dates of some events must be reckoned forward from the era, and of others backward. Thus, in using the Dionysian era of the birth of Christ, years preceding the era must be distinguished by the letters B.C., and those following by A.D. Furthermore, as the year immediately preceding A.D. 1 is B.C. 1, the interval between two events, of which one occurred before the era and the other after, cannot be ascertained by simply adding together the number of the years; for if the date of the one is 14 B.C., it occurred less than fourteen years before the birth of Christ. To obviate this difficulty, astronomers denote the year of Christ's birth by 0, so that B.C. 14 becomes B.C. 13. The Julian period, invented by Joseph Scaliger in 1582, is frequently used, as affording a convenient means of comparing eras. It consists of 7980 Julian years, and the year 4714 corresponds to A.D. 1. The Christians of Antioch adopted the era of Alexandria, computed by Julius Africanus, who reckoned 5500 years from the creation of Adam to the birth of Christ, which latter event he placed three years before the Dionysian era. On the accession of Diocletian in 284 A.D., 10 years were omitted, and 284 A.D. was reckoned the 5777th from Adam. Pondorus, an Egyptian monk, modified this calculation by striking off ten years from the age of the world, and placing the incarnation three years later, thus forming the mundane era of Antioch, which was adopted by the Christians of Syria. In the Greek Church the era of Constantinople is used, and it was followed by the Russians till the time of Peter the Great. Its date is Sept. 1, 5508 B.C. The Jews also employ a mundane era, the beginning of the world being reckoned as Oct. 1, 3761 B.C. From the Old Testament narratives many calculations have been made of the date of the creation, the most generally accepted date being 4004 B.C.

Of eras within historic times the oldest were the era of Nabonassar, the founder of the Babylonian kingdom, Feb. 26, 747 B.C.; the Greek era of the Olympiads, 776 B.C.; and the foundation of Rome, 753 B.C. (denoted by the letters A.U.C.—*i.e. ab urbe condita*). The first is believed to have been used from its origin, and was adopted by Hipparchus and Ptolemy. The Olympiad era is the year when Corœbus was victor at the first games held at Olympia in Elis, and was not introduced till the 3d century B.C. As the games were held every fourth year, an Olympiad is a period of four years. Besides the above, there are the era of Alexander (the year of his death), 323 B.C.; the era of the Seleucidæ, or Macedonian era, 311 B.C., commemorating the taking of Babylon by Seleucus Nicator, which was used by the Jews until the 15th century; the Julian era, 45 B.C., when Cæsar reformed the calendar; the era of Spain, 38 B.C., in which year the conquest of Spain by the Romans was completed; and several others. The accession to the throne of Diocletian, or the era of Martyrs, 284 A.D., is still used by the Abyssinians and the Copts; and the Nestorians date from 559 A.D., when they separated themselves from the Greek Church. Mohammedans date from the Hejra or Hejira, the date of the flight of Mohammed from Mecca to Medina, which did not actually take place till sixty-eight days after the date from which they reckon. Lastly, the Persian era is accession of Yezdegird in 632 A.D. The chief eras and their dates in the Gregorian calendar are given in the following table:

Era.	Commencement.
Julian period	4713 B.C.
Era of Constantinople	Sept. 1, 5508 B.C.
Era of Alexandria	Aug. 29, 5502 B.C.
Era of Antioch	Aug. 29, 5492 B.C.
The mundane era	4008 B.C.
Jewish mundane era	Oct. 1, 3761 B.C.
Era of Nabonassar	Feb. 26, 747 B.C.
First Olympiad	July 1, 776 B.C.
Era of Alexander	Sept. 1, 323 B.C.
Macedonian era	Sept. 1, 312 B.C.
Era of Tyre	Oct. 19, 125 B.C.
Cæsarean era of Antioch (battle of Pharsalia)	Aug. 9, 48 B.C.
Julian era	Jan. 1, 45 B.C.
Era of Spain	Jan. 1, 38 B.C.
Era of Diocletian	Sept. 1, 284 A.D.
Armenian era	July 9, 552 A.D.
Mohammedan era	July 16, 622 A.D.
Persian or Gelat-ed-din era	June 16, 632 A.D.

The natural month was at first used to determine dates, as by the Jews in the earlier centuries of their history. After the dispersion, however, they were obliged to regulate their calendar by a cycle, in order that their festivals might be held on the same days all over the world. For this purpose they invented a cycle of 84 years, probably a combination of the Calippic period of 76 years (see CYCLE) with the Greek 8-year solar cycle. This cycle was borrowed by many of the early Christians, among others by the followers of St. Columba, and hence disputes arose as to the date of Easter when the Roman Church found its way into Britain. Soon after the Nicene Council the Jews changed their cycle for that of Meton. The ordinary year consists of twelve months—*viz*, Tisri, 30 days; Marchesvan, Chesvan, or Bul, 29 or 30; Chislev, 29 or 30; Tebeth, 29; Sheba, 30; Adar, 29; Nissan or Abib, 30; Iyar or Ziv, 29; Sivan, 30; Tammuz, 29; Ab, 30; and Elul, 29. In order to render the reckoning approximate to the solar, a month, Veadar, of 29 days, is inserted between Adar and Nisan in intercalary years, in which also the last month, Elul, has 30 days. Owing to the varying lengths of Marchesvan and Chislev, the ordinary years may consist of 353 to 355 days, and the intercalary of 383 to 385. As a rule, the first year of the cycle begins with the first of Tisri, about October 2; while the other years begin earlier, gradually retrograding through the seasons. The year is formed from the Gregorian year by adding 3671, and the year of the cycle by dividing by 19. When the remainder is 3, 6, 8, 11, 14, 17, or 19, the year is embolismic or intercalary.

The Mohammedan cycle consists of 30 years, 19 being common and 11 intercalary, in which the last month receives an additional day. The cycle begins at the Hejira, and the intercalary years are the 2nd, 5th, 7th, 10th, 13th, 16th, 18th, 21st, 26th, and 29th. The months, named by the Turks Muharram, Saphar, Rabia I., Rabia II., Jamada I., Jamada II., Råjab, Shaban, Ramadan, Shawwal, Dhu'l Kadah, and Dhu'l Hajjah, have 30 and 29 days alternately, but the last has 30 in intercalary years. A Mohammedan year is 0.970203 of a Julian year, and the date of the Hejira is 621.537 in Julian reckoning. Hence the rule to find the first day of any given Mohammedan year is: Multiply one less than the number of the year by .970203, and subtract 621.537, which gives the number of years and fraction of a year that have elapsed since the birth of Christ. Multiply the fraction by 365 to convert it into days, and reckon up what date that will be. The next day will be the beginning of the new year in the old style, which is 13 days behind the new. Example:—To find when the year 1320 begins: 1319 × .970203 = 1279.69 + 621.537 = 1910.234; .234 × 365 = 85, and the 85th day is March 26. The last day of the year 1319 is, in the new style, 13 days later (*i. e.* on April 8), and the first day of 1320 on April 9. Sometimes the result given by this rule is a day wrong, as the intercalations are not made at the same time in the two reckonings; but the error may be detected by calculating the day of the week. The Mohammedan ordinary year contains 50 weeks and 4 days over, and these surplus days, together with the 11 intercalary days, amount in the cycle of 30 years to 131 days, or 18 weeks 5 days. Therefore we have (43 × 5) × (29 × 4) × 11, 1319 being the last intercalary year. The result is 342 days, or 48 weeks and 6 days over. The first Mohammedan year began on Friday, so that the 6 days bring the day of the week to Thursday. E is the Sunday letter of 1902, and is placed opposite April 13; therefore April 10 is the first day of 1320, and not April 9 as found. A Julian year is 1.030712 of a Mohammedan year, and therefore the date, say, of December 31, 1903, in the Mohammedan reckoning, may be found as follows:—1903 – 622 = 1281; 1281 × 1.030712 –1320.344. To the fraction add .477, making it .821, and multiply this by 354, obtaining 290 days. Thus 1320 years 290 days of the Mohammedan reckoning have elapsed at the end of 1902, or 1320 years 277 days at the end of 1902 in the new style. December 31, 1902, is therefore Shawwal 11, 1321.

The Alexandrians used a solar calendar, having in early times learned to measure the length of the year approximately by observing the intervals between two consecutive settings or risings of stars near the sun. They divided their year into 12 months of 30 days each, and added 5 at the end to make the full number 365. About 25 B.C. they added another day every fourth year, making the average length the same as that of the Julian year.

The Greek year was originally lunar, consisting of 12 months of 30 and 29 days alternately; but the discordance between the civil year and the solar soon became apparent, and to correct it an intercalary month, Poseideon, was inserted three times in 8 years. But the 99 lunations in these 8 years amounted to about 1½ days too little, and in order to adjust the year more closely to the lunar revolutions, Meton, in 432 B.C., proposed the use of a 19 year cycle which should contain 235 months. These months were of 30 days each, and were made up by inserting a second Poseideon seven times—*viz.* in the third, fifth, eighth, eleventh, thirteenth, sixteenth, nineteenth years; but as they would contain 7050 days, whereas, according to Meton's calculation, the whole cycle should contain 6940 days, he cut every sixty-third day throughout the period.

The Roman year ascribed to Romulus consisted of only 10 months. To these Numa is said to have added January and February, and to have ordained that the year should consist of 12 lunar months and 1 day over, amounting to 355 days in all. In Cæsar's time the differences of the civil and solar years sometimes amounted to several months, as the pontifices, whose duty it was to regulate the calendar, performed it in a careless and arbitrary manner. In order to restore the year to its proper position with regard to the seasons, the year 708 A.U.C (46 B.C.), the year of 'confusion,' was extended to 445 days, and the new reckoning was commenced on January 1, 45 B.C. The ordinary year, as now, consisted of 365 days, and every fourth year a day was inserted after February 24. The months were divided by calends, the first day of the month; the nones on the fifth; and the ides on the thirteenth; and in March, May, July, and October the nones fell on the seventh, and the ides on the fifteenth. The days were also reckoned backwards, February 24 being the sixth day before the calends of March (*ante diem sextum calendas Martii*). In intercalary years a day was inserted before February 24, and was called *bissextus*, and hence the year was named *bissextilis*.

In Persia the year consisted, like that of the Egyptians, of 365 days, until 1079 A.D., when the calendar was reformed, in the reign of Malik Shah, the Seljuk sultan of Rum (Asia Minor).

The chief eras in India are the Kaliyuga, 3101 B.C., the Salivabrana or Saka, 87 A.D. or thereabouts; and the Vikramaditya, said to begin in 57 B.C.: the years of the last reckoning are called *samvat*. The year is sidereal, ea chmonth beginning at the entrance of the sun into a constellation of the Hindu zodiac, and ending when the sun has completely passed through that sign. The Fusli era was probably introduced by the Mohammedan conquerors; of the many eras known under this name, the most common is 590 A.D. The Bengali era seems to have been derived from the Hejira; but as the year is now reckoned by solar time, the Bengali is about 9 years later than the Mohammedan. The cycle of Brihaspati, founded on an erroneous assumption that the revolution of Jupiter is equivalent to 60 solar years, is frequently used in connection with the Vikramaditya era. The first year of the cycle is assigned in Bengal to 3185 B.C.; but according to the Telinga account, it began in 3114 B.C. Several other eras are less commonly used, or only in particular provinces; and Indian chronology is so complicated that only an Oriental student can ascertain the date of an event with any approach to accuracy.

For chronological purposes the Chinese employ a cycle of 60 years. To distinguish these, two series of words, ten and twelve respectively, are used. The first year is marked by a combination of the first word of each series, the second by the second words. At the tenth year the shorter series is exhausted, and for the eleventh the first of that series is used again, together with the eleventh of the second series. The cycle began with the year 2277 B.C., and 1902 is therefore the thirty-ninth year of the current cycle. The year is divided into twelve equal parts, each containing 30 days, 10 hours, 30 minutes. Lunations are also used, each being named after the sign into which the sun enters during the lunation. As there are only twelve signs, it must happen sometimes that the sun enters into no new sign during a lunation, in which case the month is intercalary, and is called by the name of the same sign as the preceding month. The civil year begins on the first day of the lunation during which the sun enters Pisces. Since the year 163 B.C. Chinese writers have usually referred their dates to the accession of the reigning emperor. The Japanese system is identical with the Chinese. Various other eras are temporarily used. The Japanese now reckon from the era of Meiji (enlightened government), 1868 A.D., when the power of the Mikado was restored.

The Aztecs attained a close approximation to the solar year. Their year consisted of 18 months of 20 days each, and 5 complementary days, thus resembling the Egyptian year. At the end of a cycle of 52 years 13 days were added, and 12 days at the end of the next cycle, the average length of the year being increased to 365 days, 5 hours, 46 minutes, 9.23 seconds, or about 2½ minutes less than the solar year. The months were divided into 4 weeks of 5 days each, the last being the market day.

Besides the foregoing, several other methods of fixing dates have been employed. At Athens, the archon Eponymos was so named because the year was called after him; the Romans indicated the year by the names of the consuls; and public acts have been dated from the accession or coronation of the sovereign. By the papal court the indiction has also been used. See STYLE, OLD AND NEW; GREGORY; also Nicolas's *The Chronology of History* (1830); Ideler's *Handbuch der math. und tech. Chronologie* (1883); *Companion to the British Almanac* (1830 and 1839).

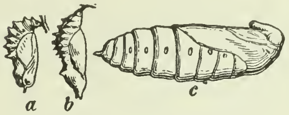
Chronometer, an instrument in the nature of a clock or watch, for the very accurate measurement of time. Chronometers are set to the time of some first meridian. American and British ships use the time of the Greenwich meridian. The French use that of Paris. In the handling of chronometers, care has to be taken to stow them in a ship as near as possible to the centre of motion, where the vibration is least; to avoid any change in temperature in the place where they are kept; to place them beyond the magnetic influence of spare compasses, etc. Chronometers are fitted in their cases on gimbals, by which means a horizontal position is always maintained. See also HOROLOGY.

Chronoscope. See CHRONOGRAPH.

Chrudim, tn., Bohemia, Austria, 15 m. by rail s. of Pardubitz, with tanning and other industries. Pop. (1900) 13,071.

Chrysalis, a term applied to the pupæ of many Lepidoptera. When a cocoon is present, the chrysalis lies within it; but typical chrysalids do not form cocoons.

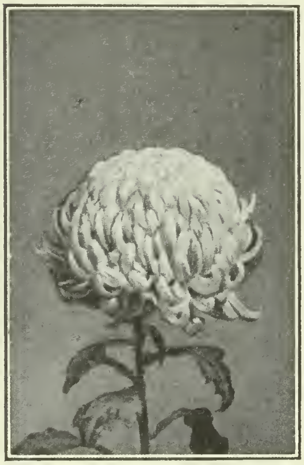
Chrysander, FRIEDRICH (1826-1901), German musical writer, born at Lübtheen (Mecklenburg). After a protracted stay abroad, especially in England, he settled down in 1866 at Bergedorf, near Hamburg. Chrysander is one of the best musical historians of Germany, and was connected with, and himself edited, several of the leading musical magazines. Among his works are *Molltonart im Volksgesang und über das Oratorium* (1853), and the unfinished *Biographie Handels* (3 vols. 1858-67), a standard work, and a model of its kind.



Typical forms of Chrysalis.
a, Argynnis; *b*, Vanessa; *c*, Sphinx.

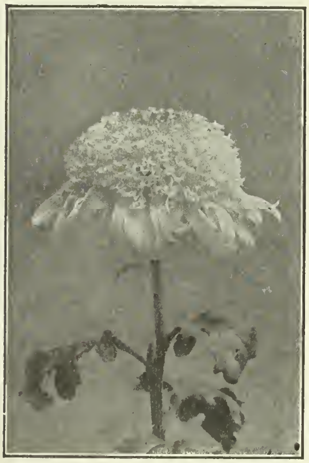
Chrysanthemum, a genus of composite shrubs and herbs, including a large number of species. The common marguerite or Paris daisy (*C. frutescens*), a half-hardy plant usually grown in pots, may also be transferred to the open garden in May. It is easily propagated by cuttings taken in spring, the young plants blooming well indoors during their first winter. The species has white flower-heads with yellow centres, but there is a yellow variety known as *étoile d'or*. *C. maximum* and *C. Leucanthemum*, the 'white weed' or 'daisy,' of America, are hardy perennials with white rays and yellow centre; *C. achillæfolium*, a hardy perennial with yellow rays; *C. arcticum*, a pretty plant, of dwarfer habit than most of the species. Its flowers are white and pink.

The annual species rejoice in deeply-dug soil and plenty of manure. The two most noteworthy are the crown daisy (*C. coronarium*) and the tricolor daisy (*C. carinatum*). The autumn chrysanthemums of the florist are derived from two Oriental species, *C. indicum* and *C. sinense*. Many of the varieties are well adapted for out-of-door culture; but it is chiefly as pot plants for the decoration of conservatories in late autumn and early winter that chrysanthemums are so highly valued. Florists have divided the varieties into several classes, according to the type of flower produced. The single-flowered have a low disc, and one or more series of rays surrounding it. The anemone-flowered much resemble the last, but the disc is high and cushion-like. The pompon are discless, and more or less globular and compact. The incurved have flowers much like those of ranunculuses, the strap-shaped florets curving inwards. The Japanese are much looser in arrangement, and these are generally acknowledged to be the most beautiful of all the chrysanthemums.



Incurved Japanese Chrysanthemum.

If good pot plants are required for the house or conservatory, strong cuttings should be taken in March, and planted in a soil of two parts fibrous loam, one part sand, one part leaf-mould, and one part cocoa-fibre refuse. It is a good plan to cover the surface of the soil with a little more sand, so that when the holes are dibbled they may become lined with a thin



Anemone Flower Chrysanthemum.

layer of sand. Having planted the cuttings, give them a little water, and place in a frame or greenhouse to root; afterward harden them in a cool house or cold frame; and in a fortnight put them into small pots, in the frame or cool house, and in a few days begin to harden them off by increasing admission of air. Soon after transferring the rooted cuttings to pots, pinch out the growing point of each. Allow three shoots to grow about six inches long, and then pinch off the growing point of each. Again from each shoot allow three shoots to grow. Attach each of these nine shoots to a slight stake. No pinching should be done after June, and no shifting should occur later than July 7, however, as it is desirable that the large pots should be full of roots when the flowering season arrives. Free drainage should be provided for, and if that be secured, too much water can hardly be given.

In growing chrysanthemums for exhibition, the cuttings should be taken in December, and planted as already advised. At about the end of March pinch out the growing point in the case of the late-flowering varieties. In the case of both decorative plants and of plants grown to produce exhibition blooms, a certain amount of disbudding is necessary. The weakest buds should in any case be removed, that the strength of the plant may be concentrated on the production of a limited number of good blooms rather than on an infinitude of pretty ones.

Chrysanthemums.
Pompon Variety.

See D. B. Crane's *Chrysanthemums* (1905) and L. H. Bailey's *Cyclopedia of Am. Horticulture* (1904).

Chrysanthemum, Order of, a Japanese order, instituted by the Mikado on Dec. 27, 1876, and bestowed only on sovereigns or on officials of the highest rank. It consists of a star in the form of a cross, with thirty-two rays. In each of the angles formed by the four principal arms is a chrysanthemum. The ribbon is red, with violet edges, and the star is attached to the ribbon by a gold chrysanthemum.

Chrysarobin, a crystalline powder, obtained from the Brazilian *araroba* by extracting with hot chloroform, evaporating to dryness, and powdering. As chrysarobin changes into chrysophanic acid on keeping, there is always a varying proportion of the latter present. It is an anti-parasitic in skin diseases, and is best used in the form of an ointment.

Chryseis, daughter of Chryses, priest of Apollo at Chrysa, carried off by Agamemnon when the Greeks were besieging Troy. A plague sent by Apollo upon the Greeks made them give up the maiden. See *Iliad*, bk. 1.

Chryselephantine, formed of gold and ivory. Some statues of ancient Greece were of wood, plated with ivory to represent the flesh, and gold to represent the dress, different colors of gold being sometimes used. The most famous works of Phidias, the Athene at Athens and the Zeus at Olympia, both of colossal size, were of these materials.

Chrysippus (280–207 B.C.), Stoic philosopher, born at Soli in Cilicia; he studied at Athens under Cleanthes. Though not the founder of the Stoic system, he based its doctrines on systematic reasoning, and appears also to have popularized it upon its ethical side, making it a practical guide to life. He wrote upwards of seven hundred works, of which only fragments survive.

Chrysoberyl, a mineral consisting essentially of glucina and alumina, and valued for its great hardness, fine lustre when polished, and often very beautiful color. It comes mostly from Ceylon, and many specimens show that chatoyancy which has given them the name of cymophane, or Oriental cat's-eye. But chrysoberyl also occurs without this property, and is then yellowish green, deep green, or brownish green in color. The variety alexandrite, which is obtained mostly from Siberia, is green in daylight, but purplish or red in artificial light, when properly cut. Chrysoberyl crystallizes in the rhombic system, and the crystals of alexandrite are often complexly-twinned radiate groups. Pale-green chrysoberyl is mistaken for chrysolite.

Chrysocolla, a green or bluish green silicate of copper, $CuSiOz + 2H_2O$, rather abundant in many mines. It may carry 22 per cent. of the metal, but is extremely variable. It is common in Arizona and Utah mines.

Chrysolite, a name for olivine, especially when used as a gem. French jewellers use the name *peridot.* About as hard as quartz, with imperfect cleavage, chrysolite is much improved in lustre by being polished, but is too soft to be of great value as a gem-stone. Its color is usually a rather pale yellowish green. Large specimens are not common. The name has been erroneously applied to chrysoberyl, tourmaline, and prehnite.

Chrysoloras, MANUEL (1350–1415), a Greek from Constantinople, who was the first to introduce the study of Greek into Italy. From the year 1397 he held various posts for the teaching of Greek—at Florence, Milan, Pavia (1402), Venice (1408), and Rome. Besides numerous theological works, Chrysoloras wrote *Erotemata*, a Greek grammar in the form of question and answer.

Chrysoprase, a green variety of chalcedony, the color being probably due to the presence of oxide of nickel. When heated or exposed to sunlight, the mineral may become paler; if covered with moist earth or cotton wool, the original color is often restored. It is somewhat brittle, but when carefully polished is a beautiful stone, and is employed for rings, brooches, and fine ornamental work. It comes principally from near Frankenstein (Silesia) in Germany, where it is found in veins in serpentine. An artificial chrysoprase is prepared by soaking chalcedony in green solutions of nickel salts.

Chrysostom, ST. JOHN (A.D. 347–407), one of the fathers of the early church, was born at Antioch. He was educated for the law, studying oratory under Libanius, but turned to the church under the teaching of Meletius, bishop of Antioch, by whom he was baptized in 370. In 375 he retired to a mountain retreat, returning to Antioch in 381, when he was ordained deacon, and in 386, priest. For twelve years he preached at Antioch, and then removed to Constantinople, where for six years he eloquently denounced abuses among the clergy, as well as among the royal family and the people. Having offended the Empress, his enemies united successfully against him, and the Emperor Arcadius exiled him to the desert borders of Armenia. His many pathetic letters roused such sympathy and indignation that Arcadius ordered his removal to Pityontes, on the Black Sea, necessitating a long journey on foot, during which he died at the chapel of Basiliscus, near Comana. His remains were brought to Constantinople in 438. His feast day is celebrated in the Eastern Church on Nov. 13, and in the Western on Jan. 27. His numerous works were published in Greek and Latin by Montfauçon (new ed. 1834–40), and in English in *Nicene and Post-Nicene Fathers* (1889–90).

Chrysotile, a fine silky fibrous variety of serpentine, which usually occurs in small veinlets within massive serpentine rock. This is the variety known in commerce and the arts as asbestos. A fibrous amphibole is also called asbestos, but is not valued so highly because of difference in flexibility of the fibre. Chrysotile is easily woven into cloth, and is much sought. The chief production is from the Thetford district, Canada.

Chrzanow, tn., in the N.W. of Galicia, Austria, 27 m. by rail W. of Cracow. Pop. (1900) 10,170.

Chu, a river of Asiatic Russia; rises near Lake Issyk-kul, flows by a devious course toward the N. Aral basin, and is finally lost in a marsh S. of Akmolinsk. Total length, 650 m.; navigable for 187 m. below Tokmak.

Chuan-chou, TSUAN-CHOU-FU or CHIN-CHEW (the Zayton of Marco Polo), city and port in Fo-kien, China, famous of old as a great centre of commerce, and still a busy place of trade and a great fishing-centre. Lat. 24° 56′ N.; 118° 51′ E.

Chub, the name of various fish belonging to the carp family.

Chubut, a territory of the Argentine Republic, flanked on the E. by the S. Atlantic, and on the W. by the Chilean cordillera. Rawson, its capital, is situated 3 m. N.W. of the mouth of the Cubut R. It was founded by Welsh settlers in 1865, and is connected with Port Madrin and Golfo Nuevo by railway. There are extensive farms and cattle ranches, and the population (4,409 in 1900) is composed chiefly of Argentines, Italians, and Welsh, with a few native Indians, who are principally engaged in cattle-breeding. The greater part of the area (93,400 sq. m.) is waterless, and partly covered with volcanic ash.

Chuck. See LATHE.

Chudleigh, or CHIDLEY, cape on N. coast of Labrador, Canada, at entrance to Hudson Strait.

Chudskoye. See PEIPUS.

Chu-fu Hsien, or KIO-FOO HIEN, tn., Shan-tung, China; contains the tomb of Confucius. Lat. 35° 36′ N.; long. 117° E.

Chufut-Kaleh, JIDOVSKII GOROD, or KYRKER, tn., Crimea, Russia, 17 m. S.S.W. of Simpheropol. It is exclusively peopled by Karaite Jews, who regard it as their holy city. It abounds in antiquities, some reaching back to the 6th century A.D.

Chuguyev, or CHUGUIEV, tn., Kharkov gov., Russia, 24 m. E.S.E. of Kharkov City, on the Upper Donetz (Don basin). Its importance is mainly strategic. Pop. (1897) 11,877.

Chu-hsiung-fu, or TSU-HSIUNG-FU, city, Yün-nan, China, on the main road from Ta-li to Yün-nan-fu. Alt. 6,200 ft. Lat. 25° 6′ N.; long. 101° 43′ E.

Chukches, or TCHUKTCHES, a nomadic race in the extreme N.E. of Asia, from 160° E. long. to Bering Str. Although incorporated in the Russian empire, they have never formally resigned their independence, nor do they pay taxes to Russia. The total number does not exceed 5,000, of whom one-half are nomads. Racially they are a mixed people, but the prevailing characteristics are Mongolian. They resemble the Eskimo of North America in culture and mythology, but differ from them in that they domesticate the reindeer. Thus they are peculiar in that they are a pastoral people living in an arctic environment. See Nordenskiöld's *Voyage of the 'Vega,'* vol. ii. (1881); Bogoras, *The Chuckchee*, 1905.

Chunam, in the E. Indies a name for a plaster made of quicklime and sand, the finer kinds of which take on a high polish; also the lime, made from shells or coral, chewed with the areca nut and betel leaf by the natives. In N. India the chunam is a weight equal to six grains troy, used in weighing gold.

Chunar. See CHANAR.

Chunchos, S. American Indians still numerous in the wooded districts of E. Peru, where they form several independent groups. Although reduced to subjection by the Inca Yupangui, soon they recovered their independence, which they have since maintained. They raise crops of maize, yuccas, plantains, and pineapples in some of the forest grades, live in large huts containing three or four family groups, and yield obedience to hereditary chiefs, at least in time of war.

Chunchuses, a warlike race of brigands infesting Manchuria and Mongolia. They claim complete independence, and refuse to acknowledge Chinese supremacy. During the recent war Russia has brought accusations against Japan of secretly encouraging and bribing the Chunchuses to wreck the railway.

Chundernagore. See CHANDARNAGAR.

Chung-ching-fu, or CHUNG-KING, treaty port in Sze-chuen, China, on the l. bk. of the Yang-tse-kiang, in the angle formed by the junction of the Kia-ling R. Its chief exports are opium, silk, wax, medicines, and musk; imports, cotton goods and yarn, and silks. Total trade (1903) $14,599,500. Pop. (1903) 350,000.

Ch'un, Prince, regent of China; was the seventh son of the emperor Tao-kuang, brother of the emperor, Hsien-feng, and father of the emperor Kwang-hsu (1872–1908) and the emperor Hsuan-tung (born 1905, enthroned 1908). He was named regent and his son designated as emperor by the dowager empress (Tzu-hsi) and emperor (Kwang-hsu), presumably just before their mysterious deaths in Nov. 1908. He has displayed a firm but conciliatory policy and pledged himself to carry out the constitutional scheme of the late emperor.

Chupanga, or Shupanga, vil., Portuguese E. Africa, on the S. bank of the Lower Zambezi, amidst beautiful scenery.

Chupra. See Chapra.

Chuquisaca, a dept. forming the S.E. corner of Bolivia, between the Paraguay R. and the Andes. Area, 26,410. Pop. about 392,738.

Chur. See Coire.

Church, a word which represents the Greek *ekklesia*, a 'meeting, gathering, assembly.' In the New Testament it is used in this sense, and also with the special meaning of a 'congregation of Christians' or the 'entire body of Christians.' It is mainly with the latter signification that this article is concerned.

Origin and Constitution.—That Jesus purposed to found a society is doubtful. At any rate the indications of the New Testament are that he did not actually do so. He had a following after the manner of a teacher of the ancient world, which was fluctuating and quickly scattered (John 6:66; Mark 14:50). After the crucifixion even the most intimate of his disciples were ready to return to their ordinary occupations (John 21:3). But the belief that he was alive revived their hopes (Acts 1:6) and gathered them in Jerusalem. The company which met there in the 'upper room,' described in Acts 1:13–15, is the first church of which there is record. The first church history is the Book of Acts, supplemented by the Epistles. Hence we learn how the first Christian assemblies were conducted and constituted. As to (1) *the church order* members were admitted by baptism, on making a profession of repentance and of faith in Jesus Christ. As the initiate was thereby considered to have died to the world, he must now live a life of consecration to the will and service of the Lord; he must be holy and pure in his personal conduct; his dealings with his brethren in Christ must be infused with the spirit of love, and his attitude to the world marked with considerateness, and regulated by the desire to bring it within the sphere of gospel influence (1 Tim. 3:7). For his Christian nurture and growth he required not only to keep in private communion with God through Christ, but also to take part in assemblies for worship and edification. These first gatherings were 'house congregations' (Acts 1:13–15; Rom. 16:5); but as various groups of Christians sprang up in a particular district or town, there arose in time the necessity for larger assemblies. Here we have the origin of the city church having its rendezvous either in the house of some prominent member (Acts 12:12), or in a place specially set apart (Jas. 2 : 2), corresponding to the Jewish synagogue. These assemblies, whether house churches or city churches, seem to have met at first every day (Acts 2:46), but by-and-by the first day of the week (the day of the resurrection) was specially observed—probably from the analogy of the Jewish Sabbath—as a time for a more elaborate and solemn worship, and for the dispensing of the Lord's Supper, 'the breaking of bread.' In time the supper—at first a common meal, to which each brought his portion—became distinct from the ordinary assemblies for edification (*cf.* 1 Cor. 11:17 *f.* with ch. 14; Acts 1:14, 2:42); the former being confined to the brethren, while the latter were of the nature of open meetings. The more public service being largely missionary in purpose, one of its main features was *teaching*, which included the reading of Scripture (Old Testament, and, after they were written, Epistles and the Gospels), and hortatory and instructive discourses founded upon it. Naturally there was also *prayer* (Acts 1:14; 4, 24–31), in which the congregation joined either by repeating the speaker's words, after him, or by uttering 'Amen' at the end of the petition (1 Cor. 14:16); and *praise* (Acts 16:25), the most frequent form of which was the psalm or hymn sung by a member or by the whole assembly. What is signified by the *glossolalia*, or 'speaking in a tongue,' it is difficult to say; it was probably some utterance of intense emotion, a blending of praise and prayer, which, though counted a gift of true inspiration, had the drawback of being unintelligible to both speaker and hearer, unless they possessed the further gift of interpretation. That abuses were not uncommon in both kinds of assemblies is made clear by 1 Cor. chaps. 11 and 14. (2.) *Organization.* — The church, either as a larger or a smaller community, soon required a controlling and directing authority, not only for the management and instruction of assemblies, but also for the administration of finance and the enforcement of discipline; the form adopted bears close analogies to existing institutions—the synagogue and secular associations. Naturally at the head of the corporate body stood the *apostles*—the name being applied not only to the twelve, but to such as had enjoyed personal contact with Christ; their authority was supreme, whether in regard to instruction or to government. Near them were the *prophets*, whose powers were equally extensive (1 Cor. 12 : 28; Eph. 4 : 11). But the apostolic functions tended in time to become divided: thus, on the one hand we have *teachers* and *evangelists*, and on the other *deacons* (the seven, Acts 6:1–6). The *elders* (*presbyters*) or *bishops* (the two are practically identical), however, seem still to have combined the two aspects of teaching and management, being at first the associates of the apostles (Acts 11:30; 15:6), and subsequently their successors (1 Tim. 3:1–7). All these offices were held in virtue of a certain *charisma* or 'gift,' but it is not always possible to define their respective jurisdictions, as might be expected in the largely tentative government of a rapidly increasing society. The ultimate controlling agency was the Holy Spirit, and where the Spirit is there is liberty (2 Cor. 3 : 17); hence there was but little of the fixed division of labor that is found later. In course of time the organization became more elaborate; and for the spiritual unity there was substituted an external union dominated by a centralized government, which, germinating in the authority of the apostles and the supposed leadership of James in the Jerusalem church (Acts 12:17; 14:13) and of Peter among the apostles (*cf.* Matt. 16:18), developed into the provincial or metropolitan bishopric, and ultimately into the hierarchy of the Roman Catholic Church. See the general church histories mentioned below; for the apostolic age in particular, Neander's *Hist. of the Planting and Training of the Christian Church* (1842), Baur's *Church Hist. of the First Three Centuries* (1873), Lechler's *Hist. of Apostolic and Post-apostolic Times* (1885), Weizsäcker's *Apostolic Age* (1894), Harnack's *History of Dogma* (1895), Hausrath's *Hist. of New Testament Times* (1895), all translated from the German; Cassell's *Supernatural Religion* (1874–9); McGiffert's *Hist. of Christianity in the Apostolic Age* (1891). For constitution and organization specially, Davidson's *Ecclesiastical Polity of the New Testament* (1854; Congregational), Jacob's *Ecclesiastical Polity of the New Testament* (1871; Low Anglican), Wordsworth's *Outlines of the Christian Ministry* (1872; High Anglican), Hodge's *Discussions on Church Polity* (1878; Presbyterian), Hatch's *Organization of the Early Christian Churches* (1882), Allen's *Christian Institutions* (1898).

History of the Church.—In the necessarily brief outline which can be given here of a history which extends to nearly two millenniums, it will be convenient to make three divisions: (1) The ancient church (A.D. 30–800); (2) the mediæval period (800–1500); and (3) the post-reformation or modern period. (For Jesus Christ, the foundation stone of the church, and for church history as a special department of theological study, see separate articles.)

1. *The Ancient Church* (A.D. 30–800).—The apostolic period begins with the day of Pentecost (Acts 2). Its characteristic features are the rapid growth of the church; the creation of the New Testament literature; an immense missionary activity, as seen in the work of the apostles and their associates; and the growing opposition of the Jews. Nor was the church long in coming into hostile contact with the imperial (Roman) authorities; witness the persecution under Nero (A.D. 64). The fall of Jerusalem in A.D. 70 marks the beginning of the post-apostolic period, during which the Christians suffered under Domitian, Trajan, Hadrian, Antoninus Pius (Polycarp martyred, 156 A.D.), and Marcus Aurelius (Justin Martyr perished *c.* 165). The internal perils of the church were hardly less grave. Ebionitism and Elkesaitism were attempts to confine Christianity within the bounds of Judaism; in Gnosticism, the endeavor was made to amalgamate it with Greek and Oriental speculation. The emergence of these heresies revealed the need for some standard of Christian teaching, and thus led to the formation of the New Testament canon; also to the literary activity of the apostolic fathers—Clement of Rome, Barnabas, Ignatius, Polycarp, Hermas, Papias, and the authors of the epistle to Diognetus and the *Didache*, or 'Teaching of the Twelve Apostles'—followed by that of the apologists, Aristides, Justin, Athenagoras, Theophilus, Minucius Felix, etc., who sought to combat the attacks of heathen antagonists, and to demonstrate the truth of Christianity on scientific lines. During the 3d century missionaries carried Christianity to Western Europe, and, in the East, to Armenia, Persia, and even India. The church began to be more favorably viewed by the emperors: Septimius Severus, Caracalla, Heliogabalus, and Alexander Severus gave it a measure of recognition; but under Decius, in 250 A.D., there was a recrudescence of persecution, as again under Diocletian (284–305). The edict of Galerius (311) and the Edict of Milan (313)—the latter issued by Constantine—close at length the sanguinary story. The victory of Constantine over Licinius (323) made Christianity the most powerful religion in the empire. The development of the creed and the constitution had proceeded apace. Here occur the great names Irenæus, Hippolytus, Tertullian, Clement of Alexandria, Origen, and Cyprian, whose writings elaborate and fix the substance of the faith against Neo-Platonism, Sabellianism, and Chiliasm. The idea of the church's unity was assuming masterful place, and the bishops of Rome were beginning to lay claim to be the visible representatives of this unity. Montanism sought to identify the spiritual element with supranaturalism and ecstasy; the Novatian controversy and the Miletian schism had to do with the exercise of discipline in the case of the lapsed —*i.e.*, Christians who had recanted under persecution (see Lapsed); the paschal controversy with the date of the passover feast. The church had no difficulty in repudiating Manicheism, a system of religious dualism allied to Gnosticism.

Under Constantine (323–337) and his sons Christianity became the religion of the empire, the pagan reaction under Julian (361–363) being powerless to stem the flowing tide of the church's power. But the imperial court, now at Constantinople, soon exhibited an inclination to interfere in ecclesiastical affairs, and considerable confusion was the result, a remoter consequence being the drifting apart of the Eastern from the Western Church. The 4th and 5th centuries were rife with theological controversies—the Arian heresy, repudiated at the Council of Nicæa (325) and demolished at that of Constantinople (381); the Origenistic controversies (394–407); the Apollinarian heresy (condemned 381); the Nestorian (rejected at Ephesus, 431); the Eutychian (Chalcedon, 451); the Monophysite (Constantinople, 553); and the Monothelitic (Constantinople, 680); in the West, the long and bitter conflict between Augustine and Pelagius. During this period arose the two great antagonistic schools of scriptural interpretation, the Neo-Alexandrian and the Antiochean, allegorical and literal respectively; also considerable changes in the general life and practice of the church—*e.g.* the widening of the distinction between clergy and laity (the tonsure, celibacy, monasticism), communion in one kind, feast-days, veneration of the Virgin and of saints, pilgrimages, etc. The outward spread of the church in the East was much hampered by the rise and remarkable progress of Mohammedanism, and in the West the tendency to centralization became ever more powerful, so that when Charlemagne assumed (800) the crown of the Holy Roman Empire, it was as a vassal of the Bishop of Rome.

2. *The Mediæval Church* (A.D. 800–1500).—This is really a transition period, during which Christianity wrought itself out of Greek and Roman conditions into a variety of forms corresponding to the needs and characteristics of the modern nations. From one point of view the history of the church might be written as the history of the popes in their struggle to win and maintain absolute supremacy in spiritual and worldly affairs. But the Holy Roman Empire, the amalgamation of the universal church with the universal state, was never more than an aspiration. The Eastern (or Greek) Church had never been in sympathy with Roman claims. The divergence of the two reaches back to the time of the Monophysite controversy: Photius, Patriarch of Constantinople, accused the Roman Bishop of having falsified the Nicene symbol by the insertion of the word *filioque*, and was excommunicated by the pope in 879; and, finally, the year 1054 saw the complete and incurable severance of the two communities. From the close of the 10th century there were instituted almost numberless monastic orders, with the common vows of poverty, chastity, and obedience, most of them —*e.g.* the Clugniacs, Cistercians, etc.—being offshoots or modifications of the brotherhood of St. Benedict, founded five centuries previously. The Franciscans or Minorites and the Dominicans or Preaching Orders arose about the beginning of the 13th century; they transformed the vow of poverty into one of absolute beggary (hence they were called Mendicants), and their principal objects were itinerant preaching and the conversion of heretics. The Crusades, designed to protect Christian pilgrims in the

Holy Land, began about the end of the 11th century. From the monastic schools proceeded the remarkable intellectual movement known as scholasticism, 'the chivalry of theology,' the aim of which was to build up the orthodox dogmas into a complete logical system; while mysticism, a concurrent growth, sought to develop the doctrine of the spiritual life on lines and principles that were often less logical than arbitrary and subjective. Heretical and schismatic movements (Paulitians, Cathari, Albigenses, Waldensians, etc.) arose, formulating a protest against what they termed the despotism and dogmatism of the church, and which may be regarded as crude manifestations of the spirit of individual liberty and the first stirrings of reform. During the 14th and 15th centuries these outbreaks became more and more frequent, and forced the papacy to exert the sternest measures of repression. Gregory IX. had already, in 1232, instituted the Inquisition. But the Reformation, through a distinctly religious and political movement, had deeper roots than the mere desire to overthrow hierarchy and dogmatism, and was really but a part, though an all-important one, of an extensive revolt of the human spirit against traditionalism in all its forms, for which the revival of letters (renaissance, humanism), the invention of printing (*c.* 1440) and the discovery of America (1492) and of the Cape route to India (1497) had prepared the mind of Europe.

3. *The Modern Church* (1500 to present day).—It is thus impossible to give place and date for the inception of the Reformation. In England the foundations were already laid; and the early part of the 16th century saw the movement in full swing—in France, under Jacques Le Fèvre (Faber Stapulensis); in Switzerland, under Ulrich Zwingli; and in Germany, under Martin Luther. Yet the German reformation assumed such a potent and regulative position that we are in a manner justified in regarding the nailing of Luther's ninety-five theses to the church door at Wittenberg (Oct. 31, 1517) as having ushered in the new day. The work of John Calvin at Geneva carried the movement into French Switzerland; in Scotland the leading personality was John Knox. Speaking generally, the new order was embraced by the Teutonic peoples, while the Latin and Celtic nations held by the old. The Roman Catholic Church reformed abuses and proved its vitality in the movement known as the counter-reformation, and reasserted its continuity with the ancient order in the decrees of the Council of Trent (1545–63). Its unity has remained unviolated except by the unimportant secession of the Old Catholics, who refused to subscribe to the doctrine of papal infallibility promulgated by the Vatican Council of 1869–70. Protestantism, however, showed two divergent tendencies almost from the first, the Lutheran and the Reformed (the adherents of the system of John Calvin), and, by its virtually subjective principles of the authority of Scripture and justification through faith, opened the way not only for the development of the national churches, but also for the rise of a multiplicity of sects, each with its distinctive watchword. The fundamental antagonism of the two great sections of the church, as well as of the denominational rivalries so characteristic of Protestantism, has helped on perhaps the most remarkable feature of the period—a missionary energy comparable only to the apostolic work of the early community. In Roman Catholicism we have the self-denying labors of Loyola, Xavier, and their followers; in the Protestant churches, immense pioneer labors among the heathen during the 19th century. It is not easy to subdivide the modern period; but we can distinguish (1) a period of conflict and reconstruction (1517–1650); (2) a period of quiescence (1650–1800), dominated by rationalistic thought at first, followed by movements like Pietism and Methodism; and (3) the 19th century, which witnessed the Protestant missionary revival already referred to, a searching examination of traditional assumptions in the light of modern knowledge and by modern scientific methods, and a steadily increasing tendency to regard right character rather than right belief as the one thing needful.

The standard church histories are Neander (trans. 6 vols., 1881); Gieseler (trans. 5 vols., 1857–80), and Philip Schaff (6 vols., 1882–92); briefer manuals are the church histories of Fisher (1887), Kurtz (trans. 3 vols., 1888–90), Möller (trans. 3 vols., 1892–1900), Sohm (1895), and Newman (2 vols., 1900–1903); Alzog's *Manual of Universal Church History* (Eng. trans. by Pabisch and Byrne, 1878); Funk's *Lehrbuch der Kirchengeschichte* (1886) and Kraus's work of the same name are good Roman Catholic presentations; see also Weingarten's *Zeittafeln und Ueberblicke zur Kirchengeschichte* (4th ed., rev. by Deutsch, 1891). See CHURCH HISTORY.

Church, ANGLICAN. The Church of England and all other churches which are in full communion with it. The liturgy used by all branches of the Anglican Church is not in every case the same, though the Book of Common Prayer is adopted in a more or less modified form by all, and the Articles are universally accepted in the British dominions and by the Protestant Episcopal Church of the United States with changes made necessary by the separation of church and state (arts. XXI and XXXVII) and omitting mention of the Athanasian creed (art. VIII). In all cases the clergy are under Episcopal authority, and are believed to have been ordained by canonical bishops, the ministry of the Anglican Church being based upon the acceptance of the 'historic episcopate'—*i. e.* the theory that a bishop alone has the right to ordain both priests and deacons, and must himself be consecrated to his office by bishops who themselves have received consecration in continuous chain from the apostles of Christ. As to the rule of order no differences of opinion are held among churchmen; but as to the spiritual significance and importance of the rule there are wide variations of teaching. The statement of the Book of Common Prayer on the subject (Preface to the Ordinal) does not actually declare that episcopal orders are of the *esse* of a church, but only that they have always subsisted in the Church of Christ. The Church of England, however, practically regards such orders as essential to a right ministry, since she not only insists that all her own ministers shall be so ordained, but permits none others to officiate within her places of worship. Nevertheless she admits into her ministry, without reordination, any otherwise eligible clergy who have received canonical ordination in the Roman Catholic or Greek Church. A clear distinction is thus made between those who have the episcopal consecration and those who have it not.

Although no formal declaration of intercommunion has ever been made between the Anglican and Greek Churches, there have been frequent friendly approaches. Anglican clergy have been permitted to celebrate the holy communion in Greek churches in St. Petersburg, in the Church of the Holy Sepulchre at Jerusalem, and elsewhere. Greek bishops have on several occasions pronounced the benediction in English churches. The Roman Catholic Church, on the other hand, maintains an attitude of implacable hostility to the Anglican as heretical and lacking the proper succession, maintaining that when Queen Elizabeth reconstituted the Church of England the consecration of Matthew Parker as archbishop of Canterbury in the Nag's Head Inn, Cheapside, London, was uncanonical and therefore invalid. This claim is stoutly denied on the Anglican side and has occasioned a long and acrimonious discussion, sometimes called the Nag's Head controversy. In 1897 the archbishops of Canterbury and York (Temple and Maclagan) issued a joint letter on English Ordinations, in both Latin and English, and addressed to the whole body of bishops of the Catholic Church. It was an exhaustive examination and refutation of the Roman claims and called forth a reply from Cardinal Vaughn, which again was answered by Professor Collins and Mr. Birkbeck on behalf of the Church Historical Society. As recently as 1922 Mgr. Barnes in his *Bishop Barlow and Anglican Orders* charged that Archbishop Parker and the government of Queen Elizabeth had forged and mutilated documents. This was disproved by Dr. Claude Jenkins.

An event of outstanding importance in the history of the Anglican Church occurred in 1927 when the Revision of the Prayer Book Measure was passed by the House of Lords only to be rejected by the House of Commons. The measure was the occasion for long and somewhat acrimonious debate, centering around the question of the reservation of the sacrament and other so-called 'high church' practices, and was defeated by a vote of 238 to 205.

In 1928 the Rt. Hon. Cosmo Gordon Lang was consecrated the 95th Archbishop and Primate of all England in place of Most Rev. Randall Thomas Davidson resigned.

For list of cathedrals of the Anglican Church see article Cathedral.

The branches of the Anglican Church are:

The Church in Ireland.—Protestantism was legally established in Ireland in 1551, but the established church never gained hold on the people. The payment of tithes was compounded in 1832, and in 1834 the number of archbishoprics was reduced to two and the bishoprics to ten. On Jan. 1, 1871, the church was disestablished by Mr. Gladstone. The government of the church has since been by the bishops and a representative body of elected clergy and laity. There are 2 archbishops (Armagh and Dublin) and 11 bishops, with about 1,150 clergy. In 1877 the general synod revised the Book of Common Prayer on 'evangelical' lines. Being constantly face to face with an aggressive Roman Catholic Church, the Anglican Church in Ireland is inclined to the other extreme. (See Ireland.)

The Church in Scotland.—Episcopacy was practically abolished by the Book of Discipline in 1560, though titular bishops remained till 1580. James VI. of Scotland and I. of England restored it for a while. In 1610 three new bishops for Scotland were consecrated in London; but in 1638 Charles I. relinquished the attempt, and the bishops were again deposed. Episcopacy was reëstablished under Charles II.; but after the revolution of 1688 the bishops refused to acknowledge William III. They were deprived in 1690, and Presbyterianism was again established. After the Jacobite rising, in 1715, and especially after that of 1745, penal laws were enacted against the church, with the result that it was almost extinguished. These were relaxed in 1760, and removed in 1792. Since then the church has made rapid strides, especially in the towns. There are 7 bishops and 343 clergy. The tone is 'higher' than that in Ireland. (See Scotland.)

The Church in the Colonies and in India.—The church is strong in Canada, where there are 4 archbishops, 21 bishops, and about 1,600 clergy. Other dioceses include those of the provinces of India and Ceylon, New South Wales, Victoria, Queensland, Western Australia, New Zealand, China, Japan, South Africa, and the West Indies.

The Church in the United States.—See Protestant Episcopal Church.

Bibliography.—Consult Shaw's *History of the English Church* (1920); Wakeman's *History of the Church of England* (1927).

Church, Greek. See Greek Church.

Church, Roman Catholic. See Roman Catholic Church.

Church, Alfred John (1829–1912), English classical scholar, was born in London. He was headmaster of Henley (1870–2) and of Retford grammar schools (1873–80), professor of Latin, University College, London (1800–8), and rector of Ashley, Gloucestershire (1892). His publications include a translation of *Tacitus*, with Rev. J. Brodribb (1882); *Two Thousand Years Ago* (1886); *Carthage* (1886); popular versions of some of the classics, *Stories from Homer, Virgil, Livy, Herodotus, Greek Tragedians* (1878); *Pictures of Roman Life and Story* (1892); *Memories of Men and Books* (1908).

Church, Sir Arthur Herbert (1834–1915), English chemist and writer, was born in London. He was educated in London and at Oxford, and became professor of chemistry at the Royal College of Agriculture, Cirencester, and in the Royal Academy of Arts. He was well known as a lecturer, did original research in chemistry, and was made F.R.S. in 1888. Among his best known works are *Color; Precious Stones; English Earthenware; English Porcelain; Food; Chemistry of Paints and Paintings; Josiah Wedgwood.*

Church, Benjamin (1639–1718), American colonial soldier, famous as an Indian fighter in early New England, was born in Duxbury, Mass. He took a conspicuous part in King Philip's War (1675–6) and was the leader of the party which finally hunted down and killed King Philip (Aug. 12, 1676) at Mount Hope, R. I. In 1689 he commanded the expedition sent by the Massachusetts and Plymouth colonies against the Indians in Maine; and in 1704 commanded the expedition, consisting of about 700 men, sent to Acadia to avenge the Indian atrocity at Deerfield, Mass. (q.v.). From Church's notes his son Thomas prepared the book, *Entertaining Passages relating to King Philip's War* (1716), which included a *History of the Eastern Expeditions of 1689, 1690, 1692, and 1704 against the Indians and French.*

Church, Frederic Edwin (1826–1900), American landscape painter, was born in Hartford, Conn. He studied under Thomas Cole, at Catskill, N. Y. and early became successful as a landscape painter in New York City. He was elected to the National Academy in 1849. He visited South America in 1853 and 1857, and used the sketch material there obtained for some of his most important pictures. He also visited Europe, the Holy Land, and the West Indies in search of material. His best known work, *Great Fall of Niagra* (1857), painted from the Canadian side, is in the Corcoran gallery at Washington. His *Icebergs*, painted from studies on the Labrador coast, was exhibited at London, 1863, and added to his reputation abroad. Other pictures are *Andes of Ecuador* (1855); *Heart of the Andes* (1859); *Chimborazo* (1864); *Jerusalem* (1870); and *Morning in the Tropics* (1877).

Church, Frederick Stuart (1842–1924), American painter and illustrator, was born in Grand Rapids, Mich. He engaged in business until 1868, with the exception of three years' service in the Civil War. Later he studied art under Walter

Shirlaw in Chicago, and under Professor Wilmarth in New York City, and soon attracted attention by his poetically fanciful drawings in black and white. He followed these with oil paintings and water-colors in a similar vein, and was equally successful as an illustrator. Among his pictures are *The Sea Princess, Back from the Beach, Peacocks in the Snow, The Sorceress, Pandora, The Viking's Daughter, The Lion in Love, Beauty and the Beast,* and *The Sea-Serpent.*

Church, Sir Richard (1784–1873), British soldier, the liberator of Greece, was the son of Matthew Church of Cork. He was employed in Egypt at the taking of Alexandria (1801), served in the defence of Capri against Murat (1806), and was assistant quartermaster general in Oswald's force operating (1809) in the Ionian Islands, where he raised two regiments of Greek troops (1809–12). When the Greek revolution broke out he was appointed generalissimo of the Greek army. His first action—an attempt to relieve the Acropolis—resulted in defeat; but next year (1828) he forced the garrisons of Missolonghi and Lepanto to surrender, and procured the evacuation of Acarnania by the Turks. In 1843 he took part in the revolution that overthrew King Otho, and in 1854 was made general in the Greek army.

Church, Richard William (1815–90), English divine, was born in Lisbon. He was appointed to the living of Whatley, Somersetshire (1852), and became dean of St. Paul's in 1871, but declined the English primacy on the death of Archbishop Tait. He was one of the foremost of the High-Churchmen. His published works, which are marked by a scholarly style, include a translation of St. Cyril's catechetical lectures for Pusey's *Library of the Fathers* (1841); 'Dante' contributed to the *Christian Remembrancer* (1850); *Essays and Reviews; Anselm* (1843); two admirable monographs—*Spenser* in 1879, and *Bacon* in 1884, in the English Men of Letters Series. His judicious and monumental history of *The Oxford Movement* appeared in 1891 and a uniform edition of his purely literary writings in 1888. *Cathedral and University Sermons* were published in 1892, and *Pascal and other Sermons* in 1893.

Church Ale, a Whitsuntide feast in England by which money was obtained for repairing the church and for charitable purposes. The wardens brewed the ale, and the countryside joined in the various festivities. The practice gradually died out after the Reformation.

Church Army, an organization in connection with the Church of England, for the rescue of waifs and strays. It was founded in London in 1882, by the Rev. Wilson Carlile. An institution for the free training of working-men evangelists is a leading feature of the work and in 1888 a social system of labor homes was commenced. There are now many such homes for men and also homes for boys, girls, the homeless poor, first offenders, and inebriates, besides an emigration test farm and market garden in Surrey. There are more than twenty homes of various kinds for women, as well as lodging homes, bureaus and missions, all of which help to complete the working plant of the army. The 'fathers' and 'mothers' of homes and other agents are mainly trained working men and women. The Army's methods are quite unconventional and at first there was a slight prejudice against it, which has now entirely disappeared and its work is gladly accepted by the Church.

Church Congress, an annual meeting of English Churchmen to discuss matters relating to the interests of their church. The first congress was held in Cambridge in 1861. The Protestant Episcopal Church in the United States also has a similar gathering of the same name, but its influence and importance are much less than in England.

Church Discipline, the procedure of the Christian Church in dealing with the graver offences of its members. The principal means employed is the ban or excommunication—the depriving of the offender of his participation in the fellowship of the Church. The earliest recorded instance of the exercise of such discipline is found in the history of the Corinthian community, in which, a scandalous case of immorality having been brought to light, St. Paul first advises to excommunicate (1 Cor. v.), and then, on repentance shown, to restore the transgressor (2 Cor. ii. 6 *f.*). Later other than moral offences were brought within the compass of church discipline—*e.g.* apostasy—as seen in the treatment of the lapsed (*i.e.* those who in the stress of persecution had renounced their Christianity). The bitter controversies regarding the lapsed disappeared with persecution; but when the Church had become a power in the Roman Empire, it began to take serious notice of heresy and schism. From the time of the Synod of Antioch (341 A.D.) persistent offenders in these respects were dealt with by the civil power, and even put under the ban of the Empire.

In the Middle Ages the prosecution and violent repression of heresy were particularly rife, and the early manifestations of doctrinal novelties were visited with extreme penalties. For offences, however, which did not subvert the status or doctrine of the Church, it became customary to exact money fines in lieu of the older penances; and this practice often led to abuses in connection with the promulgation of indulgences which gradually supplanted the discipline of public penance. The reformers generally rejected the major or extreme excommunication, as being outside the authority of the Church, and repudiated all penances and indulgences, as immoral. In the Roman Catholic Church penance is a sacrament, and the greater excommunication is a recognized part of its discipline. In Protestant churches the minor excommunication alone is retained—at least in practice.

Churches of God in Christ Jesus. See Second Adventists.

Church History, a branch of theological study, the object of which is to describe the process by which the principles of Christianity have been wrought out in the history of the world from the time of Jesus Christ till the present day. It recounts the outward spread of the church, the interfusion by Christianity of the moral, social, and political life of nations, and the variation and development of ritual and of dogma; and while each of these departments may be made the field of special inquiry, they must all receive relatively adequate treatment in any work claiming the title 'Church History.' The most notable writers of the older period are Eusebius of Cæsarea, Socrates and Sozomen (advocates at Constantinople), Theodoret of Cyros in Syria, and Evagrius. The Middle Ages produced no great writer in church history, but abounded in biographies, chronicles, and other documents which are of the highest importance to modern investigators Anastasius Bibliothecarius (9th century) and Ordericus Vitalis (12th century) may be mentioned as perhaps the most notable writers. The Reformation period produced the so-called *Magdeburg Centuries* (1574), a polemical work on the Protestant side written by many authorities, to which Cæsar Baronius replied from the Roman Catholic standpoint in his *Annales Ecclesiastici* (1588–1607). In recent times the greatest amount of good work in church history has been done by Germans. The United States has given us Schaff (of German descent), G. P. Fisher, and H. C. Sheldon; England, Milman, Smith and Cheetham, Robertson and Lightfoot; Holland, W. Moll; the Roman

Catholic Church, Alzog, Möhler, Döllinger, Ritter and others. See CHURCH.

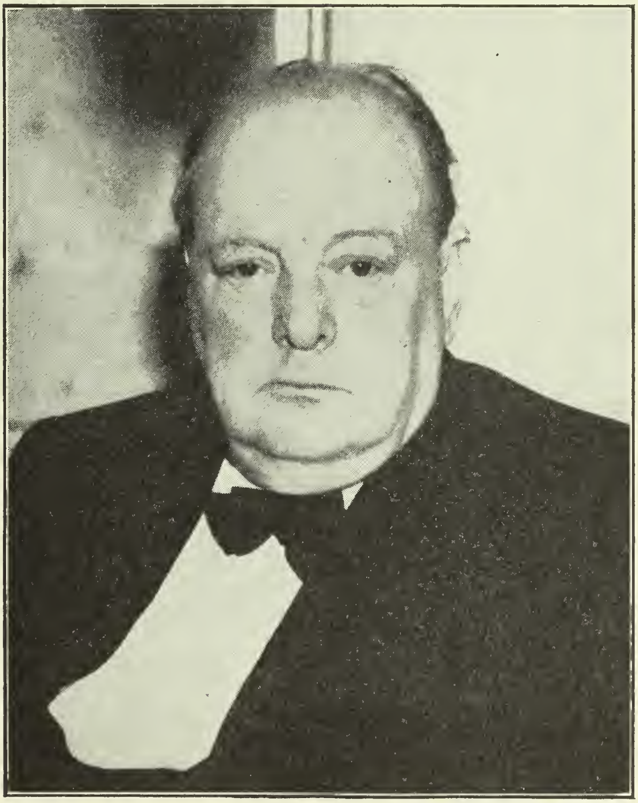
Churchill, MISSISSIPPI, or ENGLISH RIVER, a river of Canada, in Saskatchewan and Manitoba. In Sasketchewan it is made up of an extensive system of interconnected lakes, and flowing east and northeast for a course of 900 miles it enters Hudson Bay at Fort Churchill.

Churchill, CHARLES (1731–64), English poet, was born in Westminster. Ordained priest in 1756, he succeeded his father in the curacy and lectureship of St. John's, Westminster, in 1758. In 1761 he published anonymously *The Rosciad,* a satire on the leading actors of the day, which had an immediate success. He avowed the authorship and replied to the critics in *The Apology* (1761). On account of his dissipated life, he ultimately resigned his preferment (1763). His other publications include *Night* (1762); *The Ghost* (1763); a Hudibrastic poem in four books, well known for the attack on Dr. Johnson (Pomposo); *The Prophecy of Famine* (inscribed to his friend John Wilkes); the *Epistle to William Hogarth* (a satire provoked by the artist's caricatures of Wilkes and Churchill); *The Conference, The Author,* and *The Duelist,* the last four in 1763; *Additional Poems* (1764); *Sermons,* with dedications to Warburton (1765).

Churchill, LORD RANDOLPH HENRY SPENCER (1849–95), English statesman, third son of the seventh Duke of Marlborough, was born at Blenheim Palace. In 1874 he entered Parliament as Conservative M.P. for Woodstock and the same year he married Miss Jennie Jerome, of New York. Lord Randolph soon distinguished himself as a powerful debater, becoming prominent by his bitter attacks on Mr. Bright, and entering also on an electoral contest in the Liberal stronghold of Birmingham, all of which gave him prestige as a Conservative leader. He received the Indian secretaryship in the new Conservative administration (1885). The general election took place in November, 1885, and he was defeated in Birmingham, but was elected for South Paddington. After the return of the Conservatives to power, in 1886, he was appointed Chancellor of the Exchequer and leader of the House of Commons, but was in office only some five or six months, resigning on the ground that he differed from his colleagues on military and naval expenditure. In 1892 he was again elected for South Paddington, but in 1893 his health failed and he died shortly afterwards. He was a Tory in the Disraelian sense, both democratic and aggressive.

Churchill, WINSTON (1871–), American author, was born in St. Louis, Mo. He was graduated (1894) from the U. S. Naval Academy, Annapolis, and served a short time on the *San Francisco,* but soon resigned to devote himself to a literary career. His first novel, *The Celebrity,* was published in 1898. He then devoted himself to the writing of his group of American historical novels, the first of which, *Richard Carvel* (1899), quickly attained large circulation and received high praise. It was followed by *The Crisis* (1901), *The Crossing* (1904), *Coniston* (1906) and *Mr. Crewe's Career* (1908), each dealing with American life in the past century. Other books are *A Modern Chronicle* (1910); *The Inside of the Cup* (1913); *A Far Country* (1915); *The Dwelling Place of Light* (1917); *The Uncharted Way* (1941).

Churchill, WINSTON LEONARD SPENCER (1874–), English statesman and author, elder son of Lord Randolph Spencer Churchill (q. v.), was born Nov. 30, 1874 at Blenheim Palace and was educated at Harrow and Sandhurst, entering the Army in 1895 and serving with the Spanish forces in Cuba that year. He was attached to the 31st Punjab Infantry in 1897 and served with the Malakand Field Force. The next year he was an orderly officer with Sir W. Lockhart in the Tirah Expeditionary Force and later the same year was attached to the 21st Lancers, being present at the Battle of Khartoum. In 1899 he saw service as a lieutenant in the South African Light Horse and during 1899–1900 acted as correspondent of the London *Morning Post* in South Africa. He was captured by the Boers in November, 1899 and was held a prisoner for four weeks when he escaped. He subsequently took part in numerous engagements of the Boer War and was with Lord Roberts at the occupation of Pretoria on June 5, 1900.



Press Association, Inc.

Winston Spencer Churchill.

At the general election in October, 1900 he was returned to Parliament as Conservative member for Oldham but he joined the Liberals in the session of 1904. In 1906–8 he was Under Secretary of State for the Colonies and in 1908–10 became President of the Board of Trade in the Asquith cabinet, having become in the meantime a power in the Liberal party. He was made Home Secretary in 1910 but the following year Churchill was transferred to the Admiralty as First Lord with specific instructions to prepare the Fleet for war. He held that post at the outbreak of the First World War, retiring in 1915 and taking the post of Chancellor of the Duchy of Lancaster. After a period of active war service he became Minister of Munitions in 1917 and in 1918–21 was Secretary of State for War, heading the Air Ministry for the same period. Two years after the end of the war he filled the post of Secretary of State for the Colonies and in 1925 was appointed Chancellor of the Exchequer in the Baldwin administration, serving until 1929.

In the 1929–39 decade Churchill held no cabinet post but he was active in other capacities and devoted much of his time to literary work and to public addresses with particular emphasis after 1933 on condemnation of the Nazi régime in Germany as a menace to the Empire and to world freedom. He returned to office in 1939 as First Lord of the Admiralty and vigorously denounced the Chamberlain appeasement policy before and after Munich. Upon the fall of Prime Minister Neville Chamberlain in May, 1940, some eight months after the Second World War began, Churchill became head of the government, and at once formulated a policy of uncompromising belligerency against Nazi Germany. His firmness, tenacity, and inexhaustible energy imbued the people of England and the Empire with a new spirit of dogged and heroic resistance to the enemy which had a notable impact on the conduct of the war in the critical years of 1940 and 1941 and braced the people to bear up under Germany's air bombardment of Great Britain. He was a tireless traveler in the prosecution of the war, visiting Moscow, Cairo, the North African front, and participating in such notable allied conferences as Casablanca, Quebec, Cairo, and Teheran, and several meetings with the President of the United States in Washington.

Prime Minister Churchill's publications include: *The Story of the Malakand Field Force* (1898); *The River War* (1899); *Savrola* (1900); *London to Ladysmith via Pretoria* (1900); *Ian Hamilton's March* (1900); *Lord Randolph Churchill* (1906); *My African Journey* (1908); *The World Crisis* (4 vols. 1928–9); *My Early Life* (1930); *The Eastern Front* (1931); *The Unknown War* (1931); *Thoughts and Adventures* (1932); *Marlborough* (4 vols. 1933–8); *Great Contemporaries* (1937); *Arms and the Covenant* (1938); *Step by Step* (1939); and *Into Battle* (1941).

Church Missionary Society, THE, a society founded April 12, 1799 as a direct result of the evangelical movement in the Church of England. It is now, however, supported to a greater or less extent by all schools of thought, covering a larger portion of the non-Christian world than any other Anglican society. The head office is the Church Missionary House, 6 Salisbury Square, London, E. C. 4. There are about 225 ordained British missionaries and about 800 other ordained clergy, the latter recruited on the various fields. British lay missionaries, including about 100 doctors, 115 nurses, also married women and single women other than nurses, together number over 800. The chief centers of activity are China, India, Ceylon, Iran, Palestine, Egypt, Anglo-Egyptian Sudan, Kenya, Uganda, Tanganyika, Ruanda-Urundi (Belgian Congo), Nigeria, and Sierra Leone. The principal organs of the society are the *C. M. S. Outlook,* the *Round World* (for children), and the *East and West Review,* the last published jointly with the Society for the Propagation of the Gospel in Foreign Parts.

Church of England. See CHURCH, ANGLICAN.

Churches of God in North America, a fundamental religious body, founded by Rev. John Winebrenner in 1825, pastor of the Salem Reformed Church in Harrisburg, Pa. He preached the doctrine of regeneration which led to his severance from the mother church. The Churches of God were organized in 1830 as a new body, resulting from revivals conducted by Rev. John Winebrenner, taking the New Testament name 'the Church of God.' They believe that the Holy Bible is the only rule of faith and practice for Christians and that there are three ordinances—baptism by immersion, washing of the saints' feet, and the Lord's Supper. It has 15 annual Elderships and a General Eldership that meets triennially. It is composed of 381 churches and 32,083 communicants. Headquarters, Harrisburg, Pa.

Church, States of the, or PAPAL STATES, the name given to the territory in Central Italy which represented the papal ideal of temporal supremacy. By Constantine's edict of Milan in 321 the Church was enabled to hold property and from that time forward its possessions increased until in the time of Gregory the Great (590) the Roman see possessed a considerable amount of landed estate. In 754 the Frankish king, Pepin, rescued Rome from the Lombard king, Aristulf, and gave the lands to the Roman Church. Charlemagne increased these possessions and Pope Innocent III (1198–1216) further strengthened the temporal supremacy. It was weakened by the papal schism (1378–1439), but reëstablished under Sixtus IV (1471–84). Alexander VI (1492–1503) let the Church States sink to the diplomatic level of other Italian principalities, but Julius II (1503–13) rescued Italy from the hands of the French. In 1797 the French Directory occupied the States, proclaiming a Roman republic; but they were restored to the Pope at the Congress of Vienna (1815).

In 1860 the greater part of the Church territories fell to Italy, and in 1870 Rome became Italy's, papal dominion came to an end and the Pope's jurisdiction was confined to the limits of the Vatican. This condition of affairs lasted until 1929, when on Feb. 11, a pact between the Holy See and the Kingdom of Italy was signed. This pact recognized the two organizations as separate and independent sovereignties; an indemnity of $87,500,000 was granted the Papacy for losses entailed through the events of 1870; the application of canon law to the Kingdom of Italy and the modification of civil laws to confirm with canon law so that aside from purely religious matters laws should be applicable to all citizens irrespective of religion were provided for. The limits of the City of the Vatican were rectified but with very little actual increase in area, and the teaching of religion in the public schools was made compulsory.

Churchwardens, persons appointed in each parish in England for the purpose of caring for the fabric and attending to the other temporal affairs of the church, such as arranging for the seating of the congregation, receiving the offertories, and seeing that order is kept during divine service. There are usually two churchwardens; the appointment may be by the parishioners, or as is usual, by the incumbent as to one churchwarden and the parishioners as to another. They are chosen from the ratepayers and householders in the parish. The office is obligatory on those chosen, except in new parishes, where churchwardens must belong to the Church of England; but certain persons are exempt from serving, as peers, members of Parliament, sheriffs, justices of the peace, clergymen, dissenting ministers, legal, medical, and dental practitioners, officers in the army and navy, and some other persons holding official positions. There are also certain persons incapable of serving, as aliens, Jews, lunatics, minors, and felons. Roman Catholics or dissenters, if chosen, are permitted to serve by deputy. Churchwardens are elected annually during Easter week, and at the termination of their year of office they are required to render accounts to the vestry. In the Protestant Episcopal Church of the U. S. they are elected by each parish annually, and have the same duties as in England with modifications made necessary by separation of church and state.

Churchyard Beetle (*Blaps*), a genus of dark-colored and inactive beetles, found in England and elsewhere in damp and gloomy localities. These beetles are found in America, but are not known there by this name.

Churl. See CEORL.

Churn, the name given to a variety of closed vessels used for agitating milk or cream, in order to cause the fatty globules to coalesce into butter. In the older forms of churns the milk was stirred or agitated by a plunger working vertically in a tub or other vessel. In some of the modern forms the receptacle itself is stationary, but is provided with dashers inside, operated by a crank, which agitate the cream; in others, as the barrel and swing churns, the receptacle is revolved or swung to and fro, causing the cream to dash against the ends and sides. These are much in favor, as they can be easily cleaned. The construction, form, and kind of motion imparted vary widely, and the sizes range from those suited to a small home dairy to large power-churns used in creameries. The combined churn and butter-worker is, as its name implies, a churn in which the butter can be partially or wholly worked after the buttermilk has been drawn off. It is operated by power and used to considerable extent in creameries. The butter extractor is a combined cream-separator and churn, acting continuously, the sweet cream being churned as soon as separated. It is but little used in this country. The principal desiderata in all churns are that they should be constructed of a thoroughly seasoned wood, which imparts no taste to the butter, and be readily kept absolutely clean and sweet. Removable dashers do not so readily allow particles of butter to lodge in angles as fixed dashers attached within the churn. See BUTTER MAKING AND DAIRYING.

Barrel Churn

Churubusco, a small village about 6 miles S. of the city of Mexico, on a river of the same name; the scene of an American victory, Aug. 20, 1847, during the Mexican War. The most stubborn fighting was along the Rio Churubusco, and in the attack and capture of the convent of San Pablo (now a hospital). The Mexicans were commanded by Gen. Santa Anna and the Americans by Gen. Winfield S. Scott, the attacking forces being under the immediate command of Generals Twiggs, Persifor Smith, and Worth. The battles of Contreras and Churubusco, fought on the same day, really constituted a single battle, in which the Americans lost in killed and wounded about 960, the Mexicans about 4,000; these numbers, however, as also the numbers engaged on each side, are stated differently by different writers.

Chusan, group of islands off coast of Chekiang, China, 50 miles E.N.E. of Ningpo. They were occupied by British troops in 1841, and held until payment had been made of indemnity fixed by treaty of Nanking.

Chuvashes, or TCHUVASHES, a people numbering some 540,000, possibly Finnish, but more likely Turkish in origin, occupying parts of E. Russia—*e.g.* Kazan, Samara, Ufa. They are nominally Christian.

Chyle, the milky fluid contained in the lacteals after the digestion of food. Chyle is lymph plus digested fat, the fat being in globules and very minute characteristic granules. See NUTRITION.

Chyluria, a milky, coagulable condition of the urine, due to the presence of chyle, and associated with elephantiasis and the presence in the blood of the parasite *Filaria sanguinis hominis.* See ELEPHANTIASIS.

Cibber, COLLEY (1671–1757), English actor, dramatist, and poet laureate, born in London, went on the stage, becoming a member of Betterton's company. For some time his histrionic attempts were disappointing, and he took to the writing of plays, the production of his *Love's Last Shift* (January, 1696), in which he took the part of Sir Novelty Fashion, establishing his reputation both as dramatist and actor. He is credited with having written or adapted thirty pieces, and he continued to act until over threescore (February, 1733). He became one of the patentees of Drury Lane (1711), and under his management the theatrical atmosphere was purified. On the death of Ensden (1730), to the surprise of friends and foes, Cibber became poet laureate, and, as such, wrote some of the worst odes in the language. Having by a thoughtless jest wounded the tender susceptibilities of Pope, a quarrel ensued, conducted with much bitterness on the part of Pope and much patient good-nature on that of Cibber. To this quarrel he owed his elevation to the throne of Dullness in the *Dunciad.* His *Apology* (1740) is one of the best and most entertaining of autobiographies. See the *Apology for the Life of Mr. Colley Cibber,* ed. R. W. Lowe (2 vols. 1889); Disraeli, *Quarrels of Authors* (1867); Baker, *Biographica Dramatica* (1812). A bibliography of the numerous skits on Cibber is to be found in Lowe's *Bibliographical Account of English Theatrical Literature.*

Cicadas, large bugs, which feed on plant juices, and occur only in the warmer parts of the globe. They are the most noisy of insects, the males having an elaborate stridulating organ of peculiar structure, and apparently singing in rivalry with one another. The *Cicada septendecim* of America is probably the longest-lived of insects, the young form living from thirteen to seventeen years underground before emerging as the perfect insect. The common noisy, green cicada or 'locust' of the eastern United States is, however, a different species (*C. tibicen*), and short-lived. Its eggs are attached to the branches of trees, hatch, drop to the ground, and the young enter the soil and mature in a year or two, according to the warmth of the season, etc. In South America, *Tympanoterpes gigas* is stated to make a noise like the whistle of a locomotive. The manna cicada (*Cicada orni*) occurs in southern Europe.

About 800 species are known, mostly tropical.

Cicatrization (Lat. *cicatrix*, 'a scar'), the formation of fibrous tissue which is the end of the healing process of a wound. Wounds are said to heal 'by first intention' or by 'granulation' (see Wounds). But in either case the ultimate result is the formation of firm fibrous tissue on which no hair grows, and which has no sweat-glands or sebaceous ducts, and is very poorly supplied with vessels and nerves. A cicatrix tends to differ in color from the surrounding tissues, being denser, and often whiter, because of the less abundant blood-supply. Its vessels do not contract or dilate with the same readiness as those of surrounding normal tissue; and, therefore, a cicatrix, on any such situation as the face, is often most prominent during emotional influence on the circulation, being sometimes darker and sometimes whiter than the rest, according to its stage of growth. Cicatrices, owing to their low vitality, are apt to degenerate, and are frequently the seat of warts, eczema, and epithelial tumors.

Cicero. (1.) Marcus Tullius (106–43 B.C.), was the greatest orator and man of letters produced by ancient Rome, and one of the leading statesmen in the last age of the republic. He was born on Jan. 3, 106 B.C., near Arpinum, the birthplace of Marius. His first extant speech was delivered in 81 B.C. In 79 he went to Greece, and at Athens formed a lifelong friendship with T. Pomponius Atticus, to whom a great number of his extant letters are addressed. In 77 he returned to Rome, and his oratorical successes won him the quæstorship in 75. His prosecution of Verres gave him the first place among Roman orators. In 69 he was curule ædile. In 66 he became prætor, and delivered his speech in favor of the Manilian law, conferring extraordinary powers on Pompey. In 63 he became consul, and performed his greatest service to the state by putting down the conspiracy of Catiline. For the next two years he was the leading man in Rome; but the alliance of Pompey and Cæsar in the first triumvirate deposed him from this position. His opposition to the triumvirs caused him to permit Clodius to attack him by bringing forward a bill to banish any person who had put Roman citizens to death untried. This Cicero had done in executing the accomplices of Catiline. His courage failed him, and he left Rome before the measure was put to the vote, and retired to Greece. This happened in 58 B.C., but in 57 he was recalled by the unanimous vote of all Italy. In 51 he reluctantly became governor of Cilicia, and in 50 decided to join Pompey, whom he accompanied to Greece. After the battle of Pharsalia (48 B.C.), Cicero returned to Italy, and was kindly received by Cæsar. The next few years he spent in retirement, engaged in literary works. After Cæsar's murder he stepped forth as the leader of the constitutional party, and vigorously attacked Antony in his Philippic orations. In revenge for this, when Antony and Octavius formed the second triumvirate, they proscribed Cicero. He endeavored to escape, but was overtaken by Antony's soldiers near Formiæ, and offered his neck to the executioners, Dec. 7, 43 B.C.

Cicero had many friends, notably Atticus. It is in his correspondence to them that he reveals his nature to us most freely. He had many weaknesses, but for his playfulness, his humor, his wit, his kindliness, his affectionate disposition, and for the higher qualities of humanity, conscientiousness, uprightness, and adherence to what he held to be his duty, he has gained the admiration and respect of all ages.

As a literary man, Cicero is even greater than he is as a statesman. There is little originality in all his writings; and in his philosophical works he is little more than a translator from the Greek. Yet such is the perfection of his writing that the normal prose style in all modern literature may be said to be Ciceronian. Not the least of its excellences is that it suited itself naturally to all subjects, whether the vehemence of political invective, the discussion of philosophical questions, literary criticism, or the familiarity of friendly correspondence. The list of his works is too long to be given in full; they may be divided into the following classes:—(1) Oratorical works, fifty-six in number, of which the speeches against Verres, against Catiline, and the Philippics are the best; (2) seven works on rhetoric, especially the *De Oratore;* (3) philosophical works, nine in number, of which the *De Officiis* ('On Duties') and the *De Finibus* ('On the Chief Good') are the most important; (4) political works, two in number, the *De Republica* ('On the State') and the *De Legibus* ('On Laws'); (5) epistles, over eight hundred in number, covering the period from 68 to 43 B.C.; they are divided into three classes—those to Atticus, to various friends (*Ad Familiares*), and to his brother Quintus.

Editions.—Text: Orelli (1863), Baiter and Kayser (1869), Müller (1878), Friedrich (1884), and Wesenberg (1872). Annotated editions of separate works are too numerous to recount, but those of the *Letters* by Tyrrell and Purser (1879–99), of the *De Finibus* by Reid (1896), of the *De Officiis* by Holden (1890), of the *De Oratore* by Wilkins (1892–5), of the *In Catilinam* by Wilkins (1894), of the *Pro Milone* by Reid (1894), of the *Philippics* by King (1868), may be specially mentioned among many other good editions. Of translations, Reid's *De Finibus*, Gardiner's *De Officiis* (1899), Jeans' (1887) and Schuckburgh's (1901) *Letters*, Peterson's *Pro Cluentio* (1882), and Blakiston's *Pro Milone, Pro Murena, In Catilinam, Philippica II.* (1894), may be recommended. See also Strachan-Davidson's *Cicero and the Fall of the Republic* (1890), Sears's History of *Oratory* (1896), and Boissier's *Ciceron et ses Amis* (12th ed. 1902). A standard *Life* of Cicero is that of Conyers Middleton (1741). See also Trollope's *Life* (1880).

(2.) Quintus Tullius (102–43 B.C.), the younger brother of the above, was ædile in 67 B.C., prætor in 62, and then for three years governor of the Roman province of Asia. In 55 he joined Cæsar in Gaul as one of his chief officers. In the civil war he joined Pompey, but after Pharsalia was pardoned by Cæsar. He was proscribed by the triumvirs, and put to death in 43 B.C.

(3.) Marcus Tullius, son of the great orator and Terentia, was born in 65 B.C. He served with credit under Brutus and Cassius. After Philippi he joined Sextus Pompeius. In 39 he returned to Rome, and Augustus made him his colleague in the consulship in 30 B.C.

Cicerone (Ital.; from Lat. *Cicero*), in Italy (especially in Rome and Naples), a guide who conducts strangers through the collections of art, etc. First applied only to men of learning who volunteered their services *ex gratia;* thereafter transferred to ordinary professional guides. In a secondary sense, any guide, whether man or book.

Cicester. See Cirencester.

Cid Campeador (1040–99), whose real name was Ruy Diaz de Bivar, a Castilian noble and soldier of fortune. His romantic title is compounded of the Arabic *saiyid*, 'lord,' and Spanish *campeador*, 'challenger' or 'champion.' Born at Bivar, near Burgos, he became a standard-bearer in the army of Sancho II. of Castile. In 1071 the armies of the two brothers, Sancho II. of Castile and Alfonso VI. of Leon, met at Golpejar, near Salamanca, for a final struggle, it being agreed that the vanquished brother should retire to a monastery, leaving his realm to the victor. The Leonese were victorious; but whilst resting after the fight, they were treacherously surprised by the Castilians under Ruy Diaz and overwhelmed, Alfonso of Leon escaping to Moorish Toledo. On the murder of Sancho II (1072), Alfonso succeeded to both thrones, and in 1081 Ruy Diaz was banished from Castile, and took service with the Moorish king, Moktadir of Saragossa, whose armies he led against the Christian count, Ramon Berenguer III of Barcelona, gaining a signal victory over him at Lerida. In 1083 the Cid led the Moslems against the Christian king, Sancho Ramirez of Aragon, whom he completely defeated; and in 1085 he conquered the northern portion of Moorish Valencia for the king of Saragossa. In all these and his subsequent wars his personal greed and cruel rapacity were boundless. The king of Valencia then appealed to the Cid for help against his own subjects and the Saragossans. The Cid promised to recover Valencia if he were allowed the whole booty of the city; but when he had won the place he held it on his own account, and exacted a heavy annual tribute. Whilst the Cid was on a visit to Castile, the Valencian king sought the aid of the count of Barcelonia to recover his kingdom, but the Cid hurried back and overcame opposition. Thenceforward for years, with a chosen body of 7,000 desperadoes, the Cid overran, from Valencia, all western Spain, exacting tribute and ransom on his own account; and in a battle at Tebar in 1090 against his old foe, Ramon Berenguer of Barcelona, the latter was again defeated and captured, the great ransom of 80,000 gold marks being demanded. This being impossible to obtain, the Cid feasted his prisoner and released him freely. Alfonso VI attempted to check the power in Valencia of his great subject; but the Cid invaded Castile, burning, slaughtering, and plundering, until Alfonso was glad to let him alone at Valencia. This city, which had shut its gates against him, he recaptured in 1094, after a siege of heartless cruelty; and thenceforward till his death, in 1099, the Cid reigned there as an independent king. His wife carried his remains to the convent of San Pedro de Cardeña, near Burgos, in 1102; finally they were buried in the town hall of Burgos. Cruel, boastful, greedy, and brave, Ruy Diaz yet possessed a rough code of generous chivalry, and he stands out as the national hero of Spain. The famous *Poem of the Cid*, the first great epic in the Spanish tongue, modeled on the French *Chanson de geste*, was written about forty years after the Cid's death, the *Chronicle of the Cid* and other narratives being of later date.

Cider is the fermented juice of the apple. The manufacture consists in crushing the apples and squeezing out the juice. The juice is poured into casks, where it ferments and clears itself of impurities. The cider thus produced is fairly bright, and contains from 4 to 8 per cent of alcohol. It possesses a characteristic flavor of apples, and is termed rough or sweet cider, according to the amount of sugar and tannin it contains. The density of the juice depends upon the class of fruit used, and the character of the soil and season. In the leading cider-producing countries like France, Germany, and England, hundreds of distinctly cider varieties of apples have been developed. In the United States cider varieties are now scarcely grown at all. What cider is made is produced from dessert varieties of apples and generally from second and third grade fruit. The best cider is produced from sound, mature, clean fruit. If the fruit is not clean it should be washed. Winter varieties of apples make the best cider and summer varieties the poorest, due in part to temperature and in part to the lower sugar content of summer apples. The juice of ripe apples varies in sugar content from 7 to 15 per cent, the average being about 11 per cent. Mills that scratch up the pulp are better than those that crush the fruit. A bushel of apples ground in a hand press will produce about 2 gallons of cider and with a power press 4 gallons.

As the freshly expressed juice comes from the press, it is placed in covered vats or barrels where it undergoes a rapid fermentation, throwing up a white foamy head of lees. Gradually this violent fermentation subsides, the head loses its frothy appearance, becoming brown, some of the heavier lees sink, and the juice assumes a clear amber color. At this time the cider is racked, the clear juice being drawn off into clean casks and allowed to undergo a slow second fermentation.

The fermentation of apple must is due to the growth in it of yeast plants. These attack the sugar, breaking it down into alcohol and carbon dioxide. The yeast plant grows most rapidly at a temperature of 65 to 75° F. In order not to have the fermentation take place too violently and injure the product, the must should be kept in a temperature of 50 to 60° F. After racking, the recommended temperature for the second fermentation is 45 to 50° F. The second fermentation lasts from 3 to 6 months, at which time the clear juice is again racked into bottles, casks, or barrels, and tightly sealed. A small amount of sugar still remains in the juice and a slow fermentation still goes on, resulting in an accumulation of carbon dioxide in the vessels, which gives to the cider a lively, sparkling appearance when drawn. Cider thus made will keep and not turn to vinegar. Recently it has been determined that the character of the yeast causing fermentation has a marked effect on the quality of the product. If the fresh must is sown with a pure culture of yeast that gives Sauterne wine its peculiar flavor, a similar flavor is imparted to the resulting cider, etc. In this work about 1 pint of pure yeast culture is used to each 50 gallons of fresh must. The solid pulp cake from the first pressing still contains considerable juice and sugar. This may be broken up in water and a second pressing made. Cider made from the juice thus obtained is low in alcoholic content and of poor quality and is sometimes referred to as 'small cider.' The pressed pulp is known as apple pomace. It has been found to have about the same feeding value for dairy cows and about the same composition as corn silage. It keeps well in a silo and may advantageously be fed at the rate of 25 to 35 pounds per head daily. See also *Study of Cider Making in France, Germany, and England, with Comments and Comparisons on American Work*, by W. B. Alwood (U. S. Dept. Agr., Bureau Chemistry, Bul. 71), and *The Composition of Apples and of Cider as Determined by Dominant Fermentation with Pure Yeasts*, U. S. Dept. Agr., Bureau Chemistry, Bul. 88).

Ciechanow, tn., Poland, gov. of Plock, 55 m. by rail N.W. of Warsaw. Manufactures leathers. Pop. 10,664.

Ciénaga, or SAN JUAN, tn., Colombia, Magdalena, near the Ciénaga Grande, or lagoon of Santa Marta, 22 m. by rail S. of Santa Marta. Pop. 7,000.

Cienfuegos, tn., Cuba, 42 m. N.E. of Trinidad, on a landlocked harbor which accommodates the largest vessels, is the third seaport of Cuba as regards imports, and bids fair to become the first port in the export of sugar, and the center of the sugar trade of the S. side of the island. It has wide, well-paved streets, spacious public squares, and is lighted by gas and electricity. It is the seat of two hospitals, a theatre, and has good civic buildings. Admiral Schley blockaded it during the Spanish-American War. Pop. (1938) 92,258.

Cieza, tn., Spain, 24 m. N.W. of Murcia. Produces olives, wine, fruit, grain, and vegetables. Situated on river Segura, in mountains 710 ft. above sea-level. Pop. 17,899.

Cigoli, properly Lodovico Cardi (1559–1613), Italian painter and architect, born at Cigoli, near Florence. He developed his art by studying Andrea del Sarto and Correggio, and his work is characterized by beautiful coloring and power of expression. He spent the greater part of his life at Florence, but after 1605 he went to Rome on the invitation of Pope Paul V. Among his principal paintings, most of them in Florence, are *St. Francis* (1596), in the Academy, Florence; *The Martyrdom of St. Stephen,* in the Uffizi Gallery; *The Appearance of Jesus Christ to Peter* (1610), in the Pitti Palace, etc. As architect, he finished the Pitti Palace at Florence, and the courtyards of the Strozzi and Rinuccini palaces, the beautiful portal of the church of Santa Felicità (Florence), etc. For chief works, see Champlin and Perkins's *Cyclopaedia of Painters* (1888).

Cilia, in biology, are whiplike processes often found fringing cells, both in the Protozoa and in many-celled animals, and capable of very free movement. The windpipe, for example, is lined by ciliated cells, while such Protozoa as Volvox, Paramoecium, and many others, move entirely by means of them. They also serve, when surrounding the oral aperture, by their regular vibrations, to induce currents of water to flow into and out of the creature, supplying oxygen and bringing food which is absorbed by assimilative surfaces. See Packard's *Zoology* (1897).

Ciliata, an order of Protozoa characterized by the presence of cilia, and of a distinct outer layer or cortex. Familiar examples are Paramoecium, commonly found in stagnant water; Vorticella, the bell animalcule, common in fresh water; the parasitic Ophalina, found in the frog's intestine. The cilia are variously arranged in the different forms, and afford a basis of classification. A mouth is usually present, but may be absent in parasites—*e.g.* in Ophalina. Reproduction is by division, but a process of conjugation has been described in many.

Cilicia, a region in the S.E. of Asia Minor (now the valley of Adana and Tarsus); its boundaries were the Mediterranean on the S., Mt. Taurus on the N., Mt. Amanus on the E. The whole country is intersected by mountains. After 560 B.C. it was included in the Persian empire, until Alexander's conquest in 331 B.C. After his death it was governed by the Seleucidae, and was largely Hellenized. Soli and Tarsus were important centers of Greek civilization. The older inhabitants, who had retired to the mountainous western district, gained great notoriety as pirates in Roman times, until they were put down by Pompey in 67 and 66 B.C., who made the region a Roman province.

Cilician Gates, historic pass across the Taurus range, Asia Minor, leading from the central plateau to the valley of Adana and Tarsus. The width of the road at the gates proper is 25 ft., and through it, between walls of perpendicular rock, rushes a tributary of the ancient Cydnus, the modern Tarsus R.

Cima, Giovanni Battista (?1460–1518), called Cima da Conegliano, from his birthplace; Italian painter, a pupil of Giovanni Bellini. Cima restricted himself to sacred subjects and a few classical pictures. His figures are tranquil and graceful, his color jewel-like, his details, such as marble, fruit, flowers, leaves, extraordinarily careful. Great care is bestowed on architectural backgrounds; and his landscapes are often beautiful, representing mostly the hilly walled town of Conegliano. After 1492 he painted in oils, his finest altar-pieces being in the Parma Gallery, and in Venice, where is his *St. Thomas Touching the Wounds of Christ,* by many esteemed his masterpiece; and there are five panels, illustrative of his work at different periods, in the National Gallery, London. See Ruskin's *Modern Painters* (new ed. 1873).

Cimabue, Giovanni (1240–1302), Italian painter, born in Florence, and styled the 'father of modern painting,' being in reality the meeting-point between the Byzantine and early Italian art. In style a follower of the Byzantine tradition, he anticipated the change in spirit, and influenced and encouraged the real pioneer, Giotto. While he could not free himself from traditional flat surfaces, he essayed to put relief in the draperies, and a feeling of humanity into his Madonnas; hence his great appeal to his contemporaries, to whom he gave 'a Madonna they could love.' Cimabue's most important Madonnas are in Florence, but one is in the Louvre, and one in the National Gallery, London. Some of the frescoes in the church of St. Francis, Assisi, are attributed to him; also part of a mosaic at Pisa.

Cimarosa, Domenico (1749–1801), an Italian operatic composer, born at Aversa, near Naples. Among appointments he held were those of chamber composer to Catherine II at St. Petersburg (1789), and of Kapellmeister to the Emperor Leopold II (1792) at Vienna. *Il Matrimonio Segreto* (1792), his finest work, is the only one by which he is now known.

Cimbri, a people of Germanic nationality, who came from the Chersonesus Cimbricus (modern Jutland). The best authorities have given up the idea of their Celtic origin, which was suggested by the similarity of their name to that by which the Welsh call themselves, Cymry. After wandering north of the Danube they threatened Italy, in conjunction with the Teutones and Ambrones, and defeated the consul Cn. Papirius Carbo at Noreia (now Neumarkt), in Carinthia, in 113 B.C. Instead, however, of at once entering Italy, they passed through Switzerland into Gaul. There they defeated the consul Junius Silanus in 109, and in 105 annihilated the armies of the consul Cn. Maximus Mallius and the proconsul Q. Servilius Caepio. Fortunately for Rome, they then invaded Spain, and remained there for two or three years. Returning thence they pursued a march of conquest along the west coast of France as far as Belgium; but being stoutly resisted by the Belgae, turned south again, with the definite intention of invading Italy. They were now acting in concert with the Teutones; the latter attempted to enter Italy from the west, and were destroyed by Marius at Aquae Sextiae (Aix) in Gaul, 102 B.C. The Cimbri meantime crossed the Alps, entered Italy by the valleys of the Eisack and the Adige, and forced the Roman consul Catulus, who was guarding the country there, to retreat. Soon Marius joined him with his victorious army, and won an equally decisive victory over the second invading horde, on the Raudine Plains, near Vercellae, in 101 B.C. See Mommsen's *History of Rome.*

Cimmerii, the name given by Homer to a legendary people who lived in the farthest west, on the banks of the ocean stream, in darkness and mist. (See the *Odyssey,* bks. xi and xiv.) The name is also given to a historical people who dwelt on the shores of the Sea of Azov and in Asiatic Sarmatia. Herodotus tells us that, under pressure from the Scythians, they invaded Asia Minor three times. In 679 B.C.

they were defeated by Esarhaddon, king of Nineveh; about 650 they overran Lydia, during the reign of King Ardys, destroyed Sardis and Magnesia, and threatened Ephesus and other Greek cities; they were finally expelled by Alyattes, king of Lydia, between 605 and 556 B.C. Their name is still retained in the modern Crimea.

Cimon, sī'mon (*c.* 515–449 B.C.), famous Athenian general, son of the great Miltiades (q.v.), enjoyed the patronage of Aristides, and early distinguished himself in the patriotic struggle against the Persians. In 466 B.C. he destroyed a large Persian fleet off the mouth of the river Eurymedon in Pamphylia, and on the same day landed troops and routed the Persian Army. He succeeded likewise in driving the Persians from Thrace, Caria, and Lycia. The hereditary enemy of Persia, it was his policy to advocate a close alliance with Sparta; and when the Helots revolted, he twice led an army to the support of the Spartan troops; but on the latter occasion, having lost the confidence of his allies, he was dismissed. After his return to Athens his policy was opposed by the democracy, headed by Pericles, who procured his banishment by ostracism. Recalled after the battle of Tanagra in 457, he again led (449) an expedition against the Persians, who gained a complete victory off the coast of Cyprus. Cimon, however, died just before the engagement. Consult Perrin's *Plutarch's Cimon and Pericles* (1910); Grote's *Greece*.

Cinchona, sin-kō'n*a*, or more properly Chinchona, a most important genus of trees and shrubs, of the order Rubiaceæ, from the bark of which—variously known as Peruvian Bark (q.v.), Jesuits' Bark, China Bark, Quinquina, and Cinchona Bark—the important alkaloid quinine and its congeners are obtained. The genus includes some thirty or forty species native to the Andes, where they grow at altitudes of 2,300 to 9,000 feet. The leaves are opposite, and similar to those of the laurel, with deciduous stipules, and the flowers, which occur in terminal panicles, are fragrant pink and white blossoms with a small five-toothed calyx and long tubular corolla with five spreading lobes.

The species vary considerably in the kind and quantity of alkaloids contained in their bark. The true cinchonas include: *C. calisaya* of Bolivia and Southeastern Peru, one of the most extensively cultivated varieties, the bark of which is variously known as calisaya bark, royal bark, and yellow bark; *C. ledgeriana,* a variety of Calisaya extensively cultivated because of its richness in quinine; *C. officinalis* of Ecuador and Peru; and *C. succirubra,* which yields the so-called red cinchona bark containing a considerable proportion of cinchonidine. There is a large number of allied species which, though more or less bitter and even febrifugal, contain no quinine but are frequently used as substitutes or adulterants. Cinchona bark is said to yield the maximum amount of alkaloids when the tree is from six to nine years of age.

The removal of the cinchona bark for commercial purposes is a laborious and difficult operation. The method of collection practiced by the South American Indians involved the cutting down or uprooting of the trees and depended on spontaneous sprouting for renewal growths. The danger of extinction, however, eventually led to the transplanting and cultivation of this valuable commodity. The method is to remove the trunk bark from trees six years old or more by taking it off in strips, and drying it in quills. The denuded parts are then covered with moss, which not only protects the new-bark formation, but nearly doubles the alkaloid yield by shielding the bark from the direct rays of the sun.

The world's chief supply of cinchona bark is derived from the cultivated forests of Java, India, New Zealand, Ceylon, and Queensland. Cinchona plantations also exist in Bolivia, but are less profitable on account of the difficulties of transportation.

In India and Ceylon the alkaloids are usually extracted in a crude state, then shipped to Europe for purification, thereby saving in freight charges. The chief and most valuable alkaloid is quinine, associated with quinidine, cinchonidine, and cinchonine in varying proportions.

The Indians of Peru call the cinchona trees *Kina,* from whence are derived the names *Quina* and *China,* but there is no evidence that they knew the use of the bark before the arrival of the Spaniards. It was first imported into Europe in 1639, by the countess of Chinchon, the wife of the viceroy of Peru, who had been cured of an obstinate intermittent fever by means of it, and who thereafter habitually distributed it to those suffering from fever. The Jesuit missionaries afterwards carried it to Rome, and distributed it through their several stations, and thus it acquired the name of *Jesuits' Bark* and *Pulvis patrum.* Having fallen into practical disuse in Europe, it was again brought into notice by Robert Talbor or Talbot, an English apothecary, who acquired great celebrity through the cure of intermittent fevers by its use. In 1678 he cured Charles II. of a tertian fever. In 1679 he similarly cured the Dauphin and other eminent personages on the Continent, and thus induced Louis XIV. to purchase his secret. The adoption of the drug was henceforth assured. The discovery of the alkaloids on which its properties chiefly depend did not take place till the beginning of the nineteenth century.

See Quinine; Cinchonine.

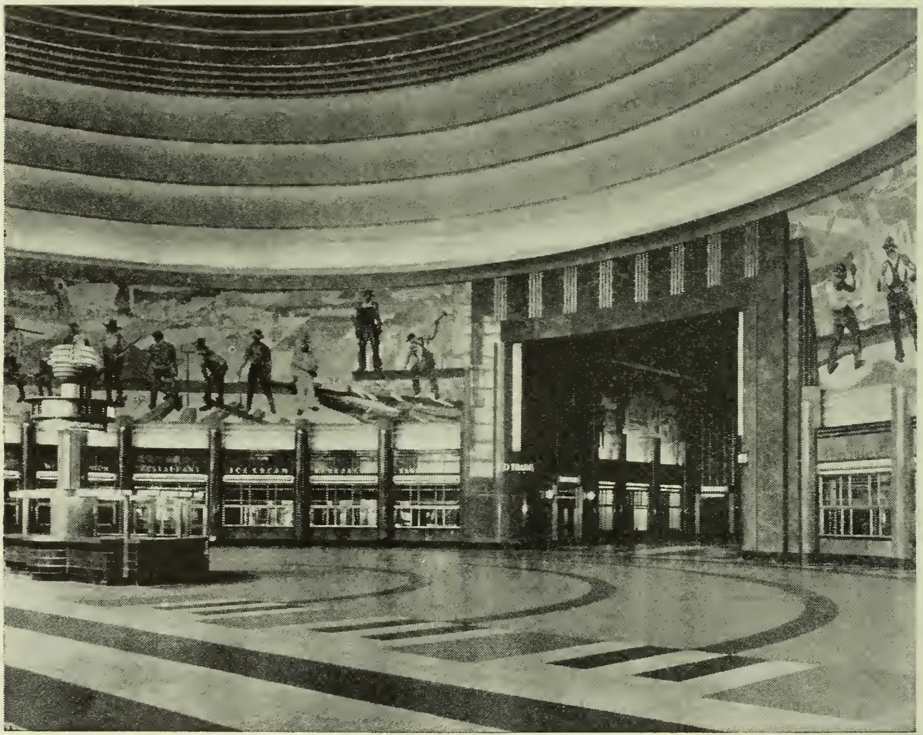
Cinchonine, Cinchonidine, sin'kō-nin *or* -nēn, and sinkon'i-din, two isomeric alkaloids. of formula $C_{19}H_{22}N_2O$, present in cinchona bark, from which they are isolated after the removal of the quinine and quinidine. They form fine, white crystalline powders, insoluble in water. Their sulphates, which are soluble in 60 to 75 parts of water, are principally used. Both alkaloids are much less powerful than quinine, and are given in much larger doses. They are sometimes used as a febrifuge for children. See Cinchona; Quinine.

Cincinnati, sin-si-nä'ti, city, Ohio, county seat of Hamilton county, second city of the State, and seventeenth in the United States, in population, is situated in the southwest corner of Ohio, on the north bank of the Ohio River at the point where the three State lines of Ohio, Indiana and Kentucky meet; 223 miles southwest of Cleveland, 300 miles southeast of Chicago, and opposite the cities of Covington and Newport, Kentucky. By rail to New York it is 760 miles, and 830 to New Orleans. Of railroad connections, eight trunk line systems operate 20 divisions radiating in every direction, comprising a total mileage of 47,397 miles, or 20% of the total in the United States. Cincinnati is the only city in the country owning an interstate railroad—the Cincinnati Southern—extending to Chattanooga, 339 miles; it cost $30,000,000, and is leased to the Cincinnati, New Orleans & Texas Pacific R. R. Lofty bridges connect with the Kentucky shore; among these is the first suspension bridge in the United States (1867–1898).

The city covers an area of 73.13 square miles and has a river front of 23 miles. The Metropolitan Area (as defined by the U. S. Census Bureau), is 519.56 square miles. Its altitude ranges from 432 to 960 feet above sea level, thus occupying a broken and irregular site. On the low-

Courtesy Cincinnati Chamber of Commerce

THE SKY-LINE OF CINCINNATI



Courtesy New York Central Lines

CINCINNATI UNION TERMINAL

est ground are the principal warehouses and manufacturing establishments; the best residential districts are on higher lands toward the crescent of picturesque hills which enclose the city on the north, east and west, while the business section, the most densely built part, occupies the middle ground between.

There are 126 public parks covering 3,724 acres; 70 supervised play centers; 12 golf courses and extensive boulevard systems of remarkable beauty. The total street mileage (1940) was 935.33; paved 774.97. There are three airports, one a municipal undertaking (Lunken), covering 1,100 acres. Seven Federal and eight State highways contact with Cincinnati; U. S. Nos. 22, 25 (Dixie), 27, 42, 50, 52 (Atlantic & Pacific) and 127. State Highways, Nos. 3, 4, 4W, 74, 125, 264, 564 and 747.

Motor truck lines number 120, running to 1,110 cities in overnight service, reaching a population over 25,000,000. Forty-four street car routes and 31 motor-coach routes convey 100,000,000 annually; the City Transit Co. carries over 2,500,000 on an additional motor-coach service.

The suburbs of Cincinnati are singularly beautiful, situated on a series of hills, interspersed with parks, and approached at points by noble, winding avenues. There are more than twenty-five suburbs, all within the city limits. On the Ohio side of the river are Riverside, College Hill, Mount Lookout, Avondale, Walnut Hills East, Linwood, Hyde Park, Westwood, Norwood, Oakley, Clifton, Walnut Hills, Pine Hill, and Winton Place. On the Kentucky side are Covington, Newport, Port Thomas, Ludlow, Bellevue, and Dayton. The suburban region is interesting also from a geological standpoint, for it is of that epoch in which the characteristic rocks of the so-called Cincinnati group were deposited. These are richly fossiliferous, and are the highest beds of what are known as the Lower Silurian rocks.

Cincinnati owns one of the finest pumping and filtering plants in existence, located at California, Ohio, a short distance up the Ohio River. Latonia Race Course, Kentucky, is six miles distant from the Dixie Terminal in the city. Eden Park is the site of the Art Museum, containing a rare collection of sculpture, paintings, etchings, textiles, ceramics, metal work, carvings, costumes, arms, musical instruments, etc., ancient and modern. Burnet Woods, a natural beauty spot, adjoin the University of Cincinnati. The Carew Tower, a $33,000,000 skyscraper, contains a 48-story office building, 800-room hotel, garage and stores. City Hall cost $2,000,000 and is adorned with a 250-foot tower. The College of Music is one of the leading institutions of its kind in America, while the Conservatory of Music has turned out many noted musicians. Hamilton county Court House is one of the architectural features of the city. Emery Auditorium seats 2,200 and is the home of the Cincinnati Symphony Orchestra during the concert season. Coney Island, on the Ohio River, ten miles above the city, is reputed the most complete summer amusement park in the West. From the Dixie Terminal Building on Walnut Street run all Kentucky electric cars; it also includes an arcade. Government Building and Custom House is an immense granite structure costing $6,000,000. The Barnard Lincoln statue in Lytle Park was presented to the city by Mr. and Mrs. Charles P. Taft, and is considered the most life-like of any effigy of the great emancipator. The new Masonic Temple has an auditorium seating 2,510. The Observatory, near Ault Park, has one of the largest telescopes in the country. The Ohio Mechanics Institute is equipped to accommodate 4,000 students. The Public Library contains some 1,300,000 volumes and a great collection of books for the blind. St. Xavier College has a large stadium and field house with seating for 9,000. The magnificent Tyler-Davidson Fountain in Fountain Square is one of the finest of its kind anywhere. The University of Cincinnati (q. v.) is the only municipally owned and supported university in the United States. Withrow High School includes an Industrial Arts Building for teaching trades and a stadium seating 8,000. The Zoological Gardens stand among the oldest in America and claim to hold the finest and most complete collection of animal and bird life in the country. The gigantic Union Terminal cost approximately $75,000,000; while the Rail River Terminal, headquarters of the Mississippi Valley Barge line, is the largest of its kind on the river.

Cincinnati's educational institutions include the University of Cincinnati (q. v.), owned by the city; the Cincinnati Observatory and the Astronomical School affiliated with the University; Miami Medical School, also affiliated with the University; Ohio Mechanics' Institute offering literary, scientific, and industrial courses; St. Joseph's and St. Francis Xavier's Jesuit Colleges, and Hebrew Union College. There are colleges also of pharmacy and law, several commercial and musical colleges, some sixty grammar and intermediate schools, and six high schools. The Cuvier Club, the Historical and Philosophical Society, and the Natural History Society have interesting and instructive collections.

The art and the music of Cincinnati are well known; its wood-carving and decorative pottery have a national reputation; the Cincinnati Symphony Orchestra (q. v.) ranks with the greatest orchestras in the United States, and the biennial music festivals, instituted by Theodore Thomas in 1873, are contributed to by the best talent in the country and are largely attended.

The important industries include soap, foundry and machine shop products, sheet metal products, printing and publishing, meat packing, clothing, shoes, radio, electric refrigeration, office furniture, sporting goods, petroleum refining, chemicals, steel, paper and airplane engines.

The city manager form of government obtains in Cincinnati, with the Hare system of proportional representation for selecting members of council, consisting of nine members, one of whom is chosen mayor by the council body.

The population of Cincinnati in 1940 was 455,610; in 1930, 451,169; in 1920, 401,247; in 1910, 363,591.

History.—It is believed that the site of Cincinnati was occupied in prehistoric times by a considerable aboriginal population, mounds containing various relics appearing to confirm this opinion. Cincinnati was first settled by white men in 1780, was permanently occupied in 1788, and was named in honor of the Society of the Cincinnati in 1790. It was incorporated in 1802; and became a city in 1819. Following the beginning of steam navigation on the Ohio River, in 1816, and the opening of the first railroad in 1845, the growth was rapid and owing to its attractiveness and prosperity the city early won the name of 'The Queen City of the West.'

During the Civil War the majority of the inhabitants were staunchly loyal to the Federal cause, although among another element there was considerable sympathy for the South. In 1884 a serious lynching riot occurred, which was put down by the militia with 45 killed and more than 100 wounded. In the same year occurred a great flood causing enormous damage. In 1911 a disastrous fire destroyed the Chamber of Commerce building, which was replaced by a finer structure. In the same year the $1,300,000 Fernbank dam was completed.

Public dissatisfaction with the self-governing charter of 1917 resulted in the creation of a 'citizens charter committee' aiming at improved government. In 1924 the charter was amended and the city manager form of government was adopted. In 1926 an amendment was proposed that the three commissioners should be appointed by the mayor, the Board of Education, and the Board of Trustees of the University of Cincinnati. Also, that the secretary of the commission should be the chief administrative officer and be appointed by the city manager.

After six years of operation, the city manager charter won a decisive success in the election of 1929, when six supporters of the charter were elected to the council, two Republicans and one Independent. Large majorities voted for all the bond issues which had previously been rejected.

Consult C. T. Greve, *Centennial History of Cincinnati* (1904); C. F. Goss, *Cincinnati, The Queen City* (1912); L. A. Leonard, *Greater Cincinnati and Its People* (1927).

Cincinnati Group. See ORDOVICIAN.

Cincinnati Musical Festival, a biennial musical festival held in Cincinnati, Ohio, where it was founded in 1873 by Theodore Thomas (q. v.). It consists of a series of concerts with music by the Cincinnati Symphony Orchestra, a local chorus of some 500 voices, and soloists of note.

Cincinnati, Society of the, a society or order established in 1783 by the officers of the Continental Line of the American army of the Revolution, 'to perpetuate . . . as well the remembrance of this vast event as the mutual friendships which have been formed under the pressure of common danger,' and to form funds for 'the most substantial acts of beneficence . . . toward those officers and their families who unfortunately may be under the necessity of receiving it.' It was so named because it included patriots, headed by Washington, who in many instances had left rural affairs to serve their country (see CINCINNATUS). Eligibility to membership was confined to 'the Officers of the American Army—as well those who have resigned with honor after three years service . . . or who have been deranged by the resolutions of Congress on the several reforms of the Army, as those who shall have continued to the end of the war,' and all French officers of the rank of colonel, and over, in the French army serving in America under Rochambeau, or who had commanded a French vessel or fleet in American waters, and such membership was declared hereditary through the eldest male line. Officers who had died in the service were similarly recognized. In 1854 it was ruled that proper descendants of officers of the Continental army or navy who were entitled to original membership, but who had failed to avail themselves of it, 'or who resigned with honor or left the service with reputation,' were qualified for hereditary membership if found worthy.

The badge of the society, generally known as the Eagle, consists of a bald eagle in gold and white enamel, bearing on its breast a medallion showing three Roman senators presenting Cincinnatus with a sword and surrounded with the legend, *Omnia relinquit servare Rempublicam.* On the reverse is shown the sun rising over a city with open gates, and with vessels entering the port, while Fame crowns Cincinnatus with a wreath inscribed *Virtutis Praemium.* Below are joined hands supporting a heart, with the motto *Esto perpetua,* and around the whole, *Societas Cincinnatorum instituta, A.D. 1783.* The badge is suspended by a light blue ribbon edged with white, emblematical of the union of America and France.

For a time after its organization the society was vigorously assailed throughout the United States, its opponents regarding it as the beginning of an hereditary aristocratic order which would be comparable to the hereditary orders of nobility in European countries, but after a relatively short period this opposition ceased.

Originally thirteen State societies were formed, and one in France under the patronage of Louis XVI. This last was dispersed during the Reign of Terror in 1792. The difficulties of travel, the increasing age of the members, as well as other causes, led to seven of the thirteen State societies becoming dormant or voluntarily dissolving by 1835, but, with a renewal of interest in patriotic organizations that began in 1875, steps were taken to revive those that had ceased to function. In 1902 the Georgia Society of the Cincinnati, the last of the dormant seven, was readmitted, and in 1925 the revived French Society was accepted as a State Society. The present membership, exclusive of honorary members, of which there is a limited number, is approximately 1500.

Presidents General since the organization of the society have been, George Washington (1783), Alexander Hamilton (1800), Charles Cotesworth Pinckney (1805), Thomas Pinckney (1825), Aaron Ogden (1829), Morgan Lewis (1839), William Popham (1844), Henry A. S. Dearborn (1848), Hamilton Fish (1854), William Wayne (1896), Winslow Warren (1902), John Collins Daves (1932), Bryce Metcalf (1939).

Cincinnati Symphony Orchestra, one of the foremost orchestras of the United States, originated in the formation, in 1893, of the Cincinnati Orchestra Association, which engaged an orchestra, then conducted by Michael Brand, to give a series of preliminary concerts in 1895. Frank Van der Stücken was chosen as the first conductor and the first regular series of concerts was held in the fall and winter of 1895–6. The orchestra disbanded in 1907, due to labor troubles, and in 1909 a new orchestra was organized.

Cincinnati, University of, a municipal institution for higher education located in Cincinnati, Ohio, chartered in 1870. It includes the McMicken College of Liberal Arts, provided for by a bequest of $1,000,000 of property by Charles McMicken in 1858; a Medical College, formed by the union of Ohio Medical College (founded in 1819), Cincinnati Medical College (founded in 1835), and Miami Medical College (founded in 1852); a School of Nursing and Health in the College of Medicine; a Law College, formed by the union of the Cincinnati Law School (founded in 1835) and the Law Department of the University (founded in 1896, by William Howard Taft and others); the Cincinnati Observatory, founded in 1842; a College of Engineering and Commerce; a College for Teachers; a Graduate School; a school of Applied Arts; a School of Household Administration and an Evening College.

The University has a splendid gymnasium and, near it, Carson Field, one of the best college athletic fields in the country. Student organizations include a Student Council, Men's Senate and Women's Senate.

Cincinnatus, sin-si-nā'tus, LUCIUS QUINTIUS, one of the old Roman heroes of the early legendary days of the republic, was born about 519 or 520 B.C. In 485 B.C. he was called from ploughing his land, as the story goes, to become dictator, the Roman consul and army having been cut off by the Æquins. He defeated the enemy, saved the army, and returned to his farm in sixteen days. He was again made dictator in 439, to meet a crisis in Rome; and Spurius Mælius, a plebeian, whose lavish liberality to the commons caused him to be suspected of aiming at monarchy, was killed by his orders.

Cinderel'la, the heroine of an ancient fairy tale, common to various languages. Abused by her step-sisters, and made the household drudge, Cinderella is arrayed for the Prince's ball by her fairy godmother, who warns her to leave by midnight. As she is fleeing from the palace, she loses one of her tiny glass slippers. The Prince, finding it, seeks its owner and tracing it to Cinderella, makes her his bride.

Cineas, sin'i-as, of Thessaly, friend and minister of Pyrrhus, king of Epirus, and one of the ablest diplomatists and speakers of his time, is best known for his mission to Rome in 280 B.C., after Pyrrhus' victory at Heraclea. His eloquence and engaging manners almost persuaded the senate to accept his proposals of peace. The day after his arrival he is said to have been able to address all the senators and knights by name. On his return to Pyrrhus he described the Roman senate as an assembly of kings.

Cinematograph, sin-i-mat'ō-grȧf, an instrument for projecting a series of instantaneous photographs of a moving scene in such rapid succession that they reproduce the action in a lifelike manner upon a screen. The name was first given by Lumière of Lyons, France, to a machine which made the original exposures, printed the positive film from the negative, and finally projected the pictures upon the screen. See MOVING PICTURES.

Cin'era'ria, a genus of herbaceous composite plants, closely allied to Senecio (q.v.), its most important members being the numerous hybrids obtained by florists from *C. cruenta*, a purple-flowered species of the Canary Islands. The flowers vary in form and color; the leaves are simple-toothed or sinuate-lobed and are sometimes of an ashen-gray color.

Single-flowered cinerarias are among the most useful and beautiful of all green-house flowering plants and are much in demand for their free-blooming qualities, brilliantly colored flowers, and the ease with which they may be grown. While they are sometimes propagated from cuttings or by division of the roots, they are best raised fresh each year from seed sown in August, in a mixture of fine loam, leaf mould, and sand. This should be well watered, and the seed then sown thickly on the surface, a very little sand being sprinkled over it. The seed-pans should be placed in a cool, shady place until the young plants can be handled. These should then be potted, and subsequently moved into larger and larger pots as growth proceeds. The soil for the final potting should consist of two parts fibrous loam, one part leaf mould, and one part well-rotted cow manure. Water should be liberally supplied at all stages. Cinerarias are specially liable to be attacked by green fly, and should be fumigated with tobacco to keep this pest in check.

Double-flowered cinerarias are best propagated annually by cuttings. They are less commonly grown than the single variety.

Cin'erary Urns, hand-made vessels of clay, sun-dried, and containing the calcined bones left after cremation, abundant as relics of the stone and bronze ages throughout Northern Europe. Strictly, the urn (1) containing or covering the incinerated remains is a large, flowerpot-shaped vessel, decorated only on its upper part; but with this there are associated (2) urns of so-called food-vessel type, broad in proportion to their height, (3) urns of so-called drinking-cup type, tall and slender, both exhibiting remarkable decorative designs in incised lines which cover the whole external surface; and (4) small cup or double-cone-shaped vessels, decorated, and having two or more perforations through the periphery, commonly styled 'incense cups,' possibly used for holding fire with which the funeral pyre was lighted. See CREMATION.

Cingalese. See SINHALESE.

Cingoli, chin'go-le (ancient *Cingulum*), town, Italy, province of Macerata; 12 miles west of Macerata. Pop. (commune), 13,000.

Cinisi, chē-nē'zē, town, Sicily, province of Palermo; 15 miles northwest of Palermo. Pop. 6,000.

Cin'na, CAIUS HELVIUS, a Latin poet, who appears to have been tribune in 44 B.C.—though some authorities believe that the poet and the tribune were distinct persons. He was killed while attending Cæsar's funeral procession, by the people, who mistook him for L. Cornelius Cinna (q. v.), the prætor. His chief work was *Smyrna;* only a few lines of his poems survive. The circumstances of his death have been immortalized by Shakespeare in *Julius Cæsar*.

Cinna, LUCIUS CORNELIUS (d. 84 B.C.), a Roman patrician, leader of the popular party at Rome from 87 to 84 B.C. In 87 Sulla, after driving Marius (q. v.) from the city, allowed Cinna to be elected consul, on his undertaking not to alter the existing constitution. No sooner, however, had Cinna entered upon that office than he impeached Sulla, endeavored to form an interest among the citizens who had been added to Rome after the Social War, and agitated for the recall of Marius. He was driven from the city by his colleague Octavius but soon returned with Marius, and took Rome after a siege. They then proceeded to proscribe and massacre their political opponents. Cinna was consul in 86 with Marius, who soon died, and again in 85 and 84. In the last mentioned year, when Sulla was about to return from the East, Cinna ordered his soldiers to cross over from Brundusium into Greece to oppose him, and was murdered by them. His daughter Cornelia was married to Julius Cæsar in 83 B.C.

Cin'nabar, native mercuric sulphide, HgS, the most important ore of mercury and the principal source from which it is obtained. It occurs in small crimson or cochineal red crystals with a brilliant lustre, but is more commonly found in dull, earthy, dark red masses. Its powder is vermillion—a good distinguishing characteristic. It has also a very high specific gravity (8.2). The principal localities in which it is obtained are Almaden in Spain, Idria in Carniola, and California and Texas, which are the only producers, in the United States, although the ore is known in several other States. Spain is the oldest and chief foreign locality. At Steamboat Springs, in Nevada, a recent deposit containing cinnabar in workable quantities has been laid down by hot saline waters rising along fissures.

Hepatic cinnabar, so called from its liver-brown color, is a variety containing a little carbon.

Cinnam'ic Acid, $C_6H_5CHCHCOOH$, exists in the free state in the balsams of Tolu and Peru, in liquid storax, and in gum benzoin. Oil of cinnamon is the aldehyde of cinnamic acid, and is represented by the formula $C_6H_5CHCHCOH$. When this oil is exposed to the air, it absorbs oxygen and deposits colorless crystals of cinnamic acid (melting point 133°c) which are readily soluble in alcohol, ether, and boiling water, but sparingly soluble in cold water. From a chemical point of view, the cinnamic acid and oil of cinnamon are related to benzoic acid and oil of bitter almonds. Benzoic acid is regarded as C_6H_5COOH, while oil of bitter almonds is the corresponding aldehyde C_6H_5-COH. On oxidation cinnamic acid is changed into benzoic acid.

Cinnamic acid is either extracted from storax or prepared synthetically by heating benzaldehyde (3 parts) with acetic anhydride (10 parts) and dehydrated sodium acetate (3 parts).

Cin'namon, the dried aromatic bark of several species of the genus *Cinnamomum,* of the order Lauraceæ, cultivated in Ceylon, Java, the West Indies, Brazil, Egypt, and the Malabar Coast. The most important species is *Cinnamomum zeylanicum,* or the Ceylon cinnamon tree, allied to the camphor tree (see CAMPHOR), the cassia (q. v.), and other aromatic plants.

Cinnamon.

The cinnamon tree naturally attains a height of 20 to 30 feet, and is sometimes 1½ feet in thickness, but the cultivated trees are not allowed to grow higher than 10 feet. The bark is of a grayish-brown color, internally of a yellowish red. The fruit is a small drupe, brown when ripe, and somewhat like an acorn in shape. There are two seasons of cinnamon harvest in Ceylon, where the finest cinnamon is raised, the first commencing in April, and the last in November — the former being that in which the chief crop is obtained. The branches of three to five years' growth being cut down, the epidermis is scraped away; the bark is then ripped up longitudinally with a knife, and gradually loosened, till it can be taken off. The slices are then exposed to the sun, when, as they dry, they curl up into *quills,* the smaller of which are inserted into the larger, and the whole tied up in bundles. When the bark is first taken off it is said to consist of an outer portion, which tastes like common bark, and an inner and highly aromatic portion. In the course of drying, the oil upon which the aroma and flavor depend is diffused throughout, and the quality of the whole is supposed to depend upon the relative quantities of these portions.

The finest cinnamon is yielded by the young branches of the tree, especially by the numerous shoots which spring up from the stump after a tree has been cut down, and which are cut when about 10 feet long, and of the thickness of an ordinary walking stick. The smell, particularly of the thinnest pieces, is delightfully fragrant, and the taste pungent and aromatic, with a mixture of sweetness and astringency. It is used like other spices by cooks and confectioners, and also in medicine as a tonic, stomachic, and carminative.

Of less importance commercially are *Cassia Cinnamon* derived from *Cinnamonum cassia,* which is cultivated in India and China, and is less delicate in taste and odor than *C. zeylanicum; Chinese Cinnamon* from *C. louieirii,* consumed chiefly by the Chinese, by whom it is preferred to *C. zeylanicum;* and *Saigon Cinnamon.*

Oil of Cinnamon.—The constituents of cinnamon are a volatile oil, tannin, starch, mucilage, woody-fibre, resin, coloring matter, and an acid. Oil of cinnamon is extracted by a process of distillation; it varies in color from yellow to cherry-red, the yellow variety being considered the best, and is most highly esteemed. It is largely used in the preparation of perfumery. Oil of cassia is often substituted for this oil, as cassia is for cinnamon. *Oil of cinnamon leaf* is prepared from the leaves, and is met with in commerce under the name of *clove oil,* which it much resembles in odor. The fruit yields a concrete oil, called *cinnamon suet,* which is highly fragrant.

Cinnamon Stone, also known as ESSONITE or HESSONITE, is a mineral of the garnet group, a lime-alumina garnet, $Ca_3Al_2Si_3O_{12}$, which has to some extent been used as a precious stone. It is hyacinth-red or cinnamon in color, and very beautiful. Perfect crystals are obtained at Ala in Piedmont. Many fine specimens have been derived from Ceylon; and in the United States. Alaska and Maine have reported good specimens; it is a variety of grossularite.

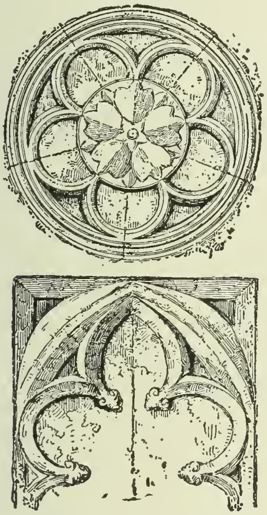
Cino da Pistoja, chē'nō dä pēstō'yä (c. 1268 – 1336), Italian poet and lawyer, was born at Pistoja. He obtained a judicial post (1307), but was banished for strong Ghibelline tendencies. From 1318 to 1331 he devoted himself mainly to the academic teaching of law, holding posts at Treviso, Siena (twice), Florence, Perugia, and Naples. His *Lectura,* or commentary on the first nine books of Justinian's *Codex,* was widely read, and frequently reprinted after the year 1483. Among his friends was Dante, who addressed two sonnets and a letter to him.

As a love-poet Cino stands midway between the school of Dante and that of Petrarch. His obscurities should not blind us to the sterling merits and genuine passion of many of his pieces. The *canzoni* lamenting the death of Dante's Beatrice and of the Emperor Henry VII. are veritable *cris du cœur.* Consult his *Le Rime Ridotte a Miglior Lezione,* edited by Bindi and Fanfani; Chiappelli's *Vita;* Corbellini's *Cino da Pistoja amore ed eselio;* Rossetti's *Dante and His Circle.*

Cinq-Mars, sań-mär', HENRI COIFFIER DE RUSE, MARQUIS DE (1620–42), second son of the Marquis d'Effiat, Marshal of France, and a favorite of Louis XIII. While yet a boy he was placed at court by Cardinal Richelieu, and at nineteen he was chief equerry to the king. Finding his ambitious projects merely derided by Richelieu, he joined with the king's brother, Duke Gaston of Orleans, in a plot to murder the great cardinal, with which was combined a wider plot with Spain for the destruction of the cardinal's power by arms. The conspiracy was discovered, and Cinq-Mars, with his friend De Thou, was executed at Lyons, September 12, 1642. His ambition was perhaps due to his affection for the beautiful Princess Maria of Gonzaga, who afterwards became queen of Poland. His story was woven by De Vigny into the well-known romance *Cinq-Mars.*

Cinque-cento, chĕn'kwä-chen'tō. This term, an Italian abbreviation for the year 1500, describes the change of mode and thought regarding art which arose in Italy as one of the consequences of the revival of letters. Gothic architecture had already in the fifteenth century shown signs of deterioration, and men's minds and tastes were ripening for a change. Down to the eleventh century the buildings erected wherever the Roman empire had power bore the universal impress of its style; and early in the sixteenth century, with one impulse, the mind of the Italian people sprang back over the fifteen hundred years of Gothic art and expression into the heart of classic taste and art. France, Germany, and England followed later, the change there being ushered in by a transition period; but in Italy the change took place rapidly. Roman and Grecian detail were applied to modern methods of building with freedom and spirit, and the result exhibited both vigor and life. Brunelleschi was the first renaissance architect, He began his work in the middle of the 15th century, and at its close his standard and method had been accepted all over Italy. The best-known examples are: St. Peter's and the Vatican palace, in Italy; in France, the Louvre, and many others; in England, St. Paul's, London. The more noteworthy names of the cinquecentists in other domains of art are Ariosto, Berni, Machiavelli, and Tasso, in literature; and Bramante, Benvenuto Cellini, Correggio, Michael Angelo, Raphael, and Titian, in the domains of painting and sculpture. In a word, cinque-cento is indicative of the modern golden age of Italian art.

Cinquefoil, in architecture, a Gothic ornament much employed in the stone decoration of windows or panels.



Two Forms of Cinquefoil.

Cinque Ports, seaports of S.E. England possessing peculiar privileges and a special history. Originally they embraced Hastings, Romney, Hythe, Dover, and Sandwich, and to these were added later the 'ancient towns' of Winchelsea and Rye, and ultimately many other places. The origin of the Cinque Ports may possibly be traced back to the days of Roman rule in England. After the Norman conquest these same ports were made the object of attack by the Danes, and in return for their services then and previously they were given certain privileges. In 1300 Gervase Alard first took the title of 'admiral of the fleet of the Cinque Ports.' The lord warden of the Cinque Ports, with official residence at Walmer, still exercises maritime jurisdiction and has certain other official functions. See Montagu Burrows's *Cinque Ports* (Historic Towns Series, 1888); Jeake's *Charters of the Cinque Ports* (1728); Philipott's *Villare Caitanum* (1835); Clowes's *The Royal Navy* (1897)

Cinthio, the name assumed by Giambattista Giraldi (1504–73), Italian writer, born at Ferrara, where he was appointed professor of philosophy and rhetoric, and later became professor of eloquence successively at Mondovi, Turin (1566), and Pavia (1568). He wrote nine tragedies on the Senecan model, full of horrors, the best being the *Orbecche* (acted in 1541); they exercised considerable influence. In 1543 he composed a discourse on tragedy and comedy, in which he upheld Seneca against the Greeks. Giraldi's fame rests on the *Ecatommiti* (1st ed. Mondovi, 1565; 2d and better ed. Venice, 1566), a collection of 112 tales, some of which supplied the themes of his tragedies. The framework was borrowed entirely from Boccaccio. The author's manner is stiff and unpoetical, his style lacking charm and color. On the other hand, the matter is often full of interest, and two of the tales are the ultimate sources of Shakespeare's *Othello* and *Measure for Measure.* See Roscoe's *Italian Novelists,* ii. 143–193 (1825; new ed. 1868).

Cintra, tn., prov. Lisbon, Portugal, 14 m. by rail N.W. of Lisbon, occupies a fine position at the foot of the Sierra de Cintra. It is a favorite summer residence of the wealthy people of the capital, and has a couple of royal castles. Its people quarry marble (white) and grow wine. Here was signed, on Aug. 30, 1808, the convention of Cintra, whereby the French agreed to evacuate Portugal. Pop. (1900) 5,918.

Ciotat, or La Ciotat, harbor and tn., dep. Bouches-du-Rhône, France, 23 m. by rail S.E. of Marseilles. Here are the workshops of the Compagnie des Messageries Maritimes. The harbor is available for vessels drawing 19 ft. Coral and other fisheries are carried on. Pop. (1901) 11,311.

Cipher. See Cryptography.

Cipher Dispatches, a series of dispatches, in cipher, which were made public (after being translated with much ingenuity) in the *New York Tribune* in 1878, and which seemed to show that the Democratic managers of the campaign of Samuel J. Tilden for the presidency in 1876 had by corruption obtained or had attempted to obtain votes in S. C. and Oregon, where gross corruption had also been attributed to the Republicans. Tilden himself publicly denied responsibility for the dispatches, and his denial has generally been accepted; certainly no corruption or attempted corruption was ever traced to him personally. The publication of the dispatches added greatly to the excitement throughout the country, growing out of the disputed election of 1876. See Electoral Commission.

Cipriani, Giambattista (1727–85), Florentine artist claimed by the English school. In 1754 he came to England, being appointed professor of drawing by the Duke of Richmond, who opened a gallery at Whitehall. Cipriani took part in the institution of the Royal Academy (1768), and was awarded a silver cup for his design for the Academician's diploma. His fame rests on his drawings, as engraved by Bartolozzi.

Circars, The Northern, a tract of country within the Madras Presidency, India, along the shore of the Bay of Bengal, having an area of over 17,000 sq. m. It includes the districts of Ganjam, Vizagapatam, Godavari, Krishna, and Nellore.

Circassia, the name of a region in the W. Caucasus, between the Black Sea and Mt. Elbruz, formerly occupied by the Cherkesses or Circassians, but now included in the Russian province of Kuban. The term Circassians denotes more particularly the peoples called Cherkesses by Turks and Russians, and Kazaks by Ossets, but calling themselves Adighés. Circassia was, by the treaty of Adrianople (1829), surrendered by Turkey to Russia. Long opposing a stubborn resistance to Russian rule, the Circassians were finally subdued (1859–64). In the middle of the 19th century they numbered about half a million on both sides of the Caucasus, but by 1880 had dwindled to about 100,000. In the 18th century many Circassians adopted Mohammedanism, and the nobles are still mostly Mohammedans, though the bulk of the people adhere to a corrupt Christianity. See Ernest Chantre's *Recherches Anthrop. dans le Caucase* (4 vols. 1885–7).

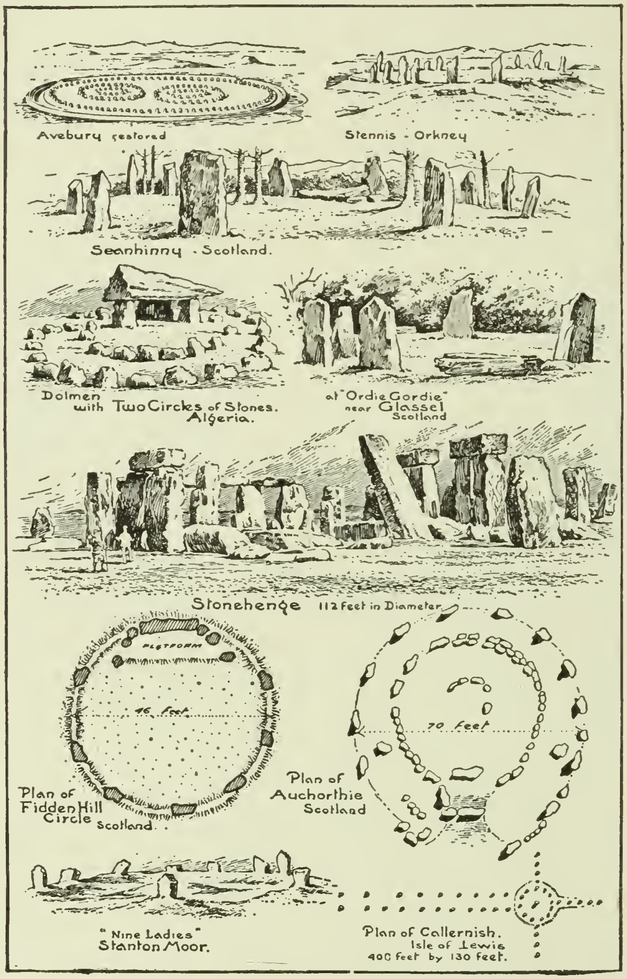
Circe, daughter of Helios (the Sun) and Perse, was famed for her magic arts. She lived in the mysterious isle of Ææa, to which Odysseus and his companions came, and she turned into swine those whom he first sent to her house. He himself, however, thanks to Hermes's advice, was able to resist her incantations, and to rescue his friends. She then gave them entertainment, and instructed him as to his future journeyings. He stayed a year with her, and she bore him a son, Telegonus. See the *Odyssey.*

Circinus, 'the Compasses.' a

small southern constellation placed by Lacaille near the fore feet of the Centaur. Its brightest component, a white star of 3.4 magnitude, has a brick-red attendant sharing its drift through space.

Circle, the most familiar of all curves, being usually defined as a plane figure bounded by a line known as the circumference, which is everywhere at the same distance (the radius) from a particular point called the centre of the circle. The great problem of the ancient mathematicians was to find the ratio of the circumference of a circle to the diameter—a ratio which it is easy to show must be the same for all circles. The Greek letter π, initial letter of perimeter, is universally used to indicate the ratio of the circumference to the diameter, which is twice the radius. The ratio 22:7 is a sufficiently accurate approximation to the value of π for most practical purposes, and the square of π may be taken roughly as equal to 10. The ratio 355:133 is a still better approximation; but it is not possible to represent π by the ratio of any two whole numbers or terminated decimals. It is, in fact, what is called an incommensurable quantity. For the most refined of practical calculations we do not require to know its value beyond the seventh significant figure. To ten figures its value is 3.1415926535, but the value has been calculated to hundreds of figures.

To recount the numberless properties of the circle would be to enunciate the propositions of the third book of Euclid's *Geometry;* but there are other interesting properties which may be noted here. For example, of all plane figures the circle contains the greatest area for a given perimeter, and has the smallest perimeter with a given enclosed area. Any points which lie on one circle are said to be concyclic. Thus, the (three) middle points of the sides of any triangle, the (three) feet of the perpendiculars from the angles on the sides, and the (three) points of bisection of the segments of these perpendiculars between their common point of meeting and the angles, are concyclic. The circle passing through these nine points is called the 'nine-point circle,' or the mendioscribed circle. The circle is one of the conic sections, being, in a sense, a particular case of the ellipse. See M'Clelland's *Geometry of the Circle* (1891); Casey's *Sequel to Euclid* (1888). For squaring the circle, see QUADRATURE.


Avebury restored
Stennis - Orkney
Seanhinny - Scotland.
Dolmen with Two Circles of Stones. Algeria.
at "Ordie Gordie" near Glassel Scotland
Stonehenge 112 feet in Diameter
Platform
76 feet
70 feet
Plan of Fidden Hill Circle Scotland.
Plan of Auchorthie Scotland
"Nine Ladies" Stanton Moor.
Plan of Callernish. Isle of Lewis 400 feet by 130 feet.

Some well-known Circles of Stone.

Circles of Stone. In all cases where competent excavation has been conducted within stone circles, relics have been yielded pointing to sepulchral interment during the bronze age. Megalithic circles are frequent in Algeria, numerous and important in Denmark and Sweden, but attain their greatest development and numbers in the British Isles. The most remarkable are the circle at Stonehenge, 112 ft. in diameter, having thirty pillars on the outer ring, five groups of trilithons, and a so-called altar-stone, the whole surrounded by a trench; at Avebury, where the trench encloses a space 1,200 ft. in diameter, containing two double concentric circles of stones within an outer ring of ninety stones; Arbor Low, Stanton Drew, the circle on Burn Moor, Cumberland, and that at Boscawen. Numerous circles occur at Carrowmore and New Grange in Ireland. In Scotland, the best examples are the Standing Stones of Stennis, Orkney, which consist of two groups—the ring of Brogar, 340 ft. in diameter, which originally contained sixty stones, with a broad trench intersected by a causeway; and the ring of Stennis, 104 ft. in diameter, and having twelve stones. The Holywood circle, in Dumfriesshire, measures 292 by 246 ft., and contains eleven stones. At Callernish, in the Lewis, are circles connected with stone avenues; and several circles at Tormore in Arran, excavated in 1864, were found to be sepulchral. There are over three hundred sites in Aberdeen and Kincardine shires alone. Many of these circles possess, in addition to their free-standing stones, an arrangement peculiar to this district of a stone greater than any of the others recumbent on its edge, flanked by two tall pillars, and having frequently two large, flattish stones projecting towards the interior. Both Perthshire and Inverness-shire have large numbers of circles, many of them of types quite dissimilar from that prevailing in the east of Scotland; and in the valley of the Nairn, at Clava, there is a specially remarkable series of grouped circles and cairns. See Fergusson's *Rude Stone Monuments* (1872); Anderson's *Scotland in Pagan Times: the Age of Bronze* (1886); *Proc.Soc. Antiq. Scot.*, vols. xxxiv.–xxxvi.

Circleville, city, O., co. seat of Pickaway co., 26 m. S. by E. of Columbus, on the Scioto R., and on the Norf. and W. and the Cin. and Muskingum Val. R. Rs., and on the Ohio Canal. The manufactures include straw boards, canned goods, agricultural implements, carriages, furniture and flour. Pork-packing is an important industry. The city takes its name from the famous circular fortification erected here by a primitive people. Pop. (1910) 6,744.

Circuit, ELECTRIC. See ELECTRICITY, CURRENT.

Circuits, a legal term that is very old and is used in both England and the United States. It is applied to a certain portion of the country to which a particular judge is assigned. It is then his duty to visit this circuit to try causes arising therein. In the United States the term Circuit Courts is applied to a certain class of federal courts. Their jurisdiction extends over several districts, and terms are variously held in these districts or counties. See COURT.

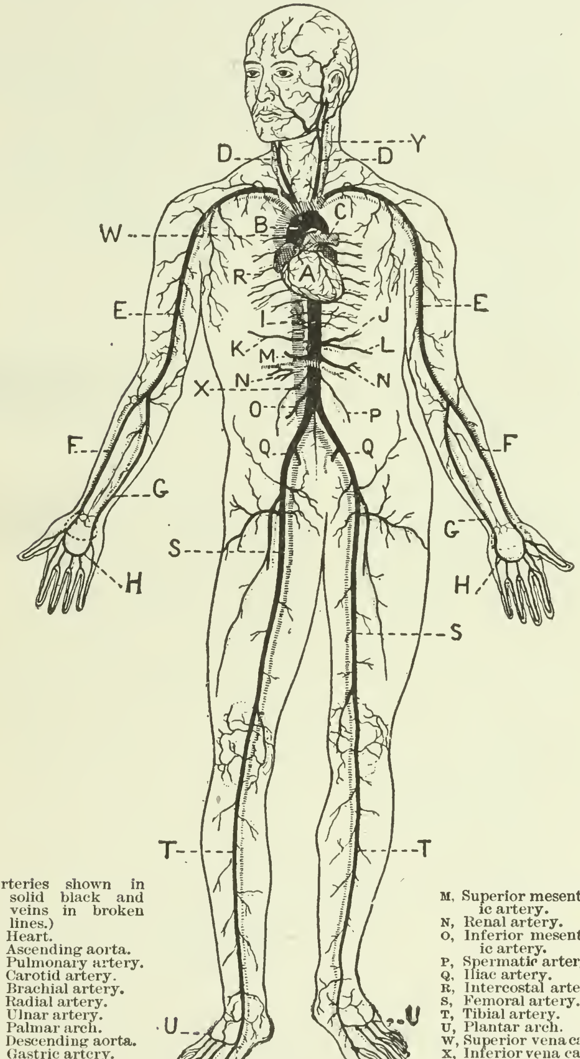
Circular Notes are issued by bankers for the convenience of customers travelling abroad, and in connection with a letter of credit. The notes without the letter of credit, or the letter without the notes, are worthless to a thief.

Circulating Decimals. See DECIMALS.

Circulation. See MONEY.

Circulation of the Blood—HUMAN. The circulation of the blood was first demonstrated by Harvey early in the 17th century (1628). Servetus and others seem to have anticipated him in the discovery, although without apparently realizing its importance or significance. Earlier anatomists thought that the heart drives the blood along the veins in waves or pulses of an ebb-and-flow character, while the arteries were considered to be air-vessels. Harvey showed that the valves in the veins and the heart prevent the blood being pumped through the veins from the heart.

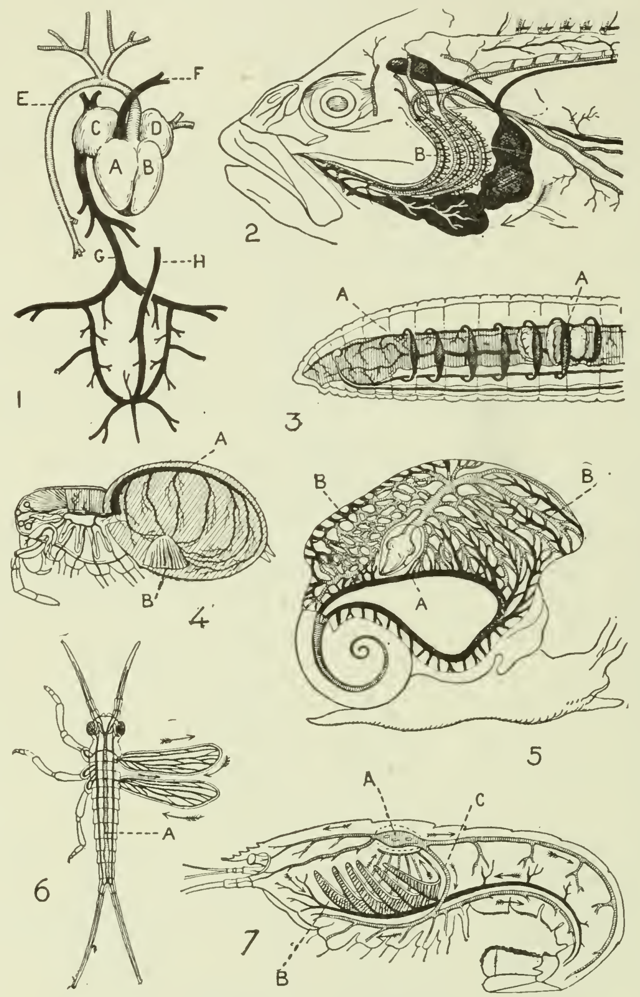
The circulatory system may be considered as double, being composed of a *systemic* (general) and a *pulmonary* (lung) system of blood-vessels. Each system consists of arteries, capillaries, and veins, and of a pump formed by two of the four chambers of the heart. Arteries are hollow, elastic tubes which carry blood *from* the heart. They divide and subdivide, their ultimate divisions being the capillaries. The walls of these last are sufficiently thin and delicate to allow of an interchange of gases taking place between the blood and the tissues. Part also of the fluid portion of the blood can pass through, so that every part of the body is bathed and irrigated by blood-lymph. The stream of blood flowing through these vessels is constant, the elasticity of the arterial walls maintaining the blood pressure.



(Arteries shown in solid black and veins in broken lines.)
A, Heart.
B, Ascending aorta.
C, Pulmonary artery.
D, Carotid artery.
E, Brachial artery.
F, Radial artery.
G, Ulnar artery.
H, Palmar arch.
I, Descending aorta.
J, Gastric artery.
K, Hepatic artery.
L, Splenic artery.
M, Superior mesenteric artery.
N, Renal artery.
O, Inferior mesenteric artery.
P, Spermatic artery.
Q, Iliac artery.
R, Intercostal artery.
S, Femoral artery.
T, Tibial artery.
U, Plantar arch.
W, Superior vena cava
X, Inferior vena cava.
Y, Internal jugular vein.

The Systemic Circulation of the Blood in Man.

The capillaries anastomose (join together) to form venous radicles (rootlets), and these in turn unite to form small veins, which coalesce to form larger ones. Most veins have in their walls pouchlike valves, which prevent backward flow. The systemic capillaries bathe the tissues with lymph, and allow the blood to part with its oxygen, and to take up the waste product carbon dioxide instead. The pulmonary capillaries surround the air vesicles of the lungs, and in these capillaries the impure blood exchanges its carbon dioxide for fresh oxygen from the air within the vesicles. (See RESPIRATION.)



Circulation of the Blood: Comparative.

1. BIRD—A, B, left and right ventricles; C, D, left and right auricles; E, aorta; F, pulmonary arteries; G, inferior vena cava; H, coccygeo-mesenteric vein. 2. FISH—A, heart; B, gills. 3. EARTHWORM—A, so-called 'hearts.' 4. SPIDER—A, dorsal vessel 'heart'; B, pulmonibranchial organ. 5. SNAIL—A, heart; B, afferent and efferent pulmonary vessels. 6. DRAGON-FLY 'larva'—A, dorsal vessel. 7. LOBSTER—A, heart; B gills; C, sternal artery.

The heart is the muscular pump which, by alternately contracting and dilating, maintains the circulation of the blood.

The pulmonary and systemic circulations may be diagrammatically represented as the two loops of a figure 8, the heart being situated where the loops meet. To trace the course of the blood stream, imagine a quantity of blood in the right auricle. The contraction of the heart begins in the auricles, so that the fluid is driven down into the still dilated right ventricle. The ventricle then contracts, and forces it into the pulmonary artery; thence it passes into the capillaries of the lungs. Leaving these, it returns by one of the four pulmonary veins to the left auricle, contraction of which drives it into the left ventricle, which in turn forces it into the aorta. The branches of the aorta convey it into all parts of the body except the lungs; and from the capillaries of all these parts, except certain abdominal viscera which will be considered later, it is conveyed by vessels, which gradually unite into larger and larger trunks, into either the superior or inferior vena cava, which carry it to the right auricle once more.

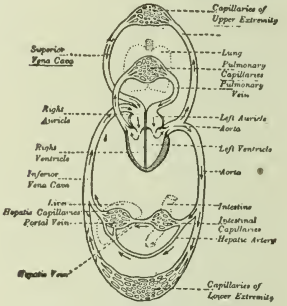


Diagram of the Circulation.

The superior vena cava brings the blood from all the organs above the level of the heart, including the upper extremities. The inferior vena cava brings back the blood from the lower limbs and from the organs below the cardiac level, except the stomach, the intestine, the spleen, and the pancreas. The venous blood from these organs is gathered into veins which unite to form a single trunk, the portal vein. The liver is a storehouse for many of the products of digestion, and the venous blood carrying these products from the stomach and intestine is distributed by the portal vein to the liver, where it mingles in the capillaries with blood from the hepatic artery. The hepatic capillaries unite to form small veins, and these form a single trunk, the hepatic vein, which opens into the inferior vena cava. The flow of blood from the abdominal viscera through the liver to the hepatic vein is called the portal circulation.

The heart derives its blood supply from the coronary arteries which spring from the root of the aorta. The blood from the heart capillaries is poured by the coronary vein directly into the right auricle. Obviously, this is the shortest route by which a blood corpuscle can travel round the systemic circulation; the longest is through the capillaries of the intestine and the capillaries of the liver. The average time required for a corpuscle to travel from the right auricle through the pulmonary and systemic circulations is about thirty seconds.

Comparative.—In mammals generally the circulation is in essentials the same as in man. In birds, the chief differences are that the single aortic arch bends over to the right instead of to the left side, that some of the valves of the heart are muscular instead of membranous, and that there is a vein called the coccygeo-mesenteric, which is not represented in the mammal after birth. Below birds the circulation is of a different type. In a fish the heart does nothing but drive blood to the gills. The ventral aorta splits into *afferent* branchials, which supply the gills. From the gills the purified blood is collected in *efferent* branchials, which, after supplying the head, meet together to form the dorsal aorta, which carries pure blood to the body. The venous system is largely lacunar (*i.e.* consists only of spaces), and there is no posterior vena cava. In essentials this is the circulation in the frog at the time of the metamorphosis; but as the lungs come into play, one of the efferent branchials forms at each side of the pulmonary artery, and the gills are more and more thrown out of the circulation by the development of cross-connections between afferent and efferent branchials. At the same time, the originally single auricle of the heart becomes divided into two chambers, and pulmonary veins are developed. When metamorphosis is completed, what was originally the first branchial arch becomes the carotid artery; the second at each side forms the systemic, the two systemics uniting to form the dorsal aorta; the third arch disappears; the last is represented only by the pulmonary artery. Owing to the mechanism of the heart, the carotid arches receive pure blood, but the dorsal aorta contains mixed blood. In reptiles the plan of the circulation is much the same as in the adult frog; and even where, as in the crocodile, the ventricle is divided into two, the fact that the dorsal aorta is made up of right and left trunks leads to the presence in it of a mixture of pure and venous blood. Only in birds and in mammals is there a complete separation of the right and left sides of the heart, and therefore of the arterial and venous systems, which only communicate through capillaries. In regard to the venous system, there is the same increase in specialization as we rise through the vertebrate phylum (race). Even more striking perhaps than this is the recapitulation of ancestral history which the individual displays in its development—a recapitulation most clearly displayed in the wonderful metamorphoses of the frog, but distinct enough in the life-history of reptile, bird, and mammal. In invertebrates, the heart, when present, is dorsal instead of ventral, and contains pure blood only, its function being to drive this to the body. The venous system is always lacunar, and the red blood-pigment of vertebrates (hæmoglobin) is only rarely present. See Packer and Haswell's *Zoology* (1897).

Circumcision, the cutting off of the foreskin, particularly as a religious or ethnic rite; it was a custom of paramount religious import among the Hebrews and has been continued by their descendants. One of the earliest controversies of the Christian church was whether the practice was to be forced upon Gentile Christians, which, of course, was only a part of a larger problem—*viz.* whether Christianity was to remain forever fettered to Jewish exclusiveness and ritual; and, though the controversy was provisionally settled by the council at Jerusalem (Acts 15), the Judaizing section continued for long to harass the Apostle Paul in his proclamation of a universal gospel. According to the late narrative of P (see Hexateuch), the rite was inaugurated among the Hebrews by a divine injunction to Abraham (Gen. 17:9 *ff.*). Its observance was not confined to them. The Egyptians practised it at a very early stage of their history, as did also the Arabs; and it is now practised by all Mohammedan peoples, and by the Copts, the descendants of the ancient Egyptians. Circumcision or some similar custom is likewise found among many widely separated peoples—*e.g.* the Abyssinians and Bantus of Africa, the aboriginal Australians, the islanders of Oceanica, and some South American tribes. In most of these cases a female mutilation is also practised. The distinctive feature of the Hebrew observance was that it was performed in infancy, on the eighth day after birth (Gen. 17:12). Nowadays the Jews employ a professional circumciser, or *mohel*, and the event still maintains its ancient solemnity.

As to the origin and purpose of circumcision, we are almost entirely in the dark. It is a fact that it affords protection against certain diseases, but there is no evidence that any of the people who practise it do so for this reason. Among most of them it has served as a tribal mark and sometimes may have been looked upon as religious in so far as it implied a sacrifice to the deity—a part for the whole. But in most cases it appears to have no religious significance whatever and is almost universally observed at the age of puberty, having to do with initiation into full tribal membership, and being an act of preparation for marriage. The fragmentary notices of the Hexateuch (Gen. 17; Exod. 4 : 24-26; Joshua 5 : 2–3) imply that in earlier time the Hebrew custom formed no exception in this respect, and probably the Hebrews established the practice of infant circumcision only when they had forgotten its original purpose among themselves. See A. Asher's *The Jewish Rite of Circumcision* (1873); Ploss's *Das Kind* (1884), p. 360 ff.; Bedzinger's *Hebräische Archäologie* (1894) p. 153 *ff.*; Dillmann's *Genesis* (1881), ch. 17.

Circumcision, Feast of the, a festival of the Roman Catholic, Greek, and Anglican churches, on January 1, in honor of the circumcision of Christ. The day was originally observed as a fast, being opposed to the feast held by the pagans in honor of Janus.

Circumvallation, the rampart thrown up round a besieged city. In Merovingian and Carlovingian times, when a place was about to be invested, two lines of ramparts of either wood or stone, and protected by ditches, were first established. The one on the side of the city, in order to afford a protection against the sorties of the besieged, and to deprive them of means of communication, was the line of *contravallation*; the other, on the side of the open country, in order to provide against succor reaching the besieged, was the line of *circumvallation*. See Fortification.

Circus. (1.) The Latin name of the place in which, anciently, games and horse and chariot races were held. Its shape was that of an ellipse. The center of the space was divided by a wall running lengthways down it, around which the races took place; the sides were occupied by the spectators' seats, rising tier upon tier. The chief circus at Rome, the Circus Maximus, rebuilt by Cæsar, was 1,875 ft. long, 625 ft. wide, and over 312 ft. high. It accommodated 150,000 spectators. But it was continually being enlarged, so that in the time of Titus it accommodated 250,000 persons, and in the 4th century A.D. 385,000. Other circuses in Rome were the Circus Flaminius, built about 220 B.C.; the Circus of Nero, celebrated for the cruelties perpetrated by that emperor against the Christians; and the Circus of Maxentius, built about 311 A.D. by Maxentius in honor of his son Romulus, the only ancient circus still preserved. It is situated on the Appian Way, two miles outside the present Porta San Sebastiano. Nearly every Roman town had a circus, after the model of those in the capital. The Circus of Constantinople, built by Septimius Severus, and enlarged by Constantine, was the scene of many bloody frays between the two political factions of the Blues and the Greens—names taken from the colors worn by the drivers in the circus, who were alternately in favor or in disgrace with the emperor. See Richter, *Les Jeux des Grecs et des Romains* (1884). **(2.)** The modern circus, in which equestrian exhibitions of the *haute école,* gymnastic and acrobatic performances, variety by the quips and fooling of the clown, are the chief attractions, dates from the close of the 18th century. Traveling circuses are heard of before 1830 in both England and America, and after 1850 assumed great dimensions, notably Hengler's, Sanger's, and Barnum and Bailey's. Colonel Cody's (Buffalo Bill) Wild West Show was a favorite in many parts of the world. The construction of permanent circuses known as Coliseums and Hippodromes has given a new life to the circus, and furnishes a variant on the itinerant show of enormous dimensions which moves about the country on special railway trains. In Spain, the arena in which bull-fighting takes place is known as the circus; it resembles in external form the ancient Roman amphitheatre. See C. Beatty and E. Anthony, *Big Cage* (1933); M. W. Disher, *Greatest Show on Earth* (1937).

Cirencester, or CICESTER, market town in Gloucestershire, England, 17 miles S.E. of Gloucester. The Royal Agricultural College, founded in 1845, on the slope of the Cotswolds, a little more than a mile from the town, is surrounded by a farm of 500 acres. Cirencester was fortified by the Romans (Corinium), and occupied a strategic position on the Ermine Street, near the intersection of the Akeman and Icknield streets and the Fosse Way. Pop. (1931) 7,200.

Cire Perdue, an ancient and delicate mode of casting bronze statuary, by making a hollow wax model of the figure and enclosing it in plaster. The wax is then melted out by the molten bronze, which takes its place, and thus reproduces the model.

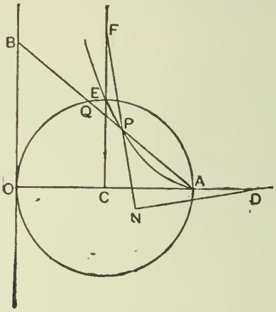
Cirque. Alpine or high altitude glaciers have a tendency to gouge out amphitheatre-like excavations on the sides of mountains. These are called cirques. Frequently their basins are gouged below the outlet, or have the outlet blockaded by morainic accumulations, so that small lakes nestle in them, high upon the sides of otherwise rugged mountains. This feature has come to be recognized as a satisfactory indication of former glacial occupation, and this in turn as the explanation of the origin of most mountain lakes.

Cirrhosis is a degenerated condition, appearing in the tissues of different bodily organs, such as the liver, lungs, and kidneys, and is due to chronic inflammatory changes. It consists in the formation of fibrous tissue, with shrinkage of the organ, and consequent compression of enclosed cells or spaces. Inflammation in some form or another is the primary cause. See LIVER, LUNG, KIDNEY, etc.

Cirripedia, an order of Crustacea, including barnacles and acorn-shells. All are marine, and in adult life are fixed head downward to some solid body. Segmentation is not obvious, and a series of limy plates typically form a more or less distinct shell. The most striking appendages are usually the six pairs of biramous thoracic feet, which are used in food-catching, being swept through the water after the fashion of a fishing-net. Though most are hermaphrodite, what are known as complementary males occur. The larval form is a nauplius, and is much more typically crustacean in form than the adult. See Packard, *Zoölogy.*

Cisalpine Republic, a former state of N. Italy, formed by Napoleon Bonaparte in 1797, and including the Cispadane republic, S. of the Po, and the Transpadane, N. of the Po, with Milan as its capital. Abolished in 1799, owing to Austrian and Russian victories, it was restored in 1802 as the Italian republic. In 1805 Napoleon was made king of Italy at Milan, the Bourbons being permitted to retain Naples and Tuscany, while papal authority was restored over Rome.

Cissoid, a curve invented by Diocles of Alexandria, more than seventy years before Christ, for finding two mean proportionals. It is described as follows:—Let ACO be the diameter of a circle, OB the tangent at its extremity, and AB be any chord drawn through A, cutting the circle in Q; then if AP be marked off equal to BQ, P traces the simple cissoid. Let the point D be taken in the radius CA produced, so that AD=CA. Through D draw any line, and let PN be drawn perpendicular to it. Also draw CE perpendicular to the diameter OA. Then if NP is produced till it meets CE in the point F, it will be found that PF=PN=CA, the radius of the circle. This gives Newton's elegant construction for the description of the curve by continuous motion. The right angle FND, with limb FN constant, moves so that F moves along a given straight line, while the limb NDG always passes through the fixed point D. The middle point of FN describes the cissoid.



Cissoid Curve.

Cist. See BARROW.

Cistercians, a monastic order founded in 1098 by a Benedictine abbot, Robert of Champagne. The first monastery was established in the forest of Citeaux (*Cistercium*), near Dijon, and was governed by the strictest interpretation of the rule of St. Benedict. After St. Bernard joined the order in 1113, it spread rapidly in all Western countries, till by the middle of the 13th century there were 2,000 abbeys. Their first establishment in England (1128) was Waverley Abbey, in Surrey; and at the time of the suppression of the monasteries by Henry VIII there were seventy-five abbeys and twenty-six nunneries attached to the order. Woburn, Tintern, Kirkstall were among the English abbeys. In Scotland, eleven abbeys and seven nunneries represented the order, the chief of which were Melrose, Dundrennan, Deer, and New Abbey. The chief French abbeys were at Clairvaux, which had been the throne from which St. Bernard ruled the hearts of Europe, and Pontigny, which had no less than seven hundred benefices in its gift.

Although founded to represent the true rule of St. Benedict, the Cistercians themselves grew wealthy; and as their wealth increased, the severity of the rule was insensibly relaxed. Disorders crept in, and the more ardent and austere members branched off from time to time to found new orders, of which the Trappists (q. v.) are the best known. The order had fallen into decay, if not into some disrepute, even before the Reformation period, and many of their establishments had been closed. The Cistercian order, however, rendered great service to the progress of society through the encouragement given to agriculture; and in England, especially in some of the eastern counties, they were great producers of wool. They were also distinguished by their devotion to the Gothic style of architecture. There are now only a few houses, in Belgium, Austria, and the British Isles.

Cistus, sis'tus, a genus of small flowering shrubs, known as Rock Roses. The flowers, which last but a day, are large, resembling single roses, and their coloring and texture delicate, the range of color being considerable. They flourish best in a sandy soil and a sunny situation, but are hardy only in warm, temperate countries, having originated in the Mediterranean region.

Cit'adel, a fort of four or five bastions in or near a city. It serves two purposes, first, to keep the inhabitants in subjection, and second, to afford a place of refuge in case of siege. The name is applied to any fort or fortified castle dominating a town. Modern warfare has rendered the ancient citadels practically obsolete.

Cita'tion, a legal term used to denote a summons or command directed to the person named therein, calling upon him to do some particular act—*e.g.,* to enter an appearance. It is now mainly employed in probate and divorce practice, and in courts of admiralty. (See Summons; Subpoena). In military affairs, special mention in official dispatches, as for bravery, is called a citation.

Cithæron, si-thē'ron, now Elatea, a range of mountains which separated Bœotia from Megaris and Attica. It was sacred to Zeus and to Dionysus and was the scene of various legends, such as the exposure of Œdipus and the death of Pentheus.

Cithara, sith'*a*-ra, an ancient musical instrument somewhat resembling both a lyre and a guitar. It consisted of a hollow body of wood or tortoise shell with two upward branching horns connected by a crosspiece. From this crosspiece the strings were stretched to the hollow body and supported by a bridge. The strings were plucked with the fingers and with a plectrum. Its invention is attributed to Apollo, and it was used by the Greeks and Romans. The modern guitar and zither are modifications of the cithara.

Cities of Refuge, certain cities (three on the west of the Jordan, three on the east) appointed by Jewish law (Num. xxxv; Josh. xx, xxi) as places of refuge for those guilty of unintentional murder until their case could be properly tried, it being the duty of the nearest relative of the slain to kill the murderer. This humaneness also marked Greek and Roman civilization. See Sanctuary.

Citium, sis̆h'i-um (now Larnaca), town of Cyprus, referred to in the Bible as Kittim (Chittim). It was originally Phœnician, but the population was increased by Greek colonists from the Peloponnesus, probably about the 10th century B.C. Here Cimon died, and here Zeno was born. See Larnaca.

Citizenship. As generally understood, a citizen is a member of a state or nation, owing allegiance to that state and being entitled to certain rights and privileges from the state. Citizenship may be defined as the sum total of those rights and duties which are involved in being a citizen.

Citizens are either native-born or naturalized. Native-born citizens, according to the view accepted by some countries, are those born within the state or its dominions, while other countries make the citizenship of the parents the determining factor. According to the Fourteenth Amendment of the U. S. Constitution 'all persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and the State wherein they reside,' and this holds even in the case of children born of alien parents who are themselves excluded from the right of citizenship. Subject to some conditions and limitations, the United States recognizes also as native-born citizens born abroad of American parents. International usage assumes that children of diplomatic representatives, wherever born, are native to the lands their fathers represent.

Naturalized citizens are those who, originally aliens, acquire citizenship through the satisfying of certain requirements prescribed by law. In the United States citizenship through naturalization is open on these terms to white persons, persons of African nativity or descent, and descendants of races indigenous to the Western Hemisphere, certain undesirable classes—as disloyal persons, persons lacking good moral character, anarchists, and others—being excluded. See Naturalization.

An American citizen, native or foreign-born, may be expatriated by naturalization in a foreign state, by taking an oath of allegiance to a foreign state, and, under certain conditions, by entering the armed forces of a foreign state, by accepting employment under the government of a foreign state, by voting in a foreign election or plebiscite, by making formal renunciation of American citizenship before an American diplomatic or consular officer, by conviction of deserting the military or naval service of the United States in time of war, by conviction of treason against the United States; and, in the case of a naturalized citizen, subject to certain exceptions, by residence outside the United States for stipulated periods of time, ranging from two to five years in different situations. The citizenship of a naturalized person may also be revoked, for fraud or illegality in the procurement of naturalization, by judicial proceedings brought by the government against the naturalized person.

Each citizen is bound to his state by the reciprocal tie of allegiance and protection. It is the duty of the President of the United States and of Congress to protect the humblest American in the remotest corner of the globe and it is the duty of every American to live, and if need be to die, for his country.

Certain expressions in the Constitution of the United States imply a Federal citizenship, and others a state citizenship. The Fourteenth Amendment, cited above, makes state citizenship equal to Federal citizenship, plus domicile, and imposes duties upon the states relative to citizens of the United States which reinforce the original provision that 'citizens of each State shall be entitled to all the privileges and immunities of citizens in the several States.' For example, Illinois cannot prevent Missourians from crossing the Mississippi and buying land or other property within her bounds; and she may not 'deprive them or her own citizens, or any other human beings, of life, liberty, or property without due process of law, nor deny the equal protection of the laws.' Just what the 'privileges and immunities' of Federal citizenship are, is somewhat indefinite. A suggested list embraces the rights of suing in the Federal courts, using the post-office, visiting the District of Columbia, sharing in the distribution of public lands, using navigable waters, petitioning Congress, and engaging in commerce.

Subject to the restrictions imposed by the Constitution, and excepting only those powers and immunities which arise out of Federal citizenship, the State possesses the exclusive control of the civil and political rights of the individuals resident within its borders, this having been the opinion rendered by the U. S. Supreme Court in the famous Slaughter House Cases (q. v.). Citizenship does not of itself give the right to vote, but most of the States confer this right upon all U. S. citizens who have lived within the State for a year and who can meet certain simple requirements.

In the British Empire, by the Imperial Acts of 1847 and 1870, colonial naturalization laws were operative only within the limits of the colonies enacting them. An alien naturalized as a British subject in Canada, therefore, became an alien again if he went to reside in the United Kingdom or any other portion of the British dominions. In 1914 an Act was passed by the British Parliament, providing for the issue of a naturalization certificate to an alien by the Secretary of State on proof of five years' residence, and the fulfilment of certain other conditions. Where the Parliaments of the Dominions enforced the same conditions of residence, their Governments were given power to issue certificates of naturalization taking effect in all parts of the Empire that had adopted the Act. This was done by Canada in 1914.

The modern growth of intercourse, travel, and migration is shaping a world-wide citizenship. Under international law, one country accords to the nationals of another an equality with its own people similar to the equality that subsists between citizens of Missouri and Illinois. Certain countries are subject to the practice of extra-territoriality (q. v.).

See AMERICANIZATION; NATIONALITY. Consult Hackworth, *Digest of International Law* (Vol. 3); Van Dyne, *Citizenship of the United States;* Shaler, *The Citizen;* Wise, *American Citizenship;* Brewer, *American Citizenship;* Ashley, *The New Civics.*

Citlaltepetl. See ORIZABA, PEAK OF.

Cit'ric Acid, $C_3H_4(OH)(CO_2H)_3$, occurs in lemons and other acid fruits. It is prepared by boiling lemon juice, filtering and neutralizing the clear liquid with chalk and slaked lime. The calcium citrate which separates is decomposed by dilute sulphuric acid, and the filtrate concentrated till the citric acid crystallizes out. Citric acid forms clear, colorless crystals with a pleasant, sour taste.

In addition to its employment as a flavoring agent, citric acid is used in the manufactures. Calico printers employ it for discharging the mordant from the cloth in patterns, and it is used in dyeing silk with safflower. It is a powerful tri-basic acid, and forms a class of salts called Citrates, many of which are employed in medicine, as citrate of ammonia and citrate of potash.

Cit'ron (*Citrus medica*), a small tree cultivated in the Mediterranean countries, especially in Corsica, and to a certain extent in Florida and California. It has short stout thorns, glossy evergreen leaves, and large flowers, white above and crimson beneath. The fruit resembles a lemon, but is larger and has a thicker rind and a smaller amount of acid pulp. The rind is dried and used in confectionary and cookery. Large quantities of it are shipped from Corsica to America to be candied. In the United States a small melon with a firm white centre is also known as a citron. It is not edible when raw, but its rind is used for preserving.

Cit'ronel'la Oil, an aromatic oil obtained from lemon grass, cultivated in Singapore and Ceylon. It is used to scent soaps and perfumes, and externally to ward off mosquitoes.

Cit'rus, a genus of aromatic evergreen shrubs and trees belonging to the order Rutaceæ, natives of the warmer countries of Asia, and cultivated for their fruit in the Mediterranean countries, Madeira, the West Indies, Florida, and California. They have fragrant white flowers and axillary thorns, and yield a large berry, with a tough skin or peel. Among the species are the orange, lemon, lime, citron, and grapefruit (qq. v.).

Città di Castello, chēt-tä'dē käs-tel'lō, town and episcopal see, Italy, province of Perugia, about 20 miles east of Arezzo. It has a fine Renaissance cathedral (1480–1540) and palaces of the 15th and 16th centuries. There are manufactures of silk, and there are mineral springs in the vicinity. Pop. (1936) 32,658.

Citta Vecchia, chēt-tä'vek'-kyä, former capital of Malta.

City, a term whose significance has varied greatly in the course of history and still varies in different countries, but which generally signifies a permanently organized community with a considerable number of inhabitants. The ancient Greek city, or more properly 'city state,' was an independent community, consisting of a town and its immediate neighborhood. Its form of government varied chiefly according to the number who were admitted to full citizenship, and might be oligarchic or democratic; but even when it was most democratic, only a fraction of the population had the rights of citizenship. In Athens at one time there were 400,000 slaves, 10,000 resident aliens, and only 21,000 male citizens of adult age. The cities (*civitates*) of the Roman Republic were of the same type, but under the Empire a city lost its administrative independence, and Roman citizenship ceased to be distinct from the condition of a Latin subject.

The mediæval city was based on commerce rather than on conquest. This was especially the case with the Hanseatic towns and the great industrial centres of Flanders and South Germany. Where the central power was weak, as in Germany, or non-existent, as in Italy, the cities approximated the Greek type.

In Great Britain the word *civitas* was not adopted. In its place the Anglo-Saxon 'burk' (the modern borough) was used. Later, *civitas* is found as a Latin equivalent of 'burgh,' and in the Domesday Book is applied to the larger boroughs. Under the Norman kings, the episcopal sees began to be removed to the chief borough, or city, of the diocese. This created the idea of an identification between city and cathedral town, which was confirmed when Henry VIII. made cities of those boroughs in which new bishoprics were set up. In recent times the rank of city has been conferred by royal charter on important boroughs which are not episcopal seats. Birmingham was the first city so distinguished in England.

In the United States, the term city is commonly applied to all incorporated towns, or villages, above a certain size. Technically, however, a city is created by statute, its charter of incorporation being granted by the State.

The modern city resembles in many respects that of the Roman Empire, being little more than an administrative unit, with greater or less powers of local government as distinct from self-government. It differs, however, from the Roman city in being distinctly democratic in its management, and in having its rights and its duties determined by statute, and not by custom. The modern city is, first, an agent of the state, and, secondly, an organization for the satisfaction of local needs. The functions which are strictly local in character are comparatively few; but under the conditions of modern city life assume a high degree of importance. In America and England it is a well established rule that the city has only those powers which have been specifically granted to it by the state. On the Continent of Europe, however, the prevailing rule is that the city may exercise any power which has not been expressly denied to it, or which has not already been entrusted to another agent. In either case, the city has no independent sphere of action which it can maintain against the state. It has no sovereign character, and administers justice only in minor cases, and, while responsible for the maintenance of order, has no armed force under its control. It thus exercises a more limited jurisdiction than the mediæval city, although it performs functions which in the Middle Ages were performed by other organizations (*e.g.*, education, poor relief), or were disregarded (as sanitation).

See CITIZENSHIP; LOCAL GOVERNMENT. Consult Wilcox, *The American City;* Saarinen, *City, Its Growth, Its Decay, Its Future* (1943).

City Manager Plan. See COMMISSION GOVERNMENT.

City Planning, also known as Town Planning or Community Planning, is the art and process of creating a more desirable community in which to live. It is generally identified with the physical pattern of the community in terms of streets, transportation, transit, parks, recreational areas, zoning, municipal services, etc. Urban planning must also identify itself with the total development of the urban community. A desirable community in which to live, work, and play must be well ordered also in terms of the planning and relationship of housing, shopping, industry, etc. A well ordered community also depends upon the efficient and economical provision of the many services and facilities.

The concept of city planning has changed and expanded through the years. For centuries town planning was thought of in terms of street patterns, public squares and plazas, and the placement of outstanding public buildings. As time went on, emphasis shifted several times between formality and informality in town layout. Gradually the concept of urban planning expanded to include a consideration of the fundamental problems which relate to all phases of urban life—particularly in relation to the physical environment.

With the expansion of concept came the specialization in certain phases of the total planning process. Specialists were called in to contribute to the solution of planning problems. Specialization was also called for in the conduct of the larger planning agencies and organizations. Thus, the terms 'administrative planning,' 'physical planning,' 'economic planning,' 'social planning,' etc., came to be applied to the respective sections of the larger planning operation. It is still the contention of many that city planning, as such, is essentially 'physical planning,' or that planning which has to do directly with the layout or design of the physical structure of the community. It is generally recognized, however, that in order properly to plan in terms of physical environment, the other phases of the total planning function are essential and vital.

Historical.—The ancient town of Kahun described by Flinders Petrie in his treatise on the construction of the pyramid of Illahun is probably the earliest piece of town planning of which we have an authentic record. This town, built in the year 3000 B.C., was laid out on regular lines with an acropolis on the higher part of the ground, a few larger houses and a number of smaller ones for the workmen. It appears to have been divided into two distinct sections by a wall, a primitive example of zoning, and the street plan in each division is that of a main thoroughfare into which feed minor residential streets.

Although the Greeks, generally speaking, showed less formality than the Egyptians for composition in plan, some of their towns show evidence of careful planning. Selinus, a Greek collony founded in 628 B.C., in Sicily, had a carefully planned acropolis, with certain quarters allotted to the major temples and public buildings. The space remaining was traversed by a main road running from north to south, two important roads running from east to west, and a number of small streets dividing the principal residential areas into small blocks on the gridiron plan. Hippodamus of Miletus, who lived about 440 B.C., author of the plans of Piræus, Thurii and Rhodes, is said to be responsible for the geometric principles followed in those cities.

Important among other Greek cities of which the plans are reasonably well determined, and which show definite premeditation, are Ephesus, Antioch, Palmyra, and Alexandria. Pompeii has an interesting quarter in the vicinity of the Forum, but for the most part its growth seems to have been haphazard.

The cities of Rome before the Christian era show an uncertain trend, but the forums, palaces and baths of the Roman Empire were planned on a monumental scale. Vitruvius gave specific directions for laying out cities in his discussion of the subject. Roman cities usually had two central focal points: the forum for public meetings, and the market, accessible to the slaves, artisans, and laborers. The forum at Timgad at the intersection of two principal axial thoroughfares is a good example.

The basic plans of the Italian cities of Aosta and Turin were determined by the Romans, and in England, Silchester and Chester retain marked traces of their origin as Roman camps. Lincoln and Colchester also retain the main streets carried through in straight lines as at Pompeii but there was no regulation of the less important quarters of these towns. While the Greeks were prone to adapt their plans to the conformation of the site, the Romans levelled off hills and filled depressions in their efforts to fit the site to the plan.

During the Middle Ages town planning was usually informal, although many authorities hold that the irregular streets and places were not laid out without intention, and that they conformed to a preconceived arrangement. This theory is strengthened by the fact that picturesque views continually open up as the curving streets approach the more important buildings; while the plans almost always fit the peculiarities of the site and follow the natural conformation of the ground. Rothenburg and Buttstedt are admirable examples.

Nor was this period without distinctly formal plans. In the thirteenth century, during the occupation of France by the English, particularly under Edward I, English engineers laid out some fifty towns, using a more or less checker-board plan, with special squares for the market place and principal buildings. Montpasier was the most notable of these. In England itself, old Winchelsea having been destroyed by the advance of the sea, Edward I, in 1277, commissioned the Treasurer of the Realm to plan a new town. About eighty acres were walled in on the checker-board plan, and special sites selected for two parish churches and two monasteries.

In Italy, the Renaissance brought about some advance in town planning. The Italian villa showed marked development in its landscape design, and this was reflected in the group plans of buildings and their immediate surroundings. Alberti urged that, although main thoroughfares be planned on straight lines, the streets of secondary importance be curved both for æsthetic and practical reasons, but his advice appears to have had little weight, and the Italian cities competed in straightening and widening their streets and in building squares and places in the grand manner. Rome was much modified during the sixteenth and seventeenth centuries and the Piazza del Popolo, the Via Sistina, the Piazza di Spagna, Trinita de' Monti, the Capitol, and the forecourt of St. Peter's, all date from this period, and in some cases did influence the approaches.

Italian influence spread to France, and Bernard Palissy wrote a treatise on the model city urging regularity and proposing the square form as the perfect one.

After the Thirty Years' War, the German princes began to amuse themselves by planning towns. Mannheim was laid out as a checker-board with an encircling street on the sides away from the river. Karlsruhe was developed in 1715, on the radial plan, with the royal castle as the center. Freudenstadt was devised as a series of concentric squares with a large place in the center, originally intended for a castle, but now occupied by the market place, gardens and various buildings. Berlin, Cassel, Dusseldorf, and Coblenz also originated at this period. Leningrad was founded by Peter the Great, in 1703, laid out on a definite plan, and completed in a few years.

Meanwhile, in 1666, after the great fire of London, a notable effort had been made by Sir Christopher Wren to have a plan adopted for the rebuilding of the devastated areas. From London Bridge were to be radial avenues and at other important points centers from which other avenues would radiate. The minor streets were on the checker-board plan. Unfortunately, the difficulty of settling exchanges of new for old boundaries of private property thwarted its adoption.

Amsterdam was laid out with a series of concentric waterways or canals, forming successive half moons and joined by radiating canals.

During the reigns of Louis XIV, XV, and XVI, in France, a formal type of city planning with a more technical sense of composition began to take form. The city of Nancy is a remarkable example of Renaissance plan development. Although the directions of its streets are more or less at right angles to one another, the checker-board is subordinated to a search for major points of interest, with important avenues, places, and parks that frame vistas of the monuments and at the same time help relieve the congestion of traffic. The Place Stanislas, in the heart of the town, has the Hôtel de Ville on its southerly side, the Bishop's Palace on the easterly, and the Theatre on the westerly side. Toward the north of the Place is a triumphal arch which leads to the elongated Place de la Carrière, at the end of which is the Palais du Gouvernement. From the Place Stanislas and from a focal point in front of the Palace important avenues extend as secondary axes at right angles to the main axis of the Place de la Carrière and lead to other minor places, while openings through the beautiful curved Louis XV grilles at the corners of the Place Stanislas reveal a vista of the Cathedral, and lesser streets open up the circulation to the outlying quarters of the city.

Of this Renaissance period, inaugurated by the Place des Vosges or Place Royale under Henry IV, there are in Paris a series of beautiful places: the Place des Victoires, laid out in 1685 from the elder Mansart's designs, but much mutilated since that date; the Place des Invalides; and finally the magnificent Place de la Concorde. In the main axis of this last are the Tuileries gardens on the east and the opening of the Champs Elysées on the west, while the transverse axis leads on the south across the Seine and over the Pont de la Concorde to the present Chamber of Deputies (originally the Palais Bourbon), and on the north between the Ministry buildings, through the Avenue de la Madeleine, to the church of that name. The Place Royale was imitated in 1620, in London, where Inigo Jones laid out Lincoln's Inn Fields and where Covent Garden soon followed suit.

Early in the nineteenth century Napoleon I interested himself in the development of Paris, but it was to his nephew, Napoleon III, that are due the extensive changes that have made that city the most beautiful in the world. He appointed Baron Georges Eugène Haussmann, Prefect of the Seine, to open up the old insanitary districts of the city and bring it into one comprehensive design. Deschamps was appointed through Haussmann's influence to take charge of the work, and with him were associated the ablest architects of the time. Deschamps accepted the old Paris with its tortuous streets as defining the important points to be accentuated and connected. He developed the Champs Elysées, the radiating avenues of the Etoile that extend outward from the Triumphal arch, erected by Napoleon I in 1806, the encircling loop of the Grands Boulevards, the Avenue de l'Opéra connecting the Louvre with the New Opera House, and the extension of the Luxembourg to the Observatory.

During the nineteenth century, the increasing industrial strength of Germany and the rapid growth of the German cities gave birth to schools of town planning that exerted an important influence upon the development of new and the reconstruction of many of the old German cities. Compulsory expropriation of land in towns for civic development was inaugurated in Germany in 1845.

The first tendency of the Germans was toward the geometrical plan, and in many cases new streets were laid out without regard for existing conditions of old towns or consideration of the topography. In 1889 Camillo Sitte of Vienna published a book, *Der Städtebau* (French translation *L'Art de Bâtir les Villes*) that greatly influenced this. He expounded the theory that picturesque mediæval towns were not the result of haphazard growth but of expert knowledge, and urged conscious design along irregular lines. His followers developed a picturesque school markedly in contrast to that of his predecessors. The cult of the picturesque, however, usually failed to reproduce the natural appearance of the old mediæval town, and had the serious defect of creating city plans which were most difficult to grasp and remember, and in which the newcomer was in continual danger of losing himself. A pronounced example of the type is the prize plan of Pforzheim by Herr Thomas Laugenberger.

The earliest evidences of city planning in America began to be manifested at or even before this period. William Penn laid out the plan of Philadelphia on checker-board lines, with a main east and west central thoroughfare (Market Street), running from the Delaware to the Schuylkill, a cross street of importance (Broad, or 14th Street), forming a central place at its intersection with Market, and four symmetrically placed squares in the four quarters resulting therefrom. New Orleans was planned with streets radiating from certain important points, a matter somewhat of accident, induced by the bend of the Mississippi. Washington, one of the most successful efforts in city planning that has been attempted and in the main, carried out, was designed in 1791 by Major Pierre Charles l'Enfant, a French engineer acting under George Washington. A partial gridiron already existed, and l'Enfant adapted to this radiating avenues between important centers, the principal of which were the Capitol and White House. He also projected a great parked thoroughfare, the Mall, on which were to have been situated the important buildings, housing the different departments of Government.

Among smaller communities, a number of the early New England villages, with their central square or 'common,' helped to foster a spacious and wholesome community life.

In 1807 a commission was appointed which laid out the City of New York on hard and fast checker-board lines, cut diagonally by the somewhat wandering course of old Broadway. The original city between the Hudson and East River was narrow and seemed destined to grow in length, and this system provided for wide north and south avenues several hundred feet apart and narrower cross streets 200 feet apart running from river to river, with a reserved space, Central Park, in the center of what was then the upper city.

A long interval in America of almost a century held city planning at a low ebb, Philadelphia alone in 1888 awakening to some consciousness, with its effort to provide more city parks. The Chicago World's Fair in 1893 however had a remarkable stimulative effect throughout the nation, because of the impressiveness of the exposition buildings and their grouping. Repercussions of this first arrived in an effort toward 'civic centers'; grouped public buildings, in Columbus, Ohio, Denver, Cleveland and Springfield, Massachusetts. The next effect was upon new state capitol buildings, in Harrisburg, St. Paul, Madison and Providence. The wheel then turned again to Philadelphia, which began to plan a parkway system to Fairmount. City halls next reflected the World's Fair influence, in Pittsburgh and Boston; and following that school buildings. Civic groups for some years were the object of city planning. Cincinnati, St. Louis, Memphis, Dayton, Worcester and Norfolk discarded old stereotyped structures and arrangements and made groups in scale with surroundings.

The City of Chicago, too, had been deeply stimulated toward city planning, but did not act until 1903 (after Cleveland a year before had set a precedent by establishing a Group Plan Commission—which in 1913 became a City Planning Commission). Chicago recognized the grave defects of its City Plan, and Daniel H. Burnham was given funds to devise a plan, which in 1908 was presented to the city. At once was set up the Chicago Plan Commission to study and develop it. This plan was a remarkably thorough one, in many respects, calling for opening 198 miles of new streets for centralization purposes, and the reclamation of 1280 acres of shore and water front on the lake side of the city; also an exterior system of radiating and encircling roads, parks, playgrounds near Chicago; and finally the rehabilitation of the transportation facilities. Burnham's plan took many years to fruition, but visitors to the 1933–1934 Exposition in Chicago saw many results which were developments from the 1893 World's Fair. Chicago continues to have an active planning program.

Hartford, Conn., was the first city in America (1907) to have a permanent city planning commission, established by legislative act.

New York City in 1916 took up leadership in city planning by adopting a zoning law setting up business and residential zone limits and limiting the height and bulk of buildings. In 1922 the Russell Sage Foundation undertook the financing of a planning program for the entire New York metropolitan region. The initial stage of this project was a survey requiring seven years to complete, and numerous planning proposals were developed and published. Begun under the name of 'Regional Plan of New York and Environs,' this planning committee was subsequently reorganized as the Regional Plan Association, Inc. which is continuing an active planning program and renders particular planning service to the communities of the region outside the city proper. Its activities also include surveys and resulting proposals for planning action within the limits of the city as well as the counties within the larger region.

Meantime, the horizon of the city planning idea began to broaden. The community is very seldom, if ever, a complete planning unit. Plans must be studied and developed with regard for the larger units of which it is an element. The regional planning development in New York pointed up the importance of this fact. Thus there have developed various levels of planning, all of which must be interrelated and coordinated. Each must contribute to and supplement the others. The various problems that are both common and interrelated within the metropolitan regions, have brought about the development of various metropolitan planning agencies. To date, the only approach to this type of planning has been by private or privately endowed organizations. Other than the New York Regional Plan, similar agencies have been developed in Detroit, Chicago, St. Louis, Los Angeles, Cleveland and other large metropolitan areas.

Logically, the next level of planning is that on the county basis. County planning is divided into two main types. One is essentially rural, the other essentially urban. County planning of the urban type is usually metropolitan in nature. In all cases where a city forms a major portion of the area of a county, planning at these two levels is closely related and must be developed with recognition of mutual and overlapping problems. State planning has now taken on great importance. The period of depression of the early 30's, coupled with the policies of the Roosevelt administration, stimulated planning particularly at this level. For the most part, state planning has dealt with activities in the field of natural resources and with surveys and recommendations having to do with resource use, exploitation, and control. During the Second World War period many state planning organizations were reorganized with emphasis on problems of post-war reconstruction.

National planning has also become prominent. The National Resources Planning Board, with the several national predecessor planning agencies, has in cooperation with Federal, state, regional, local and private agencies and institutions, prepared advisory reports, programs and plans for the development, use, and conservation of national resources. These national planning agencies have stimulated planning action at all levels of government. The National Resources Planning Board, shortly before it was discontinued in 1943, had engaged in a series of progressive local planning studies. The object was to develop local planning techniques which might be applied generally to American cities. The results were published by the Public Administration Service (1943) under the title *Action for Cities: A Guide for Community Planning.*

During the 1920's the cities of America increased rapidly in population. With this growth came the development of many suburbs around the larger cities.

An important planning instrument was subdivision control, first influenced by the garden city movement which influenced the layout of new, separate, and suburban communities in all sections of the country. Outstanding examples are Forest Hills Garden, Long Island, N. Y.; Country Club District, Kansas City, Mo.; Mariemont, Hamilton County, O., and Radburn, N. J.

Prior to 1930 relatively few American cities had active planning agencies. Many came into being, however, during the depression period. In 1934 there were 739 city planning agencies; by 1937 this figure had increased to 1,073. In addition there were 515 cities which had adopted some kind of zoning ordinance, making a total of 1,716 communities where planning or zoning or both were practiced in some form.

Planning activity has not been limited to the United States. Among European countries Germany and Russia have given particular attention to developing new communities centered about new industries. In Germany this movement has taken the form of decentralization of many of its older and larger industries. The development of the Ruhr Valley as a great industrial region has stimulated the planning of industrial communities within this area. In Russia a branch of government known as the City Planning Commissariat for Home Affairs was set up. The rapid industrialization of new areas within the Soviet Union has provided ample opportunity to plan and control the development of these new communities. The Scandinavian countries, particularly Sweden, have demonstrated the effectiveness of cooperative planning, especially in its building of large housing developments. Both in England and France new communities have been planned and developed outside of many of their larger cities.

The cities of America, although not physically damaged by the war, have undergone impacts from new and shifting industries and migrating populations. Industrial areas have greatly expanded, while other areas have lost populations. The larger cities are now inaugurating planning programs with emphasis on the redevelopment of blighted and obsolete areas. National, state and local legislation is being developed which, it is believed, will enable much of this urban redevelopment to be undertaken by private redevelopment companies. It is generally agreed that any rebuilding program will have to be of sufficient scale to replan cities in terms of neighborhood units. Neighborhood planning is no longer just slum clearance or low-cost housing. The neighborhood unit in many instances will be a complete community within the larger city, affording opportunity for not only living but for work and recreation. Large scale planning will also permit less crowding of the land, thereby giving greater opportunity for open and recreational areas surrounding both living and working quarters. This concept of large scale rebuilding and reconstruction emphasized the importance of coordination between public and private enterprise. Each has its function in the rebuilding of our cities.

Consult J. Nolan, *City Planning* (1916); Sir R. Unwin, *Town Planning in Practice* (1923); T. Adams, *The Design of Residential Areas* (1934); H. Wright, *Rehousing Urban America* (1935); National Resources Committee, *Our Cities: Their Role in the National Economy* (1937); R. Van Nest Black, *Planning for the Small American City* (1938); L. Mumford, *The Culture of Cities* (1938); National Resources Committee, *Urban Planning and Land Policies* (1939); Ladislas Segoe and Others, *Local Planning Administration* (1941); Eliel Saarinen, *The City: Its Growth, Its Decay, Its Future* (1943); Public Administration Service, *Action for Cities: A Guide for Community Planning* (1943) and American Society of Planning Officials, *Local Planning Institute, Syllabus-Notebook* (1943).

Ciudad Bolivar, sē-ōō-THäth' bō-lē'vär, city, Venezuela, capital of the state of Bolivar, on the south bank of the Orinoco, 240 miles from its mouth. It is a prosperous, well built town and an important commercial center, exporting rubber, cocoa, cattle, hides, tobacco, coffee, and cinchona. The town was generally known as Angostura until 1846. Pop. (1926) 16,762.

Ciudad Guzmán, gōōs-män', city, Mexico, state of Jalisco; 102 miles from Guadalajara. Its chief products are sugar, tobacco, iron, turpentine, and copper.

Ciudad Juarez, hwä'rās, or El Paso del Norte, town, Mexico, state of Chihuahua, on the right bank of the Rio Grande, opposite El Paso, Texas, and on the Mexican Central Railroad; 215 miles north of Chihuahua. Founded in 1585 as a missionary station, it is now an important place for transit trade. The chief products are cattle, cereals, fruits, and ores. Pop. (1940) 48,676.

Ciudad Porfirio Diaz, pôr-fē'ri-o dē'äs, now known as Piedras Negras, city, Mexico, Coahuila state, on the Rio Grande River opposite Eagle Pass, and on the Mexican National Railroad; 283 miles north of Monterey. An international bridge crosses the Rio Grande at this point. Piedras Negras is a garrison town and the seat of a United States consulate. It produces cereals, pecans, fruits, cotton, and sugar cane. The workshops of the National Railway are here, and stock raising and mining are carried on. Pop. (1930) 15,878.

Ciudad Real, rā-äl', city, Spain, capital of the province of the same name and an episcopal see; 106 miles south of Madrid. Its chief feature of interest is a huge Gothic church without aisles. Pop. (1930) 23,401.

Ciudad Real, province, Spain, in the south central part, between Sierra Morena and the mountains of Toledo, with an area of 7,620 square miles. The mountains abound in iron, silver, copper, and coal, and the province produces fruit, grain, medicinal plants, flax, sheep, swine, and mules. Grapes for the famous wine of Valdepeñas are grown here. Pop. (1940) 537,549.

Ciudad Rodrigo, rō-THrē'gō, fortified town, Spain, province of Salamanca, near the Portuguese frontier; 55 miles southwest of Salamanca. It has a Gothic cathedral dating from the 12th century, with fine architecture. The edifice has often been scarred by the ravages of war. The town was captured by the French during the Peninsular War in 1810. Early in 1812 the British under Wellington recaptured the place, which feat earned him the title of duke of Ciudad Rodrigo. Leather, linen and soap are manufactured. Pop. (1930) 9,484.

Ciudad Victoria, vēk-tō'ri-ä, city, Mexico, capital of Tamaulipas state, is situated in a fertile valley, on the Mexican Central Railroad; 812 miles northeast of Mexico City. Pop. 18,000.

Ciudad Vieja, a village near Antigua, Guatemala. Here the first Spanish Captain General ruled over Central America. The church (1543), is said to be one of the oldest ecclesiastical buildings in America.

Civet, siv'et, Civet Cat, the name given to the members of the Old World genus Viverra, of which two species especially, *V. civetta* and *V. zibetha*, yield the civet of commerce. Civets are small carnivores, placed in the family Viverridæ, closely related to the cats. They are fierce and active animals, living chiefly on small mammals and birds, but can be readily tamed if taken when young. The characteristic musky perfume is due to the secretion of two large glands near the anus, and in captive specimens these glands are periodically emptied by the keeper by means of a narrow spoon. Large numbers are kept in captivity in Eastern countries for the sake of the secretion. Of the two civets mentioned, *V. civetta* inhabits Africa, and *V. zibetha* Bengal, China, and the Malay Peninsula and Archipelago, while other species also occur in various parts of Asia. The Malays obtain their supplies of the perfume from the rasse (*V. malaccensis*), a small form present throughout India and the Malay regions. Certain allied carnivores, the Indian paradoxures (*Paradoxurus*), are sometimes also called civets or palm-civets.

Civet.

Civil Aeronautics Authority. A Federal governmental body created by the Civil Aeronautics Act of 1938 'to promote the development and safety and to provide for the regulation of civil aeronautics.' The Authority is composed of 5 members appointed by the President with the approval of the senate, one of whom is annually designated as chairman by the President. The terms of office are 6 years. No more than 3 members may be of the same political party. The Authority exercises all quasi-legislative and quasi-judicial powers conferred by the act, all executive powers of appointment with respect to employees and control of expenditures, and any necessary powers incident to its duties. An administrator, who handles executive matters, is appointed by the President with the approval of the senate. The functions of the Authority are to encourage and develop an air-transportation system properly adapted to the present and future needs of foreign and domestic commerce, postal service, and national defense; to regulate air transportation with reference to safety, economic conditions, and coordination between carriers; to promote equitable charges, efficient service, and sound competition; and to encourage the development of civil aeronautics. An extensive training program in the colleges of the country is conducted under the direction of the CAA for the instruction of reserve pilots, and by August, 1940, about 40,000 civilians held certified pilots' licenses, in large part as a result of CAA aid.

Civil Damage Acts, statutes passed in a number of the United States, giving to the husband, wife, parent, child, or guardian, for injuries done by intoxicated persons, the rights to sue those who may have sold or given the liquors which caused the intoxication. Also for injuries to means of support, for the expense and trouble of caring for the intoxicated person, and for other injuries and losses pointed out in the statutes.

Civil Engineers. See ENGINEER.

Civilian Conservation Corps. A Federal governmental organization created by act of Congress and approved June 28, 1937. It succeeded the agency known as Emergency Conservation Work. It was put under the direction of the Federal Security Agency by the Reorganization Act of 1939. The purpose of the CCC was to provide employment, as well as vocational training, for youthful unemployed through the performance of useful public work in connection with the conservation and development of the natural resources of the United States and its territories. There was a director of the Corps who had complete and final authority in the functioning of the Corps. Between 1933 and 1942, 3,000,000 men enrolled in some 4,000 separate camps, planted more than 1,700,000,000 trees, built more than 100,000 miles of minor roads and trails, built 75,000 miles of telephone lines, and spent about 5,000,000 man-days fighting forest fires. Enrollees took courses in truck driving, auto mechanics, blacksmithing, tractor operation, electric and acetylene welding, machine operation, general mechanics, in bulldozer operation, and in grader operation.

Certain functions were assumed and supervised by the War Department in regard to the CCC, such as health and enrollment, but the enrollee remained a civilian throughout his term of enlistment of three months and was not trained in military techniques.

Congress legislated the CCC out of existence in June, 1942, directing that the project be liquidated within twelve months. Most of the buildings, equipment, materials, and supplies were turned over to the Army and Navy.

Civil Law. This term is used in several senses. (1) In Roman law it is the civil law, as opposed to *jus gentium,* or international law. (2) According to continental usage it is private as opposed to public law. (3) According to English usage it is synonymous with Roman law. This, as codified from the days of the Twelve Tables till Justinian, was collected in the middle of the 6th century in twelve books of Constitutions, the Pandects and the Institutes. The code has been the foundation of nearly all continental and many colonial systems of jurisprudence, and in the course of centuries has been overlaid with a mass of commentaries in every province of the Roman empire. In England the study was revived by Vacarius at Oxford in the 12th century, and civilian proctors and advocates practised in certain local and ecclesiastical courts. See LAW.

Civil Liberties Union, American. An association incorporated under the laws of New York in 1920 which contends for freedom of speech, press, and assemblage wherever these constitutional rights have been violated in the United States by public or private agencies. It deals also with other guarantees of personal liberty in the Bill of Rights, and with academic freedom, censorship, rights of conscience, and racial discrimination. It has over 5,000 members and contributors and is managed by a Board of Directors, whose policies are ultimately determined by a National Committee numbering about 70 throughout the country. The Union is financed by contributions from over 5,000 members; membership is open to all who believe in the American Bill of Rights unequivocally and who pay dues. The Union is bound in principle to aid anyone whose civil rights are threatened. Methods of action are legal aid, publicity, organized protests to officials, and lobbying.

Civil List. Until the reign of William III the British crown was supported by the crown lands and hereditary revenues, but since the revolution an arrangement has been made at the commencement of each reign by which the sovereign resigns the crown lands, except the duchies of Lancaster and Cornwall, and the hereditary revenues, which in 1900 produced roughly about $2,250,000 a year, as against about $900,000 a year in 1838, and receives an annual sum granted by Parliament. This sum is now paid quarterly out of the Consolidated Fund. The civil list for the reign of George VI has been fixed at $2,600,000 a year.

Civil Rights Acts, two acts passed by the U. S. Congress, the first in 1866, the second in 1875, for the purpose of conferring civil rights upon the Negro and securing his unmolested enjoyment of them against the hostile legislation of certain Southern states. The first act, which was vetoed by Pres. Johnson (Mar. 27, 1866) and was passed over his veto (by the Senate, April 6, by the House, April 9), declared the Negroes citizens of the U. S., and provided that they should 'have the same right, in every state and territory of the United States, to make and enforce contracts, to sue, be parties, and give evidence, to inherit, purchase, lease, sell, hold, and convey real and personal property, and to full and equal benefit of all laws and proceedings for the security of person and property as is enjoyed by white citizens, and shall be subject to like punishment, pains, and penalties, and to none other, any law, statute, ordinance, regulation, or custom to the contrary notwithstanding.' Any person depriving the Negro of any of these rights was declared guilty of a misdemeanor, and the Federal courts were given cognizance of all offenses against the act, an appeal being permitted to the U. S. Supreme Court. The questioning of the constitutionality of this bill led to the adoption of the Fourteenth Amendment to the Federal Constitution, and the act of April 20, 1871, passed to enforce this amendment, was, in effect, an additional civil rights act. The second act, however, known as a Civil Rights Act, was that of Mar. 1, 1875, which provided that 'all persons within the jurisdiction of the United States shall be entitled to the full and equal enjoyment of the accommodations, advantages, facilities, and privileges of inns, public conveyances on land or water, theatres, and other places of public amusement; subject only to the conditions and limitations established by law, and applicable alike to citizens of every race and color, regardless of any previous condition of servitude.' In 1883 the U. S. Supreme Court decided, in the so-called Civil Rights Cases, that this act was unconstitutional in so far as its operation in the various states was concerned, thus leaving it operative only in the territories and the District of Columbia.

Civil Service. Service other than military or naval rendered to a nation or to a lesser governmental jurisdiction. The civil service varies in importance in the different nations according to the form of government and according to the degree in which the functions of government have been extended. In the United States, the war with Germany and Japan caused a great expansion in the Federal executive civil service. Between June 1939 and July 1943—four defense-and-war years—the number of officials and employees in the service increased from 920,310 to 3,156,953.

The growth of cities, with the consequent development of municipal functions, such as the supplying of water and the construction and maintenance of streets and highways, has brought about a parallel increase in the municipal civil service. The state civil service, on the other hand, although increasing absolutely, tends constantly to decrease in relative importance.

The heads of departments and numerous other important executive officials are appointed by the President, subject to confirmation by the Senate. The power of removal, however, is exercised by the President alone, and with the exception of the period from 1867 to 1887 Congress has not attempted to interfere with the President's power of removal. In the states, on the other hand, the civil service is generally decentralized. The heads of departments are usually elective and have the power of choosing their own subordinates. In the cities practice varies widely. In some cases the executive heads are elective and exercise an independent appointive power. In other cases most of the executive heads are appointed by the mayor, who thus controls the entire municipal civil service.

The Federal executive civil service consists of the departmental service (the headquarters offices of the various government agencies, most of which are located in Washington, D. C.), and the field service (establishments located throughout the country and outside the continental United States). Only a comparatively small number of the 3,156,953 Federal employees (approximately 9 per cent) are at work in Washington, D. C. The great majority are 'in the field'—in shipyards, arsenals, and military and naval posts; in the postal service; in agricultural research; and so forth. A total of 154,500 are employed outside the continental United States.

At present the Federal civil service of the United States, exclusive of the servants of Congress, consists of the following branches: (1) the Departmental Service, (2) the Custom House Service, (3) the Post-Office Service, (4) the Government Printing Service, (5) the Internal Revenue Service. The Departmental Service embraces in addition to the executive departments at Washington such branches as the Railway Mail, the Indian, and the Marine Hospital Services, the pension agencies, and the mints and assay offices.

Under the administrations of Washington civil service positions were generally filled by persons chosen for fitness. Considerations of party affiliations, however, had some influence upon appointments, and this was still more true under the administration of John Adams. The prevailing view in the first decades after the adoption of the Federal Constitution was that civil service officials should hold office during good behavior. President Jefferson, while professing this view, nevertheless thought it expedient to remove a large number of the appointees of the previous administration. Whenever possible this was done under color of alleged misconduct in office. By 1820, when an act was passed fixing at four years the term of office for a large class in the Federal civil service, party leaders in the states had learned the advantages to be gained for their organizations through control of offices. In New York a well-developed spoils system existed almost from the formation of the union. When Jackson was elected President he inaugurated the policy of removing a large proportion of the civil service officials and replacing them by his own supporters. The precedent thus established was followed by Jackson's successors to the great detriment of the service. After several ineffectual attempts at reform, Congress in 1871 authorized the President to prescribe rules and regulations for admission to the public service and to appoint a Civil Service Commission. Accordingly the President placed a certain number of offices under the control of the commission. But in 1874 Congress failed to make appropriations for the Civil Service Commission, and its work was practically suspended. In 1883 the Civil Service Act was passed, putting into effect a merit system under which appointments to positions subject to provisions of the act are made according to ability and fitness, without regard for political considerations; the act authorized the appointment of a commission (the United States Civil Service Commission) to administer its provisions and empowered the President to extend the merit system by executive order. Positions subject to the Civil Service Act make up what is known as the classified service, and persons appointed to these positions must prove their ability by passing an appropriate examination administered by the United States Civil Service Commission. In some cases Presidents have withdrawn certain classes of offices from the classified service in order to make place for their supporters. The practice is generally condemned, but since the appointing power is vested in the President by the Constitution, it is impossible to prevent such action by law. Recent Presidents, however, have all declared their adherence to the merit system. In June 1943, approximately 95 per cent of the Federal executive service was under the jurisdiction of the Civil Service Commission.

Since March 16, 1942, the United States Civil Service Commission has operated under a set of emergency War Service Regulations, which supplant several of the rules under which the Commission operates in peacetime. Appointments made under the regulations are in most cases for the duration of the war and not to exceed six months thereafter.

Examinations for the classified service are of two types—assembled and unassembled. In an assembled examination, competitors go to an examination room and take a test. In an unassembled examination, competitors are not required to take a written test but are rated on the experience, education, and training shown in their applications and established by the Commission through corroborative evidence. Persons who attain a rating of 70 or more in an examination have their names entered on a list of eligibles. When an appointing officer (an official in a government agency who has the responsibility for making appointments) decides to fill a vacancy through an original appointment—instead of promoting or transferring someone already in the service, or reinstating a former employee—he asks the Civil Service Commission to certify names of eligibles to him from an appropriate list of eligibles. He then selects one for appointment, and sends the other names back to the Commission, so that they may be considered in connection with other vacancies.

In 1883 a law introducing the merit system was enacted in New York, and in the following year it was extended to the 23 incorporated cities in the state. In 1943, 20 states had merit systems in all executive departments, and all of the states were at least partially under the merit system. In addition, more than 550 cities selected some or all of their employees on a merit basis.

Consult C. R. Fish, *The Civil Service and the Patronage* (1920); F. J. Goodnow, *Principles of the Administrative Law of the United States* (1905); W. E. Mosher and D. Kingsley, *Public Personnel Administration* (1936); United States Civil Service Commission, *History of the Federal Civil Service* (1941); and L. D. White, *Introduction to the Study of Public Administration* (1939).

Civil Service, CANADIAN. Members of the civil service belong either to the inside (that part under the several departments of the executive government at Ottawa) or the outside service. Admission to the former is by competitive examination. The Civil Service Commission consists of three members appointed by the Governor-General-in-Council. It passes upon the qualifications of the candidates and supervises their conduct afterward. The commissioners are removable only on a joint address from both Houses of Parliament. Successful candidates are on probation for six months and may be discharged during that time for cause shown. Members of the outside service, who are the great majority, are appointed by political patronage.

Civil War, AMERICAN, the war, 1861–5, between the Northern and Southern States of the U. S., or between the U. S. (proper) and the Confederate States of America. For its political significance see UNITED STATES; for the Confederacy see CONFEDERATE STATES OF AMERICA; also see SECESSION and STATES RIGHTS. The present article is concerned only with the military history of the war.

The two combatants were in many respects unequally matched. In population, in economic resources, the North was greatly the superior of the South; the South was largely dependent on imports from the North or from abroad, and the North having a vastly superior navy, importation from abroad became increasingly difficult owing to the Federal blockade. But the South had various great advantages. Her people were more apt as soldiers; her armies could fight on interior lines; and she had the great advantage in the important eastern campaigns of having almost from the beginning such a leader as Lee, generally considered the greatest soldier of the war.

On April 12, 1861, South Carolina opened the war by firing on Fort Sumter, which, after a bloodless conflict, surrendered two days later. Pres. Lincoln immediately called for 75,000 volunteers, which with the small regular army—depleted by the withdrawal of Southern officers and men—formed the fighting force at the outset. The South with great vigor also raised and began the training of troops, and before the war closed the North (in 1865) had more than a million men under arms, the South (in 1864) nearly half a million.

Public opinion on both sides clamored for action and forced the troops forward. The first serious engagement, a decisive Confederate victory, was fought at Bull Run (July 21, 1861)—the Federals being commanded by McDowell, the Confederates by J. E. Johnston and Beauregard. Soon afterward McDowell was succeeded by McClellan, who rendered his greatest service, and one of the utmost value, in moulding the famous Army of the Potomac into a most efficient fighting force.

At the beginning of 1862 fighting on a large scale began in the West. Here two sets of operations were long coincidently in progress—one (also in the Southwest) for the control of the Mississippi, the other resulting from the efforts of the Federals to drive back and overcome the Confederate armies between the Alleghenies and the Mississippi. The first Confederate line of defense extended irregularly across Kentucky. Eastern Kentucky was freed from Confederate control by the battle of Mill Springs (Jan. 19, 1862), and the line itself was irretrievably broken by the Federal capture (by Grant and Admiral Foote) of the central strongholds, Forts Henry and Donelson (Feb. 6 and Feb. 16, 1862). A new line was then established by the Confederate commander, Gen. A. S. Johnston, approximately along the Memphis and Charleston Railroad—'the great central east and west artery of the Confederacy.' Of this line Corinth constituted the center, Memphis the left and Chattanooga the right flank. Grant (under Halleck, then commanding in the West) aimed at Corinth, but at Shiloh (Pittsburg Landing) he was surprised by Gen. A. S. Johnston, who, however, in a two-days' battle (April 6–7) was beaten back, Grant being assisted and possibly saved from defeat by the opportune arrival from Nashville of Gen. Buell. Gen. Johnston himself was killed, and was succeeded by Beauregard, who withdrew to Corinth. This place he soon (May 30) gave up to Halleck, who had taken command in person in the field. Memphis passed into Federal hands on June 6. Previously, by the capture of New Madrid (Mar. 14) and Island No. 10 (April 7), and through the enforced Confederate evacuation of Fort Pillow (June 5), the Federals had gained control of the Mississippi to this point, and now the river became free as far south as

Vicksburg. In April, also, Farragut had gained possession of New Orleans, and from its mouth to Port Hudson the Mississippi was also practically free. In July, Bragg (Confederate) strongly fortified Chattanooga, and in East Tenn. was confronted by Buell commanding the Army of the Ohio—Halleck having been transferred to Washington to direct all the Federal forces in the field and Grant having been placed at the head of the Army of the Mississippi and the Army of the Tennessee. Bragg suddenly, late in August, eluding Buell for the moment, marched for Louisville, Ky.; a race between the two followed; Buell, reaching Louisville first, turned on Bragg, and by the battle of Perryville (Oct. 8) forced him back into Tenn. In the closing months of 1862 and in Jan., 1863, occurred the first Federal campaign (unsuccessful) against Vicksburg, Grant proceeding by land and Sherman down the Mississippi from Memphis.

During all this period there had been heavy fighting in the East, where the great Federal objective was Richmond, the capital of the Confederacy. Early in March McClellan with the Army of the Potomac was transferred to the peninsula between the York and the James rivers, thence to move against Richmond, while McDowell at the head of another army was to cooperate by marching from before Washington toward the Confederate capital. Other Federal armies (under Banks and Frémont) were in the Shenandoah Valley. McClellan delayed to besiege Yorktown (which was evacuated May 3), then proceeded up the peninsula, defeating the Confederates at Williamsburg (May 5) and at Fair Oaks or Seven Pines (May 31–June 1), where the Confederate commander, J. E. Johnston, was wounded and was succeeded by Gen. Lee. Meanwhile 'Stonewall' Jackson (Confederate), in a brilliant campaign in the valley against Banks and Frémont, frightened the Federal government into holding back McDowell for the defense of Washington. Jackson then rejoined Lee. McClellan thus failed to receive the expected support of McDowell, and during the Seven Days' Battles (June 26–July 2), his campaign already a failure, changed his base from the York to the James, fighting almost continuously with Lee. With Lee's futile attack on Malvern Hill (July 1) the Peninsula campaign virtually closed.

Lee, however, was soon confronted by a new antagonist. Gen. Pope (Federal) at the head of the Army of Virginia (a short-lived organization formed by the consolidation of the former commands of McDowell, Banks, and Frémont) advanced to the Rappahannock. Jackson, passing through Thoroughfare Gap to Pope's rear, destroyed large quantities of Federal supplies; and Pope drew back to meet Jackson, whom Lee joined with his other corps (Longstreet's). The two armies met (Aug. 29) on the old battlefield of Bull Run, and Pope was defeated and driven back to Washington. Lee then taking the offensive advanced into Maryland, but was met by McClellan (who had superseded Pope), and by the battle of Antietam (Sept. 16–17) was forced back across the Potomac. Soon afterward McClellan gave way to Burnside, who planned a flank movement by way of Fredericksburg against Richmond. Lee, however, anticipated him in seizing and fortifying the heights back of Fredericksburg. Lee's position was almost impregnable, but Burnside, with great foolhardiness, endeavored to dislodge him (Dec. 13) and was beaten back with terrible loss. Burnside, however, even contemplated making a second attack, but before he could do so was superseded by Gen. Hooker, who on May 1–4, 1863, was thoroughly defeated by Lee at Chancellorsville, near Fredericksburg. The Confederates, however, suffered an irreparable loss in the death of Jackson. For the second time Lee took the offensive, and advancing through the Shenandoah Valley, penetrated into Pennsylvania. He was followed by Hooker, who on June 28 gave way to Meade as the Federal commander, and by the terrible three days' battle of Gettysburg (July 1–3, 1863) was once more forced back into Virginia. From this reverse has been dated the beginning of the fall of the Confederacy; and until the close of the war there were no more Confederate invasions.

While these Eastern campaigns were in progress, hostilities were also being pushed with vigor in the West. In the autumn of 1862 Rosecrans (who had superseded Buell) lay with the Army of the Cumberland in Nashville, while Bragg occupied Chattanooga. In Nov., Bragg advanced to Murfreesboro; Rosecrans on his part proceeded toward Chattanooga, and along the Stone River near Murfreesboro the two armies met on Dec. 31, 1862, the battle being tactically drawn, though Bragg withdrew and left the field in the possession of the Federals. In the early part of 1863, also, Grant, again assisted by Sherman, once more moved against Vicksburg, and in a series of successful operations and by skillful maneuvering he finally shut the Confederate leader Pemberton within that stronghold. Two assaults having failed (May 19 and 22) he settled down to a siege; and on July 4, 1863, almost simultaneously with the Federal victory at Gettysburg, Pemberton with about 37,000 men surrendered. Banks had meanwhile been operating against Port Hudson, and on July 8, news of the fall of Vicksburg having reached the Confederate garrison, this place also surrendered, and the Mississippi at last was free.

After a six months' rest at Murfreesboro, Rosecrans late in June, 1863, once more took the offensive. By skillful maneuvering he compelled Bragg (strongly fortified at the outset at Shelbyville) to abandon position after position, and finally (early in Sept.) flanked the Confederates out of Chattanooga. Bragg remained nearby, however, and in the battle of Chickamauga (Sept. 19–20, 1863) utterly defeated Rosecrans, who late in Oct. relinquished his command of the Army of the Cumberland to Thomas. Grant, who had been placed in supreme command in the West, proceeded to Chattanooga, whither he also called Sherman, and in the battle of Chattanooga (Nov. 23–25, 1863) the Confederates in turn were badly defeated.

On Mar. 9, 1864, Gen. Grant was made a lieutenant-general and was placed in supreme command, under Pres. Lincoln, of all the Federal armies in the field. Sherman was left in command in the West, and after a campaign against the cautious and skillful Johnston and the rash and impetuous Hood (Johnston's successor), gained possession of Atlanta (Sept. 2, 1864). In Nov. Sherman cut loose from his communications and started on his famous 'March to the Sea,' while Hood, his antagonist, endeavored to crush Thomas and Schofield in Tenn. and in the battles of Franklin (Nov. 30) and Nashville (Dec. 15–16) was himself crushed by them. Sherman, destroying crops and doing great damage over a belt sixty miles wide as he marched, reached the vicinity of Savannah early in Dec. and gained posession of that place on Dec. 20. He then marched north through the Carolinas, where once more he had Johnston for his opponent, and by the middle of April, 1865, had reached and occupied Raleigh, N. C.

Grant, after leaving Sherman in command in the West, himself assumed the personal direction of the operations against Lee in the East, and having a great preponderance of strength, adopted almost from the first the policy of 'hammering.' He first, early in May, confronted Lee in the Wilderness, a dense forest in the vicinity of Chancellorsville, and the first stubborn contest occurred on May 5–6, the advantage on the whole being with Lee. Between May 8 and May 21 there was almost continuous fighting in the vicinity of Spottsylvania Court House, the Federal loss exceeding that of the Confederates. Between May 31 and June 12 a series of bloody engagements were fought in the vicinity of Cold Harbor, Grant's assault on June 3 being repulsed with relatively slight loss by Lee, though the Federal loss was appalling. Within five weeks Grant had lost almost as many men as Lee had had at the beginning of the campaign. Grant, changing his base to the James River, soon began his long contest to gain possession of Petersburg, a place of great strategic value. In July Lee sent Early through the Shenandoah Valley into Maryland. Washington itself was at one time in imminent danger of capture, but Early was delayed by Wallace at Monocacy, and soon withdrew to Strasburg. Into the Valley Grant then (Aug.) sent Sheridan, who beat back Early, and moreover thoroughly devastated that rich grain-producing region. Both Sheridan and Early were called to Petersburg. In March, 1865, Grant renewed his 'hammering,' and after a brave and brilliant resistance, Lee, his army suffering greatly from lack of food and almost exhausted, surrendered (April 9, 1865) at Appomattox Court House. With his surrender the Confederacy almost immediately collapsed. On April 26 Johnston surrendered to Sherman on the same terms previously granted to Lee. On May 4 Gen. Richard Taylor, commanding the Confederate forces in Miss. and Ala., surrendered to the Federal General Canby, and on May 26 Gen. Kirby Smith surrendered the Confederate forces in Texas.

Throughout the war most efficient services were rendered by the Federal navy, the stringent and rigorous blockade having much to do, as already mentioned, in bringing about the economic exhaustion of the Confederacy. The most important events in the naval history of the war were the contest between the *Monitor* and the *Merrimac* or *Virginia* (Mar. 9, 1862); the capture (previously mentioned) of New Orleans by Farragut; Farragut's victory over the Confederate squadron in Mobile Bay (Aug. 5, 1864); the various attempts, uniformly repulsed, to capture the defenses of Charleston Harbor; and the destruction off Cherbourg, France, of the *Alabama* (Confederate) by the *Kearsarge* (Federal) on June 19, 1864.

For further details concerning individual battles see the separate articles dealing with those battles; also see the biographical sketches of the prominent leaders on either side. The literature of the Civil War is already enormous. The most important original sources of information are the *War of the Rebellion, Official Records* (70 v., 1886–1900) and the *Records of the Union and Confederate Armies and Navies* (1880–1901). Secondary accounts are the following: Johnson and Buell (ed.), *Battles and Leaders of the Civil War* (4 v., 1887–9); the two series entitled *Campaigns of the Civil War* (16 v., 1881–2), and *The Navy in the Civil War* (1883); Comte de Paris, *History of the Civil War in America* (4 v., 1875–88); Woods and Edmonds, *The Civil War in the United States* (1905); and Ropes, *Story of the Civil War* [for 1861 and 1862] (2 v., 1899). Also see the volumes of memoirs and recollections by various Federal and Confederate leaders, and for a more complete bibliography see Larned, *Literature of American History* (1903); D. S. Freeman, *Lee's Lieutenants* (1942).

Civitavecchia, seaport, town and episcopal see, Italy, province of Rome; 50 miles by rail N.W. of the city of Rome. It has cement factories, and in the vicinity of the town are sulphur springs and remains of Roman baths. Pop. (1936) 31,858.

Clackmannanshire, the smallest county of Scotland, is bounded on the N. and E. by Perthshire, by the Firth of Forth on the S.W., and by Stirlingshire and Perthshire on the S.W. and W. Its area is 34,927 acres. The climate is moderately dry, and the soil is generally rich and arable, the higher grounds being partly pastoral. The manufactures include woolen goods, wool spinning, iron founding, brick and tile manufacture, ale brewing, whiskey distillation, and coal mining. There are two rivers, the Devon and the Black Devon, and four branch railways (with center in Alloa) of the Caledonian Ry. and the North British (three). Chief town, Clackmannan. Pop. (1931) 31,947; (1940 est.) 33,200. See J. Lothian, *Alloa and Its Environs* (3d ed. 1871), and D. Beveridge, *Between the Ochils and the Forth* (1888).

Clacton-on-Sea, urban district and watering-place, East Essex, England; 16 miles S.E. of Colchester. Pop. (1931) 15,851.

Claflin University. A coeducational institution for the education of Negroes at Orangeburg, South Carolina, established in 1870 largely through the aid of Lee Claflin of Massachusetts. From 1872 to 1896 the university and the College of Agriculture and Mechanics' Institute were under one management. It has preparatory, collegiate, normal, and music departments, and well-developed courses in manual and industrial training and domestic science. The university is under Methodist Episcopal control.

Claiborne, WILLIAM (*c.* 1589–*c.* 1676), American colonist, born in Westmoreland, Eng. He was sent to Virginia by the London Company as a surveyor in 1621; he soon became a large landowner, and in 1625 was made secretary of state for the colony. In 1631, on behalf of a London trading company, he established a trading post on Kent Island (in the Chesapeake Bay), to which a number of settlers soon came; Maryland, however, asserted her ownership of this island (1634), and this gave rise to a long dispute between Md. and Va., Claiborne himself eventually recognizing the authority of the former. In 1642 he was appointed treasurer of the colony of Va.; in the following year he forcibly regained possession of Kent Island, which Gov. Calvert of Md. had reduced, but he surrendered it to Lord Baltimore in 1657. In 1652 he was one of the commissioners sent to reduce Md. and Va. to obedience to the Commonwealth. He was subsequently again secretary of state of Va. and a member of the Va. legislature.

Claiborne, WILLIAM CHARLES COLE (1775–1817), American political leader, born in Sussex co., Va. He studied law in Richmond, Va.; removed to Nashville, Tenn., where he practised; was a member of the first constitutional convention of Tenn., and succeeded Andrew Jackson as the representative of the state (then having only one representative) in the national House of Representatives, serving two terms (1797–1801). In 1802–4 he was governor of Mississippi Territory; in 1803 he was one of the commissioners appointed (with James Wilkinson) to receive the transfer to the U. S. of Louisiana; from 1804–12 he was governor of the Territory of Orleans (the lower part of the Louisiana Purchase), and in 1812–16 was the first governor of the state of Louisiana. He was elected to the

U. S. Senate in 1816, but died before taking his seat.

Clairau, or CLAIRAUT, ALEXIS CLAUDE (1713–65), French mathematician, whose talents developed so early that in his thirteenth year he read before the French Academy a paper on the properties of four curves discovered by him, and was admitted a member at eighteen. In 1736 he measured, in conjunction with Maupertius, an arc of the meridian in Lapland. He published *Théorie de la Figure de la Terre* (1743; new ed. 1808), and his *Théorie de la Lune* gained the St. Petersburg Academy prize (1750). With Euler and D'Alembert he formed a triumvirate that succeeded Newton. He computed the perihelion and approximate date of return of Halley's comet.

Clairton, city, Pennsylvania, Allegheny county, on the Monongahela River, and on the Pennsylvania, the Pittsburgh and West Virginia, the Baltimore and Ohio railroads; 20 miles S.E. of Pittsburgh. The manufactures include, structural iron, steel, boiler tubes, and river boats and barges. Pop. (1930) 15,291; (1940) 16,381.

Clairvaux (Lat. *Clara Vallis*), village, department of Aube, France, on the left bank of the river Aube; celebrated for its Cistercian abbey, founded in 1115 by St. Bernard, and abolished at the revolution. Its buildings are now used as a central prison.

Clairvoyance, a term which in French denotes clearness of insight, but which in English has become applied to the faculty claimed by certain persons, who profess to see objects hidden from ordinary human vision, and to describe events far distant in space or time. See PSYCHICAL RESEARCH.

Clam, a name for almost any edible bivalve mollusk other than a scallop, mussel or oyster. In the eastern United States the clams of market are of two kinds: the hard or round clam (*Venus mercenaria*) and the soft clam (*Mya arenaria*). The former are known in New England by the Indian name 'quohog,' and are contained in heavy, somewhat triangular shells, from which the Indians made the best of their wampum beads; they live on sandy bottoms, where they move about half sunk in the sand, and are obtained by raking or dredging, as in the case of oysters. The 'little-necks' of New York restaurauts, a delicacy eaten raw, are young clams of this sort not larger than half-dollar pieces, whereas full-grown quohogs may be as large as one's palm. These clams occur plentifully from New Jersey northward as far as the middle of the Maine coast, and north of Cape Cod are largely used (as also are those next to be mentioned) in baiting the hooks of trawls used by the cod-fishermen. Another large clam of the northern coastal waters is the sea-clam, a Mactra.

The soft clam is the Mya—the species used on the American Atlantic coast being *M. arenaria,* while that of Europe is *M. truncata.* It has thin, elongated, white shells, gaping at the interior end (whence its British name 'gaper'), and is found deeply buried in mud or sand near shore, thrusting up a long siphon to imbibe water and with it microscopic nutriment during high tide, and withdrawing during the ebb. This clam, therefore, is obtained by digging, and as it is numerous, and reproduces itself rapidly and safely, it remains abundant, especially when the grounds are given periodical seasons of resting. Its artificial planting and propagation are successful. This clam is rarely eaten raw, but is the ordinary material for broths, chowders, and other cooked preparations; and its flesh is preserved in large amounts by canning, as well as shipped to interior markets in iced packages. Both these clams have been transplanted to the Pacific coast, and grow abundantly in San Francisco Bay, while several other species of local edible bivalves are eaten along that coast.

The largest bivalve mollusk known is the giant clam (*Tridacna*) of the South Pacific region, whose valves may measure two feet across and weigh 500 pounds. It is a native of the Pacific and neighboring seas, and is dreaded by trepang-divers—*e.g.* on the Australian Barrier Reef—the sudden closing of the valves sometimes imprisoning the diver's hand or foot. Other species occur in the Indian and Pacific Oceans.

Clan is one of the outstanding forms of organization of early (not primitive) society. The term has acquired a special significance and application to the Highland clans of Scotland. The Scottish state was always weak, and never succeeded as England had in subordinating the various local authorities and reducing them to the level of subjects; and it confined its efforts to the attempt to elevate the clan system into the feudal system, which in itself is but a transition stage between the clan and the state.

The distinction between the clan and the state may be given in the words of Professor E. Jenks (*Law and Politics in the Middle Ages,* 1898): 'The clan is a community of groups; the state is a community of individuals. The clan is an exclusive organization, founded on rigorous principles of religion and birth, and reverencing birth and age as the symbols of dignity; the state is a community of casual units bound together by the tie of military allegiance acting directly upon its individual members, valuing only personal ability, and willing to take personal ability wherever it can find it.' The clan received a special development among Celtic peoples, among whom feudalism had but little hold. The clan differed from the feudal system in the absence of charters or written agreements. The Highlanders had no liking for charters; and custom, by which the relations of chief and clansmen were governed, had its own advantages as between men of the same blood. For it must be remembered that the clan is united by descent from a common ancestor—a real or fictitious descent from a more or less fictitious ancestor—and that authority was conferred on the chief by the directness and authenticity of his descent from the common ancestor. The clan, however, was apt to break up into several smaller clans when it grew large, although the conditions of life tended to keep down population.

Clan-na-Gael, the name assumed by a society of Irish-American Fenians, was founded about 1884, and had its headquarters in Chicago. Its membership was confined to the irreconcilables, who held that Britain would yield nothing to Ireland's legitimate demands for freedom except as the result of fear. They were, therefore, opposed to a parliamentary campaign conducted under the forms of constitutional agitation. Indeed, it is even said that the dynamite outrages (1883) and the assassinations Clan-na-Gael perpetrated through its agents in England and Ireland were intended as much to confound the parliamentary movement as to terrorize the public.

Clap, ROGER (1609–91), American colonist, born in Salcomb, Devonshire, Eng. He emigrated to the Massachusetts Bay Colony in 1630, lived at Dorchester until 1686 and thereafter at Boston, and held various minor colonial offices. He is remembered chiefly for his *Memoirs* (1731), republished in Young's *Chronicles of Massachusetts Bay* (1846), and separately in 1844 by the Dorchester Antiquarian and Historical Society. He had fourteen children, including Experience, Preserved, Wait, Waitstill, Hopestill, Desire, Unite, Supply, and Thanks.

Clap, THOMAS (1703–67),

American educator, was born at Scituate, Mass., and graduated (1722) at Harvard. He studied for the Congregational ministry, and was pastor of the church at Windham, Conn., from 1726 until his acceptance of the rectorship (now styled the presidency) of Yale College in 1740. Mr. Clap effected many reforms in the management of the college and library, and obtained (1745) a more liberal charter from the Connecticut legislature. His term of office ended in 1766 owing to differences with his associates in regard to the propaganda carried on by Edwards and Whitefield. He published, among other works, *An Introduction to the Study of Philosophy* (1743), *The Religious Constitution of Colleges, Especially of Yale College* (1754), and *Annals or History of Yale College* (1766).

Clapham, a suburb of London. It is purely a residential district, and has no particular feature of interest beyond its common.

Clapperton, Hugh (1788–1827), Scottish African explorer, born at Annan; spent his early life in the navy, was first across the breach at Port Louis, Isle of France (1810), and, with Oudney and Denham, journeyed into Central Africa (1822–4), through Haussaland, penetrating as far as Sokoto. On a second expedition (1825) he died at Chungary, near Sokoto. See *Journal of a Recent Expedition* (1829), with a short Life; R. Huish, *Book on African Travels* (1836); T. Nelson, *Memoirs of Oudney* (1830).

Claque, a body of men hired to applaud in theatres. The leader of the *claque* attends the rehearsals, and afterward gives instructions to the claqueurs to applaud, laugh, and weep, as required. The *claque* is considered illegitimate outside of Paris.

Clare, county, province of Munster, Ireland, lying between Galway Bay on the N. and the mouth of the Shannon on the S. The coast is very irregular, bordered in great part by high, rocky cliffs. The surface is mountainous or hilly, and very diversified. The rivers are generally short and there are numerous lakes. The soil is in parts fertile, especially in certain low alluvial tracts, called *carcasses,* bordering the Shannon and Fergus. Large numbers of cattle and sheep are reared, pasture lands occupying about one-half of the county, while the area under tillage is less than one-sixth. Large oyster-beds lie along the Burren shore and around Ballyvaghan Bay, in the N., and the salmon fisheries of the Shannon, Fergus, etc., are important. Manufactures are of little account. Lead, slate, inferior coal, and other minerals occur, but are little worked. Area, 787,756 acres. Pop. (1941) 88,287.

Clare, John (1793–1864), the Northamptonshire 'peasant poet,' born at Helpstone, near Peterborough, of poor parents; was a gardener's apprentice, militiaman, gypsy, and lime-burner, always poor. His first volumes of poetry—*Poems Descriptive of Rural Life and Scenery* (1820) and *The Village Minstrel* (1821) —were well received, and Clare was made much of in London. But London would not buy his next book, *The Shepherd's Calendar* (1827), and his *Rural Muse* (1835) was noticed and praised by Christopher North alone. This drove him insane. In one of his occasional lucid intervals he composed his last and best poem, *I am; yet what I am who cares or knows?* He died in the county asylum, practically forgotten. See *Life of John Clare,* by F. Martin (1865); *Life and Remains of John Clare,* by J. L. Cherry (1873); C. M. Herford, *Age of Wordsworth* (1897), etc.

Clare, St. (1193–1253), and Nuns of the Order of Clarisses or Poor Clares. St. Clare was born at Assisi in Italy. She fled to St. Francis at the Portiuncula in 1212, and gave her fortune to the poor. Within a few years Clare founded monasteries at Perugia, Padua, Rome, Venice, Milan, and elsewhere, under the strictest Franciscan rule. The order was later divided into Damianists (Clare received the church of St. Damian from Francis as a monastery) and Urbanists, who followed mitigated rules given by Urban IV (1265). St. Clare was canonized by Alexander IV (1255), her festival being August 11. The care of poor girls is one of the chief occupations of the sisters. They are the female Franciscan order, and have been represented in the United States since 1875. See Heimbucher's *Orden und Kongregationen* (1896–7).

Claremont, village, California, Los Angeles county, on the Atchison, Topeka and Santa Fe Railroad; 35 miles E. of Los Angeles. It is the seat of Pomona College. Pop. (1930) 2,719; (1940) 3,057.

Claremont, town, New Hampshire, Sullivan county, on the Sugar River, and on the Boston and Maine Railroad; 43 miles W.N.W. of Concord. The chief manufactures are machinery, paper, shoes, lumber, brick, and textiles. Pop. (1930) 12,377; (1940) 12,144.

Claremont Park, royal demesne, in Surrey, England, 5 miles S.W. of Kingston. It was the residence for many years of the Duchess of Albany. The original mansion was erected by Sir John Vanbrugh early in the 18th century. He sold it to Lord Clive of Plassey in 1768, who rebuilt it at a cost of £100,000, employing 'Capability' Brown for the purpose; and in 1816 the property was purchased by the British Government as a residence for the Princess Charlotte of Wales, who died there in the following year. Queen Victoria became its private owner in 1882, by purchasing the reversion. Louis Philippe and his queen also lived there.

Clarence, Dukes of, derive their title from Clare in Suffolk —Lionel (1338–68), second son of Edward III, on marrying Elizabeth de Burgh (1360) lady of Clare, being created Duke of Clarence. Other royal holders have been William (1765–1837) afterwards King William IV; and Albert Victor (1864–92), eldest son of Edward VII.

Clarenceux, the title of one of the two provincial kings-of-arms in England. His jurisdiction comprises all England south of the Trent. See King-of-Arms.

Clarendon, Edward Hyde, Earl of (1609–74), English statesman and historian, born at Dinton, Wiltshire. He studied in the Middle Temple, and associated with the literary people of the day. Entering the Short Parliament (1640) as a member for Wootton Bassett, Wiltshire, he at first co-operated with the progressive party, but halted when he saw how wide the breach between privilege and prerogative was becoming. In the Long Parliament he represented Saltash, Cornwall, and became with Falkland the king's confidential adviser, the author of his manifestoes, and drew up the monarch's reply to the Grand Remonstrance. When the appeal to arms was made, Clarendon joined the king in the north. Appointed chancellor in 1643, he went to Jersey and the Scilly Isles with the young Prince of Wales (1645), and in the former island began his famous *History.* Created Baron Hyde of Hindon at the restoration, and later Earl of Clarendon, also confirmed in the dignity of High Chancellor, he managed to offend all parties, being popular with neither Cavaliers nor Puritans. He was one of the proprietors who obtained a grant of the first Carolina Charter in 1663, the Cape Fear establishment receiving the name of 'Clarendon County' in his honor. His conduct of the foreign affairs of the kingdom was unpopular—the sale of Dunkirk, the Dutch war, and the treaty of Breda, contributing to his overthrow in 1667, when he was impeached for high treason, but allowed to depart for France, where he remained until his death at Rouen. Whether cognizant of the secret marriage of his daughter with James, Duke of York, the king's brother, cannot be determined, but his indignation on learning of it cannot have been sincere. His *History of the Rebellion in England* (1702–4) is an apology for and vindication of Charles I, and makes no profession of impartiality; but the stately splendor of its style, and the skill displayed in depicting character and analyzing motives, raise it far above the sneer that it is a political pamphlet in three volumes. In addition to the *History,* he wrote a continuation entitled *History of the Civil War in Ireland* (1720), an autobiographical *Life of Edward, Earl of Clarendon* (1759), and a volume of *Tracts of Edward, Earl of Clarendon* (1727). The best edition of his *History* is that published by the Clarendon Press (1888).

Clarendon, Edward Hyde, 3d Earl of. See Cornbury.

Clarendon, George William Frederick Villiers, fourth Earl of (1800–70), English statesman, born in London, and educated for the diplomatic service. He was appointed ambassador at Madrid (1833), but becoming Earl of Clarendon on the death of his uncle (1838) he returned home, and was appointed Lord Privy Seal in the Melbourne administration (1840). Though a Whig he supported Sir Robert Peel in the repeal of the Corn Laws, joined Lord John Russell's administration as President of the Board of Trade (1846), and went to Ireland as lord-lieutenant, where he won praise for the wisdom displayed in dealing with the Smith O'Brien discontents. He became Foreign Minister in the Aberdeen cabinet (1853), and was thus responsible for the Crimean War. His diplomatic skill was utilized in the Congress of Paris. Again Foreign Minister in 1865, he held the same portfolio in Mr. Gladstone's administration from 1868 till his death. See Thornton, *Life of G. W. F. Villiers, Fourth Earl of Clarendon* (1881–2).

Clarendon, Constitutions of, were laws or enactments by which Henry II and his nobles (1164) met those demands for papal supremacy implied in the exemption of the clergy from the law of the land. These laws secured for the crown a right of interference in the election of church dignitaries, and were the cause of the quarrel between Becket and Henry II.

Clarendon Park, parish, Wiltshire, England, 3 miles S.E. of Salisbury. Traces still remain of the royal palace, in which the Constitutions of Clarendon were signed in 1164.

Clarens, one of the most frequented villages (grouped with many others under the general name of Montreux) on the N.E. shore of the Lake of Geneva, in the Swiss canton of Vaud. It is 3 miles by rail S.E. of Vevey; part of the commune of Le Chaterlad, which in 1900 had 8,986 inhabitants.

Claret, a light-red wine produced in the French province of the Gironde, also known as Bordeaux wine. Scattered through the province are many châteaux, each of which yields a wine of special characteristics, which depend on the vintages, and these in turn largely on soil, climate, and season. In some years the clarets are elegant and soft, of good body and bouquet; in others, thin, coarse, and inferior. The best-known clarets are the Médocs, St. Julien, Pauillac, Margaux, La Rose, Pontet Canet, and Château Lafitte. Those of the four last places take long to mature, but they are among the best, and are high priced when in condition. The Médoc, St. Estêphe, St. Julien, St. Emilion, and similar clarets form good light dinner wines. In alcoholic strength clarets vary from 9 to 14 per cent. The California clarets rival some of the best French wines in color, body, flavor, aroma, and power of maturing well with age.

Claretie, Jules Arsène Arnaud (1840–1913), French novelist and dramatist, born at Limoges; early wrote for the papers under various pseudonyms, notably that of 'Candide.' War correspondent in Italy (1866), he became dramatic critic to *L'Opinion Nationale* (1867), and followed the army of the Rhine (1870). He succeeded Perrin as director of the Comédie Française (1885), and was elected to the Academy in 1888. He published *L'Assassin* (1866), his best romance; *Molière* (1873); *Les Muscadins* (1874), since dramatized; *Le Prince Zilah* (1884), dramatized 1885; etc. Among his plays are *Un Père* (1877); *Les Mirabeau* (1879); *Monsieur le Ministre* (1883), a comedy. His *Œuvres Complètes* appeared in 1897.

Clarinda, city, Iowa, county seat of Page county, on the Nodaway River, and on three branches of the Burlington Route; 95 miles s.w. of Des Moines. It is the seat of a state asylum for the insane. The principal industries are coal-mining and the manufacture of carriages, flour, well drilling machinery, magnetic nuts, lawn mowers and training rifles. Agricultural and dairy produce, livestock, etc., are extensively shipped. Pop. (1930) 4,962; (1940) 4,905.

Clarinet, or Clarionet, a wood-wind single-reed instrument, said to have been invented at Nuremberg, in 1690, by Johann Christopher Denner. Owing to its great compass, richness, and variety of tone, the instrument ranks as one of the most important in the modern orchestra. As a solo instrument the clarinet also takes a high place. It consists of a cylindrical tube which ends in a bell at the lower part, and at the upper part terminates in a cone-shaped mouthpiece, which is beveled to a thin edge on one side, and has a flattened longitudinal portion on the other, upon which the reed is laid and kept in position by a ligature containing two screws. The reed (see Reed), made from a slip of grass (*Arundo sativa*), is very thin at its upper end. The table upon which the reed is laid is slightly curved toward its point; thus a tiny aperture is formed between the upper part of the reed and the mouthpiece. The beating of the reed against the table causes the sound, the quality of which is greatly influenced by the inherent properties of the reed itself. The tube is furnished with holes and keys which give a fundamental scale or register—called the chalumeau—of nineteen semitones, from E in the bass stave to B— in the treble. By keeping open the B— key, and using the same fingering as for the lower register, another register of somewhat different tone quality is formed which is a twelfth higher, and gives other fifteen semitones—to C— above the treble stave—and by cross-fingering the compass can be extended another octave; but notes above the intermediate G are not often used. Music written in extreme keys is very difficult of performance on the clarinet, but by using instruments of different pitches the execution is considerably facilitated. In orchestras the clarinets are usually in A and B—, the C clarinet being now little used; there is also a tenor clarinet. (See Basset Horn). In military bands the clarinets most in use are those in B— and E—. A bass clarinet, usually in B—, but sounding an octave below the ordinary clarinet, is also used in orchestras and military bands.

Clarinet.

Clarion, borough, Pennsylvania, county seat of Clarion county, on the Clarion River, and on the Baltimore and Ohio Railroad; 62 miles N.N.E. of Pittsburgh. It is the seat of a state normal school. Pop. (1930) 3,201; (1940) 3,798.

Clark, Abraham (1726–94), American patriot, born in Elizabethtown, N. J. He was one of the signers of the Declaration of Independence. He helped to frame the United States Constitution, and was a member of Congress from 1782 until the year of his death.

Clark, Alonzo Howard (1850–1918), American naturalist, was born in Boston, Mass., and was educated at Wesleyan University. In 1875 he was given charge of the U. S. Fish Commission station at Gloucester, Mass. From 1881 he was connected with the Smithsonian Institution at Washington as curator of American history in the U. S. National Museum, and editor of the publications of the Institution. He was assistant to the U. S. commissioner at the London International Exposition (1883), and U. S. expert commissioner to the Paris Exposition (1889). He was secretary of the American Historical Association (1889–1908). He wrote *Fishery Industries of the United States; Whale and Seal Fisheries; History of the Menhaden Fishery; The Food Industries of the World.*

Clark, Alvan (1808–87), American optician, was born in Ashfield, Mass. He established a factory at Cambridgeport, which became the most important in the United States, where he was the first person in the country to make achromatic lenses. He progressed in the preparation of telescope lenses from the 18-inch glass at Chicago (1860) to the 36-inch refractor made for the Lick Observatory.

Clark, Alvan Graham (1832–97), American optician and astronomer, son of the preceding, was born in Fall River, Mass. He worked at lens-making in his father's factory, became a partner in the firm in 1852, and head of the firm in 1891. He completed the telescope for the Yerkes Observatory, with a 40-inch lens, then the largest in the world; a 30-inch lens for the Imperial University in St. Petersburg (Leningrad), and many other glasses. He made several mechanical improvements in the telescope.

Clark, Champ (James Beauchamp) (1850–1921), American legislator and Speaker of the U. S. House of Representatives, was born in Anderson county, Ky. He was educated in Kentucky University, Bethany College, and Cincinnati Law School. He worked in a country store, edited a country newspaper, and practised law. He was president of Marshall College, West Virginia, in 1873–4; in 1875 he removed to Missouri, where he held several offices, including that of prosecuting attorney of Pike county. He served as Democratic Representative in Congress in 1893–5 and 1897–1911. He was permanent chairman of the St. Louis Democratic National Convention (1904) and was elected Democratic (minority) Congressional floor leader in 1908. He was re-elected to the Sixty-second Congress (1911–13), and on April 4, 1911, succeeded Joseph G. Cannon as Speaker of the House of Representatives.

Clark, Charles Edgar (1843–1922), American naval officer, was born in Bradford, Vt., graduated at the U. S. Naval Academy in 1863, and was promoted ensign in the same year. During the Civil War he served on the *Ossipee* in the Western Gulf blockading squadron, and took part in the battle of Mobile Bay (1864). He became successively master (1866), lieutenant (1867), lieutenant-commander (1868), commander (1881), captain (1896) and rear-admiral (1902). He served as lighthouse inspector (1887–91); commander of the *Ranger* (1883–6), the *Mohican* (1893–4), the *Independence* (1895–6), the *Monterey* (1896–8), and the *Oregon* (1898) in the battle of Santiago. He was governor of the Naval Home in Philadelphia from 1901 to 1904, and president of the Naval Examining and Retiring Board (1904–5). He retired in 1905.

Clark, Charles Heber. See Adeler, Max.

Clark, Edward (1822–1902), American architect, was born in Philadelphia, Pa. He studied architecture under Thomas U. Walter (q. v.), and acted as Mr. Walter's assistant while the latter was architect of the National Capitol and other buildings at Washington from 1851 to 1865. From 1865 until his death he was architect of the Capitol, and superintended the construction and remodeling of public buildings and monuments in the District of Columbia. He was a member of the commissions that supervised the erection of the Washington Monument and Congressional Library.

Clark, Francis Edward (1851–1927), American clergyman, born in Aylmer, Quebec. He was graduated at Dartmouth College in 1873, and studied divinity at the Andover Theological Seminary. He became pastor of the Williston Congregational Church at Portland, Me., in 1876, where in 1881 he founded the Society of Christian Endeavor, which is now found in every land the world around. In 1883 he accepted a call to Phillips Church of South Boston, Mass., resigning in 1887 to become president of the World's Christian Endeavor Union. He was editor of *The Golden Rule,* the society's organ, the name of which was subsequently changed to *The Christian Endeavor World.* Among his many books are *Our Business Boys* (1883); *Christian Endeavor Saints* (1890); *Our Journey Around the World* (1894); *The Great Secret* (1895); *Old Lanterns for New Paths* (1898); *A New Way Around an Old World* (1900); *Training the Church of the Future* (1902); *Christian Endeavor Manual* (1903); *Christian Endeavor in All Lands* (1906); *Continent of Opportunity* (1907); *Gospel in Latin Lands* (with Mrs. Clark, 1909); *Similes and Figures from Alexander Maclaren* (1910).

Clark, George Rogers (1752–1818), American soldier, brother of William Clark (q. v.), was born in Albemarle county, Va. He became a land surveyor; served in Lord Dunmore's War (1774) against the Shawnee Indians; and settled in Kentucky in 1776, where he became a recognized leader among the settlers. He was sent to the Virginia Assembly (1776); was instrumental in having the 'county of Kentucky' created, and in December, 1777, obtained Governor Patrick Henry's approval of a plan for the conquest of the British posts in the Northwest. He gained possession of Kaskaskia, Cahokia, and Vincennes, in the Illinois country, in the summer of 1778. Vincennes having again fallen into the hands of the British, Clark led another expedition against that post, and forced its capitulation. Clark's conquest of the Northwest, though involving little bloodshed, has justly been regarded as of the utmost importance in securing to the United States, by the treaty of 1783, possession of the vast territory between the Mississippi and the Alleghenies.

Clark was prominent during and after the Revolutionary War as a leader in frontier warfare. For his services in the Revolution he received a grant of land from Virginia, on part of which, near Louisville, Ky., he spent his last years. Consult English, *Life;* Thwaites, *How George Rogers Clark Won the Northwest* (1903); Butterfield, *History of George Rogers Clark's Conquest of the Illinois* (1904).

Clark, Henry James (1826–73), American naturalist, was born in Easton, Mass. He was graduated (1848) at New York University; studied botany under Asa Gray and zoology under Agassiz, graduating (1854) at the Lawrence Scientific School. He assisted Agassiz in microscopical work and natural history (1856–63). He was appointed adjunct professor of zoology at the Lawrence Scientific School in 1860; lecturer at the Museum of Comparative Zoology in 1861, and at the Lowell Institute in 1864. From 1866 until his death he was successively professor in the Agricultural College of Pennsylvania, University of Kentucky, and Massachusetts Agricultural College. His knowledge of botany and zoology enabled him to point out certain distinctions between the lowest protozoa and plant spores, and to prove the animal nature of sponges. His Lowell Institute lectures were published under the title *Mind in Nature.*

Clark, John Bates (1847–1938), American economist, was born in Providence, R. I. After two years at Brown University, he finished his college course at Amherst in 1872. He continued his studies at Heidelberg, Zürich, and Paris, and in 1877 became professor of political economy at Carleton College, Minn. He filled similar chairs at Smith and Amherst Colleges until his appointment to the chair of political economy at Columbia in 1895–1923. He was director of the Division of Economics and History under the Carnegie Endowment for International Peace. As a lecturer and writer on economic theory he holds first rank among American economists. He published *Capital and Its Earnings* (1888); *Modern Distributive Process* (with Prof. Giddings, 1888); *Control of Trusts* (1901); *Distribution of Wealth* (1901); *Problem of Monopoly* (1904); *Essentials of Economic Theory* (1907).

Clark, Jonas Gilman (1815–1900), American philanthropist, was born in Hubbardston, Mass. He established a carriage-making business; engaged in large enterprises in California (1853–8), and after 1858 made his residence in New York City. He gave his native town a library and post-office building; and after eight years' study of foreign universities, he established (1887) a fund of $1,000,000 for the founding of a university devoted to scientific research. In 1889 Clark University (q. v.) was organized at Worcester, Mass. He left the university a further sum of $2,500,000 in his will. Consult S. W. Clark, *In Memoriam Jonas Gilman Clark.*

Clark, Lewis Gaylord (1810–73), American author, twin brother of W. G. Clark (q. v.), was born in Otisco, N. Y. He became editor of the *Knickerbocker Magazine* in 1834, a position which he held until its suspension in 1859. He also edited the *Literary Remains of Willis Gaylord Clark* (1847); and published in book form *Knickerbocker Sketch-Book; Knick-Knacks from an Editor's Table; Life of Daniel Webster.*

Clark, Mark Wayne (1896–), Lieut. General U. S. A., commander of the American Fifth Army in Italy in the Second World War under the command of Gen. Dwight D. Eisenhower, was born at Madison Barracks, Sacket Harbor, N. Y., and was graduated from West Point in 1917 and also from the Infantry School, the Command and General Staff School, and the Army War College. He went to France in 1918 as an officer in the Eleventh Infantry and later served with the Army of Occupation at Coblenz. Following the entrance of the United States into the Second World War, Gen. Clark was made chief of staff of the ground forces in the United States (1942) and in August went to England where the Combined Chiefs of Staff of the United Nations were planning for the opening of a second front on the continent. A few weeks before the Allied invasion of French North Africa in 1942, he was sent there to obtain information about Axis activities in that area and to enlist the support of the French army in the projected enterprise. He participated in the African campaign which resulted in the expulsion of the German and Italian forces, and assumed command of the American Fifth Army in the Sicilian and Italian mainland invasions.

Clark, Thomas March (1812–1903), American Protestant Episcopal prelate, was born in Newburyport, Mass. He was graduated (1831) at Yale, and studied divinity at the Princeton Theological Seminary. He was licensed to preach in the Presbyterian Church at Newburyport in 1835, but joined the Episcopal Church the following year, and was ordained deacon and priest. He was rector of Grace Church, Boston, in 1836–43, and of other churches from 1844 until his consecration as bishop of Rhode Island in 1854. He was presiding bishop of his church from 1899 until his death.

Clark, William (1770–1838), famous American explorer, one of the leaders of the Lewis and Clark expedition and the brother of George Rogers Clark (q. v.), was born in Virginia. He entered the U. S. Army under his brother, Gen. G. R. Clark, in 1786, served in Indian wars, and resigned with the rank of lieutenant in 1796. He re-entered the army as a second lieutenant in 1804; and, with Meriwether Lewis (q. v.), led the notable expedition of 1804–6 across the continent from St. Louis to the mouth of the Columbia River. He was made first lieutenant in January, 1806; brigadier-general and superintendent of Indian affairs of Louisiana Territory (1807); was governor of Missouri Territory (1813–21); surveyor-general of Illinois, Missouri, and Arkansas (1824–5); and Federal superintendent of Indian affairs (1822–33). In 1906, the hundredth anniversary of the expedition, a bronze commemorative tablet was unveiled on the site of Clark's old home in St. Louis. Consult *Original Journals of Lewis and Clark Expedition,* edited by R. G. Thwaites (1903–5); Thwaites, *Life* (1906); Wheeler, *Trail of Lewis and Clark, 1804–1904* (1904).

Clark, William Andrews (1839–1925), American capitalist and U. S. Senator, born near Connellsville, Pa. He studied law at the Mount Pleasant Law School in Iowa, to which State his parents had removed, but did not practise. After teaching school for a time he emigrated to Colorado; then to Montana in 1863, where he established a store at Bannock, and also engaged in banking and mining. He amassed a large fortune through his copper-mine holdings in Montana and Arizona, said to be the two greatest copper-producing properties in the world; and also acquired immense plantations in California and Mexico. He filled various honorary offices in Montana; was a candidate for U. S. Senator in 1890 and 1898, and was elected U. S. Senator from Montana for the term of 1901–07. With E. H. Harriman (q. v.) he built and paid for the San Pedro, Los Angeles and Salt Lake Railroad from Salt Lake City to the Pacific Coast (778 m.).

Clark, William Bullock (1860–1917), American geologist and educator, was born in Brattleboro, Vt. He was graduated at Amherst College in 1884, and studied for several years in Germany and England. After 1887 he was a member of the faculty of Johns Hopkins University, as instructor (1887–92), associate professor (1892–4), and (after 1894) professor of geology. He also became director of the Maryland Weather Service (1891); State geologist of Maryland (1896); commissioner on the re-survey of the Mason and Dixon line (1900), and member of various State commissions. He was assistant geologist (1888–

94), geologist (1894–1907), co-operating geologist (after 1907) on the United States Geological Survey. He was a member of the National Academy of Sciences. He published *Eocene Deposits of the United States* (1891); *Mesozoic Echinodermata of the United States* (1893); *Geology of Maryland* (1906).

Clark, William George (1821–78), English man of letters, was born in Yorkshire. He established the *Journal of Philology* (1868), of which he was one of the editors. He edited the first series of *Cambridge Essays* (1855) and in 1872 published lectures on the *Middle Ages and the Revival of Learning.* The *Cambridge Shakespeare* (1863–6) was planned by him, and was executed with the assistance of Mr. Glover, and later of Aldis Wright. In conjunction with the latter he edited the *Globe Shakespeare* (1864).

Clark, Willis Gaylord (1810–41), American poet and journalist, twin brother of L. G. Clark (q. v.), was born in Otisco, N. Y. He entered journalism in Philadelphia, and owned and edited the *Gazette* of that city at the time of his death. He contributed to his brother's *Knickerbocker Magazine* and other periodicals. His *Literary Remains* (1884) were edited by his brother.

Clark College, a Methodist institution, Atlanta, Ga., founded in 1870, and maintained by the Board of Education of the Methodist Church. A Liberal Arts College, bestows the A.B.; B.S. and B.S. in H.Ec. degrees.

Clarke, Sir Caspar Purdon (1846–1911), Anglo-American art director, was born in London, England, and was graduated from the National Art Training School (1865). In 1870 he went to Italy to superintend reproductions for the Kensington Museum, and later made journeys through Europe and the East. In 1880 he was given charge of the Indian Department of the Museum, and spent several years in India, collecting works of art and superintending exhibitions. He became assistant director of the South Kensington Museum in 1891, and director in 1896; and in 1904 acted as Royal Commissioner to the St. Louis Exposition. He was knighted in 1902. In 1905 he was appointed director of the Metropolitan Museum of Art, New York, a position from which he resigned in 1910 on account of ill health. He was well known as an archæologist and an authority on Oriental textiles, for his architectural ability, and his genius for organization.

Clarke, Charles Cowden (1787–1877), English author, was born in Enfield, and entered into partnership as music publisher with Alfred Novello. He published *Shakespeare Characters* (1863), *Molière Characters* (1865), *Recollections of Writers* (1878), and *The Shakespeare Key* (1879), the last compiled in collaboration with his wife, Mary Cowden Clarke (q. v.).

Clarke, Frank Wigglesworth (1847–1931), American chemist, was born in Boston, Mass., and was educated at Harvard University. He was instructor in chemistry at Cornell University in 1869, and professor of chemistry and physics at the University of Cincinnati from 1874 to 1883, when he was appointed chief chemist of the U. S. Geological Survey and honorary curator of minerals, U. S. National Museum. He was a chevalier of the Legion of Honor, and was for eighteen years chairman of the International Committee on Atomic Weights. In 1901 he was president of the American Chemical Society. He published: *Weights, Measures and Money of All Nations* (1876); *Elements of Chemistry; Constants of Nature* (1873–82); *Recalculation of the Atomic Weights* (1897; new ed. 1910); *Elementary Chemistry* (with L. M. Dennis, 1902); *Data of Geo-chemistry* (1908).

Clarke, Sir George Sydenham (1848–1933), First Baron Sydenham of Combe, English soldier, was born in Lincolnshire. He saw service in Egypt and the Sudan (1882–5), and became an expert in the science of fortification, being intimately connected with the development of coast artillery. He was knighted in 1893; was governor of Victoria, Australia (1901–4); and a member of the Committee on War Office Reorganization (1900–1). In 1904 he was secretary to the Committee of Imperial Defense. From 1907 to 1913 he was governor of Bombay. In 1913 he was created First Baron Sydenham of Combe, and in 1914 was made Director of the Standard Bank of South Africa. He published many works on naval and military subjects.

Clarke, James Freeman (1810–88), American theologian and writer, was born in Hanover, N. H. He was graduated from Harvard (1829), and from the Cambridge Divinity School (1833), and in 1841 assisted in founding the Unitarian Church of Disciples in Boston, Mass., of which he was for many years pastor (1841–50; 1854–88). He was professor of natural theology in Harvard (1867–71), and was lecturer on ethnic religions in the same institution (1876–7). He was an earnest anti-slavery advocate. Among his works are: *The Ten Great Religions* (1871–83); *The Christian Doctrine of Forgiveness of Sin* (1852); *Orthodoxy* (1866); *Steps of Belief* (1870); *Events and Epochs in Religious History* (1881); *Five Sources of Our Knowledge of Jesus Christ* (1888). His *Autobiography* was edited by E. E. Hale.

Clarke, James P. (1854–1916), American legislator, was born in Yazoo City, Miss., was graduated in law from the University of Virginia in 1878, and practised in Helena, Ark. He was elected to the State legislature in 1886 and to the State senate in 1888 (served till 1892; president in 1891), was attorney-general (1892) and governor (1895–7), and served as U. S. Senator until his death.

Clarke, John Hessin (1857–), American jurist and U. S. Supreme Court justice, was born in Lisbon, O. He was graduated from Western Reserve University (1877), was admitted to the Ohio bar, and practised law in Lisbon (1878–80), Youngstown (1880–97), and Cleveland (1897–1914). From 1914 to 1916 he was U. S. district judge for the Northern Judicial District of Ohio. He was also chairman of the Short Ballot Committee in Ohio, and vice-president of the Anti-Imperialist League of that State. In July, 1916, he was appointed by President Wilson to succeed Charles Evans Hughes, resigned, as an Associate Justice of the U. S. Supreme Court. In 1922 he resigned this office to engage in other public work, notably the cause of international peace.

died Mar. 22, 1945.

Clarke, John Mason (1857–1925), American geologist, was born in Canandaigua, N. Y. He was graduated from Amherst College in 1877, and studied at Göttingen University. He was professor of mineralogy and geology at Smith College (1881–4); assistant State palæontologist of New York (1886–94); assistant State geologist (1894–8); State palæontologist (1898–1904); and in 1904 became State geologist and palæontologist and director of the State Museum and Science Department, University of the State of N. Y. His published works include: *Early Devonic History of New York and Eastern North America* (1908), for which he received the Hayden Gold Medal and the Spindiaroff prize of the International Geological Congress; *Sketches of Gaspé; The Magdalen Islands; Heart of Gaspé; Life of James Hall; Organic Dependence and Disease;* and *L'Ile Percée.*

Clarke, John Sleeper (1833–99), American actor, was born in

Baltimore, Md. He made his debut in Boston as Frank Hardy in *Paul Pry* in 1851. The following year he joined the stock company of the Chestnut Street Theatre at Philadelphia; and in 1861 he made his New York appearance as Diggory in *The Spectre Bridegroom.* In 1864–7, with Edwin Booth and William Stuart, he undertook the management of the Winter Garden Theatre. He lived in England from 1867.

Clarke, Mary Victoria Cowden (1809–98), English author, daughter of Alfred Novello, married Charles C. Clarke (q. v.) in 1828. She published in 1845 her well-known *Shakespearean Concordance,* supplemented in 1879 by *The Shakespeare Key,* prepared in collaboration with her husband. She wrote also *Girlhood of Shakespeare's Heroines* (1850), *World-Noted Women* (1857), *My Long Life: an Autobiography* (1896), and a number of novels.

Clarke, Samuel (1675–1729), English divine, was born in Norwich and became chaplain to Bishop Moore (1698). In 1704–5 he delivered his Boyle Lectures on the *Being and Attributes of God,* containing his famous *à priori* proof of the existence of God; also the first statement of the doctrines of the so-called 'intellectual school of ethics,' which maintains that moral laws are as necessary and as incapable of proof as the presuppositions of mathematics. His controversy with Leibniz about 'time' and 'space' (to which Clarke attributed a real existence) appeared in 1717; and in 1721 he published *Three Practical Essays on Baptism, Confirmation, and Repentance.*

Clarke, Thomas Shields (1860–1920), American sculptor and painter, was born in Pittsburgh, Pa. He was graduated from Princeton University (1882), and studied art in New York, Paris, Rome, and Florence. He was a member of the Royal Society of Arts of London and other well-known art societies, and was awarded numerous medals. Examples of his sculpture are the caryatides on the Appellate Court House, New York City, the *Alma Mater* for the Princeton University Campus, and the *Cider Press Monument* in Golden Gate Park, San Francisco. His best known paintings are *A Fool's Fool* (1887) and *The Night Market in Morocco* (1891).

Clark Fork River is formed in western Montana by the confluence of the Flathead and Missoula rivers, and flows northwest through Pend d'Oreille Lake, in Idaho, crosses the northeast corner of Washington, and joins the Columbia River just across the Canadian border. With the Missoula, its length is about 700 miles.

Clarks'burg, city, West Virginia, county seat of Harrison county, on the Monongahela River, and the Baltimore and Ohio Railroad; 60 miles s.w. of Wheeling. Manufactures include iron and tin plate, chemicals, glass, tableware, and woolens. Pop. (1930) 28,866; (1940) 30,579.

Clarksdale, city, Mississippi, county seat of Coahoma county, at the head of navigation on the Sunflower River, and on the Yazoo and Mississippi Valley Railroad; 76 miles south of Memphis. The chief industries are the production of long staple cotton and allied businesses and industries. Pop. (1930) 10,043; (1940) 12,168.

Clark'son, Thomas (1760–1846), English anti-slavery advocate, was born in Wisbech, Cambridgeshire. His attention seems first to have been directed to slavery by the composition of a Latin essay on the theme, *'Anne liceat invitos in servitutem dare?'* in 1785 and thereafter he devoted himself to the crusade against it. On March 25, 1807, the bill for the abolition of the slave trade received the royal assent; but slavery still remained in the West Indies, and in 1823 the Anti-Slavery Society was formed, Clarkson and Wilberforce (q. v.) being vice-presidents. Before the struggle ended in the Emancipation Bill of 1833, Clarkson was stricken with temporary blindness. He wrote *History of the Abolition of the Slave Trade.*

Clarks'ville, town, Arkansas, county seat of Johnson county, on the Missouri Pacific Railroad; 100 miles n.w. of Little Rock. The Little Rock-Fort Smith Highway passes through the town. It is the seat of the College of the Ozarks. Pop. (1930) 3,031; (1940) 3,118.

Clarksville, city, Tennessee, county seat of Montgomery county, on the Cumberland River, and on the Louisville and Nashville and the Tennessee Central railroads, and a line of river packets; 45 miles n.w. of Nashville. Here is located the Southwestern Presbyterian University. Pop. (1930) 9,242; (1940) 11,831.

Clark University, an institution of higher education for men and women, in Worcester, Mass., founded in 1887 by Jonas Gilman Clark (q. v.). It opened in October, 1889 and consisted at first of a group of eight closely related departments—mathematics, physics, chemistry, biology, psychology, pedagogy, economics and sociology, and history. Only college graduates or those of equivalent attainments were admitted as regular students. In 1902 a bequest of $1,300,000 from the founder was devoted to the establishment of an independent collegiate department for men (known as Clark College), with a course covering three years and leading to the degree of B.A. In the academic year 1921–2 the university was reorganized, the two separate faculties being united in a single body. At the same time a Graduate School of Geography was established. A Summer School was also opened in 1921. In September, 1922 the requirements for graduation were increased and a four-year course became the normal one leading to the degree of Bachelor of Arts. In 1936, work leading to the degree of Master of Arts in Education was introduced. The Graduate Division of International Affairs began work in the fall of 1941. A department of instruction in fine arts was organized in 1940 and the Division of Business Administration early in 1941. In 1941, the Women's College of Clark University was authorized by the Board of Trustees, and a limited number of women were admitted in the fall of 1942.

Classical Studies, American School of, at Athens, Greece, an institution devoted to the study of Greek languages, literature, and archæology, was founded in 1882 by the Archæological Institute of America (q. v.). It is supported by contributions from American universities and colleges, from which its students are largely drawn. It has carried on important excavations at Eretria, Argos, and Corinth.

Classics. This term, as applied to literature, is derived from the division of the ancient Roman people in the *comitia centuriata* (assembly by centuries) into five classes, on the basis of property in land. The term *classicus* was especially applied to the first. Aulus Gellius (second century A.D.) was the first to use the term 'classic' of the great writers of Greece and Rome; but from his time it was regularly employed to describe those authors. The classical period of Greek literature extends from the time of Homer. It embraces Hesiod; the lyric poets (of whose works, except in the case of Pindar and Bacchylides, little survives); the dramatists Æschylus, Sophocles, Euripides, and Aristophanes; the historians Herodotus, Thucydides, and Xenophon; the orators Antiphon, Lysias, Andocides, Isocrates, Isæus, Æschines, Lycurgus, Hyperides, and Demosthenes; the philosophers Plato and

Aristotle; and it ends about the time of the death of Alexander the Great, in 323 B.C. Many writers who would have earned the title of classics are lost—*e.g.* Agathon, Eupolis, Sappho, Alcæus, Menander, and Empedocles; others of later date deserve to be included—*e.g.* Theocritus, Plutarch, Lucian, and Longinus. The classical age in Latin literature falls into the first century before Christ and the first after. The great prose authors are Cicero, Cæsar, Sallust, Livy, Tacitus, the Plinys, and Quintilian; the great poets, Lucretius, Catullus, Propertius, Tibullus, Horace, Virgil, Ovid, Lucan, Martial, Persius, Statius, and Juvenal. Of earlier date are the dramatists Plautus and Terence, and later the poets Silius Italicus, Ausonius, and Claudian. The term 'classic' has always been held to connote perfection of literary form combined with excellence of matter; hence such authors as Polybius, Dion Cassius, and Pausanias have been omitted from the Greek, and Cato, Varro, and Suetonius from the Latin list. The term 'classics' is now also used of the great authors of any language whose works fulfil the above-named conditions, such as Shakespeare, Milton, Dryden, of the English writers; Corneille, Racine, Molière among the French; Schiller and Goethe among the Germans; and Dante, Petrarch, Tasso, and Ariosto among the Italian writers.

Classification, an arrangement of a number of things into groups or classes, such that the members of any group resemble each other in one or more respects (possess a common quality), while differing in the same respects from the members of the other groups. Since there must be some fundamental resemblance among, or quality common to, all the things classified, in virtue of which we can regard them together, the classification is at the same time a *division* of the comprehensive class constituted by this common quality; that is to say, the genus to which all the things belong is divided into its several species. A classification is said to be 'natural' in proportion as it is based on the intrinsic nature of the things classified, 'artificial' in proportion as the principle or point of view which determines the classification is extrinsic to their real or proper nature, and so more or less arbitrary.

Clastic, a term applied by geologists to materials which have been produced by the disintegration of rock masses. Sands, clays, and gravels are of clastic origin, and the rocks which they form are known as clastic rocks. This group of rocks is also known as *sedimentary, fragmental,* or rocks of *derivative* origin, as they have been derived from the breaking up of older rocks. The processes by which clastic sediments are produced are known as denudation. A classification of this group of rocks, by Prof. A. W. Grabau, makes the following subdivisions, based upon the agency chiefly instrumental in their formation:—*pyroclastics,* of igneous origin; *autoclastics,* crush rocks, fault breccias; *anemoclastics,* wind deposits; *atmoclastics,* disintegrated material by weathering; *hydroclastics,* water-deposited sediments; *bioclastics,* organic influence, artificial stone.

Claude, klōd, JEAN (1619–87), French Protestant divine, was born in Sauvetat-du-Droit. He was successively pastor of Nîmes (1654), Montauban (1662), and Charenton (1666), where he continued till the revocation of the Edict of Nantes (1685), when he was banished, but was sheltered at The Hague by the Prince of Orange. His principal works are *Défense de la reformation* (4 vols. 1671) and *Plaintes des protestants cruellement opprimés dans le royaume de France* (1686).

Claudel, PAUL (1868–   ), French poet and diplomat, was born in Villeneuve-sur-Fin. He was educated at the Lycée Louis-le-Grand and in 1892 entered the consular service, being sent to the East as consul successively in Foochow, Shanghai and Tientsin. He served as secretary in Peking, was ambassador to Tokyo in 1921–1926, and in 1927 became ambassador to the United States. He has contributed to the *Nouvelle revue française* and has written many poems and plays, which latter are characterized by a somewhat vague mysticism. His published works include *Connaissance de l'est* (1900); *La jeune fille* (1901); *Cinq grandes odes* (1910); *L'annonce faite à Marie* (1921); *Deux poemes d'été* (1914); *Poemes de guerre* (1915); *Le pain dûr* (1918); *La messe la-bas* (1919); *L'ours et la lune* (1919); and *Feuilles de saints* (1926).

Claude Lorrain, klōd lō-rān′, or DE LORAIN (1600–82), French landscape painter, whose real name was CLAUDE GELÉE, was born in Chamagne in Lorraine. He was taken to Rome in 1613, where after 1627 he spent the rest of his life. He effected a great revolution in art by being the first to study the introduction of 'sunshine effects' in a natural manner. He was accompanied, on one of his expeditions to Tivoli, by Poussin, by whom he was influenced in his early work; but his study of sunshine in Italy changed his cool blue tones to a richer mellowness. According to Constable, 'Claude's exhilaration and light departed from him when he was between fifty and sixty. After he became a professor of the "higher walks of art," he fell in a degree into the manner of the painters around him.' He had many patrons—Pope Urban VIII. and his three successors, Cardinal Mazarin, and the Duke of Bouillon: and in 1644 suffering much at the hands of forgers, in order to keep a record of his pictures, about four hundred in number, he prepared his *Liber Veritatis* outline drawings in bistre of all his paintings, which is now in the possession of the Duke of Devonshire. England is rich in Claude's works, nineteen paintings being in the National Gallery, London; others are in Dulwich, Windsor, the South Kensington Museum, and 270 drawings in the British Museum.

Claudianus, klō-di-ā′nus, CLAUDIUS (fl. *c.* 400 A.D.), the last of the Roman classic poets, was almost certainly a native of Alexandria. Stilicho was his patron. Under the emperors Arcadius and Honorius—who erected a statue to him in the forum of Trajan—he bore the titles of *notarius* and *tribunus*. The last historical allusion in his works refers to the year 404. His works consist largely of panegyrics on the emperors and their favorites; there are one book of an epic on the war against Gildo, seven short poems on natural history subjects, and three books of an unfinished epic on the rape of Proserpine—his chief work. Though he displays great learning and command of language, united to brilliancy of imagery and rhetorical power, he lacks the true simplicity of nature and genuine feeling. Among recent editions are those of Birt (1892) and Koch (1893); a complete English verse translation was published by A. Hawkins (1817). Consult J. W. Mackail's *Latin Literature.*

Claudius, klô′di-us, the name of a distinguished Roman clan. The Claudian clan has been generally represented as displaying great haughtiness and patrician hostility to the commons; but Mommsen maintains that they were readier to lead the people than to restrain them, and were rather reformers than obstinate conservatives. The most noteworthy members of this clan were:—(1) APPIUS CLAUDIUS REGILLENSIS SABINUS, leader of the commission of ten which framed the Twelve Tables, the first Roman code of law. His downfall may have been due to his attempt to seize the beautiful maiden Virginia; for he was impeached by Virginius, and either committed suicide or was executed in prison by order of the tribunes. (2) APPIUS CLAUDIUS CÆCUS, censor in 312, consul in 307 and 296 B.C. The story that he was blind is doubtful. In his censorship he built the Appian aqueduct and began the Appian Way. As censor, he introduced men of the popular party into the senate, and enrolled freedmen in all the tribes—both democratic measures. In 296 as consul, and in the next year, as prætor, he gained victories over the Etruscans and Samnites. When an old man, in 280 B.C., by a vigorous speech he dissuaded the senate from accepting the terms offered by Cineas from Pyrrhus. (3) PUBLIUS CLAUDIUS PULCHER, usually known as Clodius, tribune of the people in 58 B.C., was the persistent enemy of Cicero, whose evidence had disproved a plea of *alibi* brought forward by him when tried on the charge of profaning the mysteries of the Bona Dea in 62. In revenge he secured Cicero's banishment in 56. For some years after that he was prominent in causing disturbances at Rome; he and his chief enemy Milo were regularly attended by armed bands of gladiators. At last, in January, 52, he met his death in an affray between his followers and Milo's near Bovillæ, on the Appian Way.

Painting by Claude Lorrain: David at the Caves of Abdullah, Metropolitan Museum, New York City

Claudius (10 B.C. to 54 A.D.), Roman emperor from 41 to 54 A.D., whose full name was TIBERIUS CLAUDIUS DRUSUS NERO GERMANICUS, was the younger son of Drusus, brother of the Emperor Tiberius and of Antonia, and was born in Lyons. He is represented as the laughing-stock of the imperial family; and it was only when he became emperor, in 41 A.D., that he took any part in public affairs. The chief event of his reign is the conquest of Britain in 43. His two marriages were most unfortunate. His first wife Messalina, of notorious fame, was executed for scandalous infidelity and treason. She was succeeded by the younger Agrippina, who is generally believed to have murdered him.

Claudius II. (214–270), emperor of Rome (268 to 270 A.D.), whose full name was MARCUS AURELIUS CLAUDIUS GOTHICUS, was descended from an obscure family of Dardania or Illyria, and gained his elevation by his military talents. He is believed to have been one of the conspirators who murdered Gallienus, and whom he succeeded. His short reign was distinguished by two great victories—the first over the Alemanni, who had invaded Italy, in a battle fought near the Lago di Garda; the second over a huge host of Goths, who were besieging Thessalonica, in a battle near Næssus in Dardania (269 A.D.). He died in Sirmium in 270.

Claudius, MATTHIAS (1740–1815), German author, was born in Reinfeld Holstein. He was educated at Jena but spent most of his life in the little town of Wandsbeck, near Hamburg, and there edited the *Wandsbecker Bote* (1771–75). The poems, tales, and letters which he contributed to that periodical were collected in his *Asmus omnia sua secum portans, oder sämmtliche Werke des Wandsbecker Boten* (1775, 1779–1812; new ed., 2 vols., 1902). In 1814 he removed to Hamburg to the house of his son-in-law, Friedrich Christoph Perthes, the publisher, where he died. His works show his kindly humor and orthodox piety, with a leaning to mysticism. His language was suited to simple folk, among whom the *Bote* rapidly became popular, and it was he who succeeded in making them appreciate Lessing and Goethe. Several of his songs are still heard. A selection from his works has been edited by Sauer (*Der Göttinger Dichterbund*, 1887–95, pt. iii.), and another by Karl Gerok (3d ed. 1903). There is a selection of his works in English, *Claudius, or the Messenger of Wandsbeck.*

Claus, EMILE (1849–1924), Flemish painter, was born in Vive Saint-Eloi. His love of open air painting brought him into conflict with traditional teaching, and his work from 1874-89 bears witness to the development of his independent efforts. He became popular as a painter of children. His *Cock Fight in Flanders*(1880)shows truthful realism and keen characterization. His matured talent shows itself in *The Old Gardener* (Liege) and the *Flax Weeder*(Antwerp), with admirable play of light and atmosphere. See the *Studio*, vol. xvii. (1899); R. Muther's *History of Modern Painting* (1895).

Claus, KARL FRIEDRICH WILHELM (1835–99), German zoölogist, born at Kassel, studied at Marburg and Giessen, was successively professor of zoölogy and comparative anatomy at Würzburg (1860), Marburg (1863), Göttingen (1870), and Vienna(1873). Claus made a special study of the Invertebrata, especially Crustacea and Cœlentera, and wrote *Untersuchung der genealogischen Grundlage des Krustaceensystems*(1876); *Untersuchungen über die ... Medusen* (1883); *Ueber die Wertschützung der natürlichen Zuchtwahl* (1888), etc. See his *Autobiography*(1899).

Claus, SANTA. See CHRISTMAS.

Clausel, or CLAUZEL, BERTRAND (1772-1842), marshal of France, born at Mirepoix, and served under Napoleon in the Italian and Austrian campaigns (1807-9). Proscribed by Louis XVIII. after the fall of Napoleon, he came to the U. S. and lived in Mobile for several years, writing during his residence there his *Exposé justificatif*. He returned to France on receiving an amnesty (1819), and was sent to Algeria as governor (1835). See *Observations du Général Clausel* (1830); *Nouvelles Observations* (1833); *Explications du Maréchal Clausel* (1837).

Clausen, GEORGE (1852), realist painter, called the Bastien-Lepage of England, born in London, devotes himself to painting impressions of rural life and study of sunlight direct from nature. In 1886 he joined Holman Hunt and Walter Crane in their crusade against the Royal Academy, and was one of the founders of the New English Art Club. In 1890, however, he was elected associate, and the same year the *Girl at the Gate* (Tate Gallery) was bought by the Chantry Bequest. From 1873-5 he held a South Kensington scholarship, learning his vigorous brushwork at Antwerp, and the refinements of modelling in France. At the Royal Academy (1905) he exhibited *The Ploughman's Breakfast*, *The Listener*, and *A Morning in June*.

Clausewitz, KARL VON (1780–1831), Prussian general and military writer. Born at Burg, he saw service with the Prussian and Russian forces (1793-1813). For some years he was director of the Academy of War at Berlin (1818-30) and inspector of artillery (1830), doing much to increase the efficiency of this branch of the service. His *Vom Krieg*, 'On War' (1843; new ed. 1880), is a standard work. Another work, *Nachrichten über Preussen in. . . . 1806*(1888), is also of considerable value. His writings have been republished as *Hinterlassene Werke über Krieg und Kriegführung* (1832-7). See *Life* in German by Schwartz(1877)and by Von Bernhardi (1878).

Clausius, RUDOLF (1822–88), German physicist and mathematician, born at Köslin (Pomerania), became professor of physics at Zurich (1855), at Würzburg (1867), and at Bonn (1869). In optics and electricity he made valuable discoveries, and his investigations on heat place him among the founders of the science of thermo-dynamics. His chief work is *Abhandlungen über die mechanische Wärmetheorie* (1864–7), trans. into English by Dr. T. A. Hirst (1867). The revised 2d German ed. of 1876–9 was also translated by W. R. Browne (1879) as *The Mechanical Theory of Heat*. There are separate eds. of vol. i., *Die mechanische Wärmetheorie* (new ed. 1887) and of vol. iii., *Die kinetische Theorie der Gase* (1889-91). Clausius also wrote *Die Potentialfunction und das Potential* (1859; 4th ed. 1885); *Ueber die bewegende Kraft der Wärme* (1898). See *Life*, in German, by Riecke (1889).

Clavenna, Italy. See CHIAVENNA.

Claverack, tn., Columbia co., N. Y., 32 m. s. of Albany, on the Boston and Albany R. R. It is the seat of Hudson River Institute. Knit goods are manufactured. It is a very old town, having been settled by the Dutch in 1660, and has many objects of historic interest and a public library. Pop. (1910) 4,114.

Claverhouse. See DUNDEE, VISCOUNT.

Claveria, pueb., Cagayan prov., Luzon, Philippines, the most N. pueb. of the isl., 36 m. by water W. of the mouth of the Cagayan Grande, the nearest point which has road communications and a telegraph station. Pop. (1903) 5,472.

Clavichord, an obsolete musical instrument, often confounded with the harpsichord and spinet. Its strings were set in vibration by brass tangents pressing upwards against the strings, instead of being plucked, as in the case of the other instruments named. See PIANO.

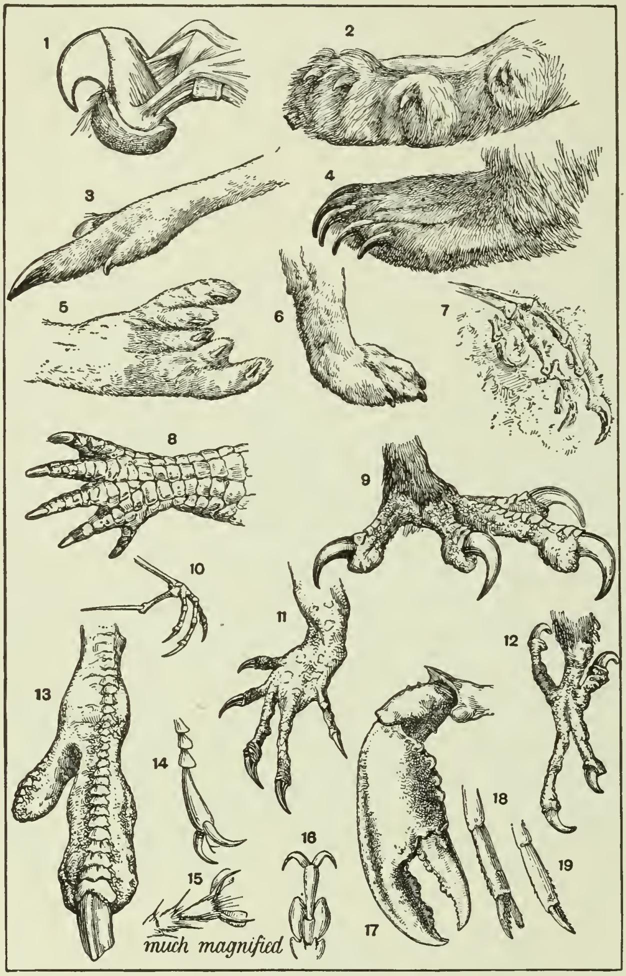
Clavicle, or COLLAR-BONE, a long bone, lying almost horizontally between the upper end of the sternum or breast-bone and the acromion process of the shoulder-blade. It lies above, and partially in front of, the first rib, and its special function is to act as a fulcrum to the upper extremity, making lateral motion of the arm possible. Injuries to the clavicle are fracture and dislocation. The treatment, briefly, is to bring the parts, whether dislocated or fractured, into proper position by bracing the shoulder back, and by manipulation, and to keep them in place by supporting the arm and fixing the shoulder.

Clavicornia ('club-horned'), a name given by entomologists to a series of beetles having club-shaped antennæ. The group includes the burying-beetles.

Clavier, the name given to a pianoforte by the Germans, and to the keyboard of a piano or organ by the French.

Clavigero, FRANCISCO XAVIER (1731–87), Spanish-Mexican historian, born at Vera Cruz; became a Jesuit, and devoted his life to the collection of material for a history of Mexico, which, after the expulsion (1767) of the Jesuits from Spanish territory, he wrote in Italian, and published at Cesena in 1780–1. It was translated into English, under the title of *The History of Mexico*, by Cullen (1787), and was also published in Spanish in London (1826). Clavigero likewise wrote *Storia della California*, published in Venice (1789).

Claws. In the majority of mammals the digits end in more or less sharp and pointed nails called claws or talons, often constituting powerful weapons. In ungulates these are replaced by the hoofs, and in most primates by flattened nails. As weapons, claws are most perfectly developed in the Carnivora, especially in the higher forms—*e.g.* the cat, where they are prevented from becoming dulled by being automatically lifted above the ground by an elastic tendon operating upon the outermost bone of the toe, to which the claw is attached; when the animal wishes to seize its prey it pulls down the bone and claw by contracting a muscular tendon which runs underneath the toe. Such claws are said to be 'retractile.' The kangaroo or great ant-bear can rip open a dog with one stroke of the greatly developed fourth toe, which carries a powerful claw. Claws are always present on the toes of birds; in Archæopteryx they were also present on all three fingers in the adult. By analogy, the term 'claw' is also applied to similar types of weapon in the invertebrates — *e.g.* the claws of crustaceans, of insects and so on. In these cases the claw is the actual extremity of the limb, and not a tegumentary appendage of the limb, as in vertebrates. In vertebrates claws first appear in certain amphibians, but above amphibians are always present, save where the adaptation of the limb to some special function has caused their suppression or modification.



Types of Claws.

1. Lion, details of single retractile claw. 2. Lion, right fore paw with the claws lifted and sheathed in the skin. 3. Great gray kangaroo. 4. Brown bear. 5. Seal, left hind foot. 6. Wolf. 7. *Archæopteryx macrocrura* (fossil). 8. Alligator. 9. Golden eagle. 10. Skylark. 11. Water monitor. 12. Macaw. 13. Ostrich. 14-16. Insect claws. 17-19. Lobster, holding claw, and ambulatory claws.

Claxton, Kate (1848), American actress, was born in New York city, and was the daughter of Spencer H. Cone, colonel of the 61st regiment in the Civil War. She made her début with Lotta at Chicago in 1870, and soon afterward joined Augustin Daly's stock company at the Fifth Avenue Theatre, New York. In 1872 she became a member of A. M. Palmer's Union Square company. Her greatest success in this company was as Louise in *The Two Orphans*, a part identified with her name, and in which she acted for several years. Miss Claxton began touring as a star in 1876. In 1878 she married, for her second husband, Charles A. Stevenson. Died May 5/1924

Clay, a mineral occurring in the form of a fine earthy powder, very rarely in definite plates or crystals, and consisting essentially of hydrous silicate of alumina ($H_4Al_2Si_2O_9$). It is insoluble in acids, but dissolves slowly in boiling caustic alkalis. Kaolin is the result of the decomposition of feldspar in granitic rocks under the action of the atmosphere and other agencies. China clay is the purest form of the mineral. Natural clays are mostly very impure. In fact, the name 'clay' is often given to any kind of fine rock detritus, and does not necessarily imply that kaolin, or china clay, is present in any quantity. This mineral is the basis of an immense industry including the manufacture of brick, terra cotta, stoneware, pottery, china, and many related wares. The product exceeds $100,000,000 each year in U. S.

Clay, Alexander Stephens (1853), American legislator; was born in Cobb co., Ga.; graduated at Hiawassee College in 1875; admitted to the bar in 1877; served in both branches of the legislature (also as speaker and president); elected U. S. Senator (Dem.) in 1896 and 1903. died 1910

Clay, Cassius Marcellus (1810–1903), American political leader and reformer, born in Madison co., Ky., the son of Green Clay (1757–1826), who distinguished himself at Ft. Meigs (q. v.) during the War of 1812. The son graduated in 1832 at Yale, where he became an ardent abolitionist, which fact soon proved a fatal handicap to him as a politician in Ky., preventing his re-election (1841), after having served two terms, as a member of the state legislature. In spite of bitter opposition, he established (1845) at Lexington, Ky., an anti-slavery journal, the *True American*, which, however, he was soon forced by mob violence to remove to Cincinnati, O. He believed rather in meeting force with force; and in the period before the Civil War he took part in various duels and personal conflicts. In the Mexican War he served in the Southern campaign under Gen. Scott as a captain of a cavalry company. He was an anti-slavery candidate for governor of Ky. in 1850, and after 1856 was a prominent member of the newly organized Republican Party. He was U. S. minister to Russia (1861–2 and 1863–9); during part of the Civil War (1862–3) he was a major-general of U. S. volunteers, but saw no active service; in 1872 he was prominent as a Liberal Republican, and subsequently until 1884, when he rejoined the Republican ranks, he identified himself with the Democratic Party. Consult his autobiography, *The Life, Memoirs, Writings, and Speeches of Cassius M. Clay* (1886).

Clay, Frederick (1839–89), English operatic composer, born at Paris. Besides numerous operas, he wrote two cantatas and many songs, among which are *She wandered down the Mountain Side, I'll Sing Thee Songs of Araby,* and *The Sands of Dee.*

Clay, Henry (1777-1852), American orator and statesman, born in a district called 'The Slashes' in Hanover co., Va., on April 12, 1777, the son of John Clay, an eloquent but undistinguished Baptist clergyman, who died in 1781, leaving his family in reduced circumstances. Henry received little schooling, owing to the necessity of his contributing to the support of the family. For several years he was a clerk in the High Court of Chancery at Richmond, and as such came under the influence of George Wythe, the chancellor of the court, and was thus led to study law. He was admitted to the bar in 1797, and in practice at Lexington, Ky., met with immediate success, one of his cases being the defence of Aaron Burr at Frankfort in 1807. From the first, however, his chief interest was in politics. He was a member of the Ky. Constitutional Convention of 1799, in which he vigorously but without avail advocated the prohibition of slavery within the state; he was elected to the lower house of the state legislature in 1803, and in 1806–7 he filled out the unexpired term of John Adair in the U. S. Senate, in which he began his long fight in behalf of internal improvements. In 1808–9 he was again a member of the lower house of the Ky. legislature, of which he was speaker in 1809, and in 1810–11 of the U. S. Senate, in which he was prominent in debate and first attracted general attention as an advocate of the protection of American industries. He was then a member of the national House of Representatives (1811–21 and 1823–5), serving as speaker in 1811–14, 1815–20, and 1823–5. He was the leader of the group of younger members, including Calhoun and Lowndes, who urged the adoption of an aggressive policy toward Great Britain, and the declaration of war in 1812 was probably due more to his influence than to that of any other one man. In 1814 he was one of the negotiators of the Treaty of Ghent bringing the War of 1812 to a close. In 1824 he was one of the four candidates, all nominally Democrats, for the presidency, and when, no one having received a majority of the electoral votes, the House of Representatives was called upon to select one of the three who stood highest—Adams, Jackson, and Crawford—Clay was largely instrumental in securing the election of Adams. Adams soon afterward made Clay his secretary of state, and the two were virulently, but, as is now admitted, quite unjustly accused of having made a corrupt bargain—Clay, angered by the charge, fighting a bloodless duel, one of several fought by him, with perhaps his bitterest accuser, John Randolph of Roanoke. Clay's term as secretary of state (1825-9) was marked principally by the bitter controversy concerning the Panama Congress (q.v.), which he strongly favored. He subsequently was a member of the U. S. Senate from 1831 to 1842 and from 1849 until his death, at Washington, on June 29, 1852. After 1824 Clay's career was characterized by an almost unremitting struggle for the presidency, which he eagerly coveted. At first a Democrat (nominally), he broke personally and politically with Jackson, the leader of the Democrats, who deeply resented Clay's opposition to him in the contest of 1824; and toward the close of Adams's administration, he, with Adams, stood at the head of the National Republicans (q.v.). Later he naturally joined the Whigs, a large element of whom constantly looked to him as their leader. In 1832 he was the National Republican candidate for the presidency, but was defeated, chiefly on the bank issue, by Jackson. In 1840 he was defeated for the Whig nomination by Wm. H. Harrison, who was chosen on the score of 'availability,' Clay's superior claim, on other grounds, to such recognition being conceded. In 1844 Clay, again nominated by his party, was defeated by the Democratic candidate James K. Polk, his defeat being due primarily to his attitude with regard to the annexation of Texas, which drove into the ranks of the Liberty Party many who otherwise would have voted for him. In 1848 he failed to secure the nomination, Zachary Taylor being considered a more available candidate.

Clay is remembered, however, not so much for his long and unsuccessful struggle for the presidency, as for his extremely important services in Congress. These were connected primarily with two subjects — protection and the great slavery contest. From the beginning he favored protection—some of his speeches being veritable storehouses of arguments for protectionists—and his name is inseparably connected with the history of what he himself made known as the 'American System.' As regards slavery he, perhaps because from a border state, took a middle ground, pleasing neither side. He regarded slavery as grievously wrong in principle and injurious in its effects, the 'deepest stain,' he said, 'upon the character of the country'; but on the other hand he had no sympathy, rather distrust and dislike, for the Abolitionists and their propaganda. His position between the two extremes, however, though it lost him adherents both in the South and the North, enabled him to play a part as mediator, which was peculiarly congenial to his temperament and to which he was impelled primarily by his passionate love for the Union. In this rôle, indeed, he was so conspicuous that he has become known as 'The Great Pacificator.' He favored, but did not originate, as is often said, the Missouri Compromise of 1820, and in 1821 he suggested and more than any one else brought about the settlement of the difficulty concerning the actual admission of Missouri as a state. (See Missouri Compromise.) In 1833, when relations between the Federal government and S. C. were critical, he originated and secured the adoption of the compromise tariff of 1833 (See Nullification); and in 1850 he proposed in their original form, and more, probably, than any one else secured the passage of the measures which constituted the famous Compromise of 1850 (q.v.).

With Webster and Calhoun, Clay formed the great triumvirate of what has been called 'the golden age of American oratory.' By temperament and by training, by nature, also, which gave him an attractive presence and a wonderful voice, he was a great orator, one of the greatest whom America has produced; but his eloquence lives only in tradition, and his printed speeches often betray a certain superficiality of thinking and of research, and for the most part make dull and tedious reading. His personality was engaging; he attached people to him by a certain indefinable magnetism, and during his lifetime he was unquestionably more popular in the country as a whole than were any of his great contemporaries. Consult Colton (ed.), *The Works of Henry Clay* (last ed. 7 v. 1898), which also contains a biography; and Schurz, *Henry Clay* (2 v. 1887), in the American Statesmen Series.

Clay Center, city, Kan., co. seat of Clay co., 80 m. w.n.w. of Topeka, on the Republican R., and on Chi., R. I. and Pac. and other R. Rs. The manufactures include tanks, flour, brooms, brick, cigars, and iron goods. Pop. (1910) 3,438.

Clay Ironstone is a variety of

spathic or carbonate iron ore. It occurs in beds in the Carboniferous and other formations, and consists of the mineral siderite in finely granular condition, or in nodules and concretionary masses mixed with clay and other impurities. It is of various shades of gray or brown, and, when exposed to the atmosphere, weathers on its surface to a red, rusty-looking substance. Sometimes it contains a considerable amount of admixed coal, and as it is then black in color it is known as blackband ironstone. The blackband ores have been of great economic importance in Pennsylvania and other states of the Appalachian region. As a rock it is characterized by its high specific gravity, which is due to the amount of iron present. These ores are important sources of iron in England, the Cleveland iron ore being a clay ironstone.

Concretions of clay ironstone, known as sphærosiderite, are of frequent occurrence in some kinds of clay and shale. They are due to the aggregation of compounds of iron scattered through the rock around certain centres in a manner not entirely understood. When broken open, they often show a network of cracks filled with white calcite. The shales of the Carboniferous formation are often crowded with them. Not uncommonly they contain in their centre a coprolite, a fragment of a plant, or some other fossil. See Kemp's *Ore Deposits of the United States and Canada* (1903), J. D. Kendall's *Iron Ores of Great Britain and Ireland* (1893), and J. A. Phillip's *Treatise on Ore Deposits* (1884).

Claymore, the two-edged broadsword of the ancient Scottish Highlanders. The term is frequently but erroneously applied to the basket-hilted broadsword introduced in the 16th century, which was frequently single-edged. Officers of the Highland regiments in the British army carry this kind of sword. The claymore was not, except in extraordinary instances, two-handed.

Clay Pigeon. See PIGEON SHOOTING.

Clay-rock, a rock consisting of clay, and occurring in beds from a few inches up to several feet in thickness. It differs from shale in not being laminated or divided into thin layers of leaflets, from clay in being more adherent and harder. It occurs in many of the geological formations, and is perhaps more generally known as mudstone. Often it is colored red by iron oxides, or gray by other impurities. The term marl is sometimes improperly applied to clay-rocks.

Clays, PAUL JEAN (1819–1900), Belgian marine painter, born at Bruges; associated himself with the group of artists that included Stevens, Willems, and Leys, who practically established the modern Belgian school of art, the influence of which has been powerful on European art generally. His strength is especially shown in depicting the beauties of the sea at peace and the poetry of tranquil waters. His best-known pictures include *Dutch Boats in the Flushing Roads* (National Gallery, London), *Festival of the Scheldt at Antwerp* (New York), *Calm on the Scheldt* and *Coast near Ostend* (Brussels), *The Open North Sea* (Munich), and *The Entry of Queen Victoria into Ostend in* 1857.

Clay Soils. Clay is a very important ingredient of agricultural soils, in which it is always mixed with other minerals, its proportion varying within wide limits. Clay soils are moist, and retain their interstitial water when exposed to drought. But clay, when wet, is impermeable to water; hence clay soils do not allow any excess of rainfall to sink readily through them, and are improved by systematic and thorough drainage. Clays are also adhesive, and hard to till, and in consequence they are said to be 'heavy.' On the whole, when properly treated, frost and wind being of inestimable service after rough ploughing in winter, they are fertile. Because they retain so much water they have a high specific heat, and warm only slowly. Hence they are said to be 'cold,' and are usually late soils. See Merrill's *Rocks, Rock Weathering and Soils*, W. Fream's *Soils and their Properties* (1890); R. A. Stevens's *Agriculture* (1903); A. D. Hall's *The Soil* (1903).

Claystone, a name often given by the older geologists to a fine-grained, soft, pale-colored, frequently pink or yellow rock, formed by the weathering of certain igneous rocks, such as andesites and trachytes. Frequently they contain traces of original porphyritic crystals of feldspar, and are then known as claystone-porphyries. Little used of late years.

Clayton, ESTELLE (born Estelle Evesson), American actress and dramatist, was born in New York city, and made her début with a touring company in 1878. She was a member of Augustin Daly's company 1879–80. She is particularly associated with the performances given at the Madison Square Theatre in New York, where she played in *Esmeralda*, *Hazel Kirke*, and *Young Mrs. Winthrop*, also appearing in her own play, *Tric-o-trim*, at the same theatre in 1885. Her plays include a dramatization of *The Quick or the Dead* (1888), *A Puritan Romance* (1897), and the librettos of various operettas, including *Paulita* and *The Viking*. She was married to Charles W. Durant in 1888.

Clayton, JOHN MIDDLETON (1796–1856), American jurist and political leader, born in Sussex co., Del. He graduated at Yale in 1815, studied law in the famous Litchfield Law School, founded by Tappan Reeve, was admitted to the bar in 1818, and practised with much success at Dover, Del., where he also became prominent in politics. He was a member of the state legislature, was secretary of state of Del., and in 1837–9 was chief justice of the state. For many years, also (1829–36, 1845–9, and 1853–6), he was, first as a National Republican and afterward as a Whig, a member of the U. S. Senate. He vigorously opposed the policies of Pres. Jackson, supported the compromise tariff of 1833, and advocated the prosecution of the Mexican War (once begun). From Mar., 1849, until July, 1850, he was secretary of state in the cabinet of Pres. Taylor, and as such negotiated the Clayton-Bulwer Treaty (q.v.) with the British minister, Sir Henry Lytton Bulwer.

Clayton-Bulwer Treaty, a treaty between the U. S. and Great Britain, negotiated in 1850 by Secretary of State John M. Clayton, representing the U. S., and Sir Henry Lytton Bulwer, the British minister at Washington, representing Great Britain. Ratifications were exchanged at Washington July 4, 1850. Great Britain having established a protectorate over the Mosquito Coast in Nicaragua, this treaty was negotiated for the purpose of 'setting forth and fixing' the 'views and intentions' of the two powers with reference to the construction of a ship-canal across Nicaragua, the two powers declaring that neither would 'ever obtain or maintain for itself any exclusive control over the said ship-canal,' and agreeing to cooperate in protecting the canal when completed. By the Eighth Article they also agreed 'to extend their protection, by treaty stipulations, to any other practicable communications, whether by canal or railway, across the isthmus which connects North and South America.' The treaty subsequently gave much dissatisfaction in the U. S., was the subject of prolonged negotiations between the two powers, and was finally superseded by the Hay-Pauncefote Treaty of 1902. Consult Travis, *History of the Clayton-Bulwer Treaty* (1900).

Clayton-le-Moors, par. and tn., Lancashire, England, 1 1-2 m. N.W. of Accrington; has coal mines, cotton mills, calico printing, soap and engineering works. Pop. (1911) 8,871.

Clazomenæ, ancient city in Ionia, on the w. coast of Asia Minor; it was counted as one of the Ionian cities, though its colonists came largely from Cleonæ and Phlius. It was the birthplace of Anaxagoras.

Cleanthes (*c.* 300–220 B.C.),one of the leading Stoic philosophers of ancient Greece, was born at Assos, in the Troad. Coming to Athens, he studied first under Crates and then under Zeno, whom he succeeded as chief of the Stoic school in 263 B.C. He was nicknamed 'the Ass,' as being of a slow intelligence. He died of voluntary starvation in 220.

Clear, isl. and cape, extreme s. of Co. Cork, Ireland, 8 m. s.w. of Baltimore. Fishing forms an extensive industry, but the majority of the inhabitants are engaged in agriculture.

Clearchus, a Spartan, who held various commands in the later years of the Peloponnesian war. For refusing to return home from Byzantium, where he made himself a 'tyrant' after delivering the place from the attacks of the Thracians (403), he was sentenced to death, and therefore attached himself to Cyrus the younger, who was preparing to attack his brother Artaxerxes, and raised a large force of Greek mercenaries to support him. In command of these he marched into Upper Asia in 401 B.C., and aided Cyrus in the battle of Cunaxa, in which Cyrus himself fell. He was treacherously assassinated by Tissaphernes, the Persian satrap. It was this Greek force which formed the Ten Thousand, whose retreat through Asia is told in Xenophon's *Anabasis*.

Clearfield, bor., Pa., co. seat of Clearfield co., 90 m. N.E. of Pittsburg, on w. branch of Susquehanna R., and on the Buff., Roch. and Pitts., the N. Y. C. and H. R. and the Pa. R. Rs. The chief industries include agriculture, the manufacture of flour, lumber, leather, and fire-brick, and coal mining and limestone quarrying. Pop. (1910) 6,851.

Clearing House. In the ordinary course of business a modern city bank daily receives checks drawn upon other banks; checks drawn upon it are deposited with other banks. To obviate the inconvenience and risk that would attend the direct settlement of reciprocal claims, the banks in most important cities of America and Europe have formed associations which provide a common meeting place, called a clearing house, where clerks are sent daily from each bank to present claims upon other banks in the association, and to settle claims upon it presented by such banks. The principle of settlement is simple: Each bank sends to the clearing house all checks drawn upon other banks; these are assorted, and a list is made showing what sum the bank claims from every other. The aggregate of claims represents the credits of the bank in the day's clearing house transactions. The bank then receives from the other banks lists of claims upon it, the aggregate representing the debits of the banks. After due examination by representatives of each bank of the separate items in the claims upon it presented, the credits and debits are balanced. In case the debits of a bank exceed its credits, it is required to pay the balance to the manager of the clearing house, who in turn pays the creditor banks the balances due them. By this method an enormous volume of claims is settled with very little shipping of actual money from bank to bank. In New York city the balances to be paid in cash seldom amount to 5 per cent. of the aggregate claims settled. The advantages of the system are such that the associated banks, through their power to expel members, and to refuse the privilege of clearing through members, are able to control in large measure the policy of all the banks in a city.

Membership in the clearing house association is subject to varying rules in the different cities. An annual membership fee, graded according to the capital or the business of a bank, is charged, the sums thus obtained being used for the maintenance of the clearing house. With the consent of the association, a bank not entitled to membership may have its checks cleared through a bank enjoying that privilege.

The same principle has recently been adopted in the stock and produce exchanges of some of the more important cities. A broker may buy and sell the same stock or produce; through a simple adjustment he may drop out of the transaction altogether, the broker of whom he purchased the stock or produce delivering directly to the broker to whom it was sold. Or broker A may have sold certain securities to B, who sells them to C, who later in the day sells them to A. In this case the transactions cancel, except for differences in price, which are easily adjusted. Such practices have of course been employed ever since the organization of exchanges; they have merely been systematized by the adoption by the exchanges of the clearing system. See BANK.

Clearing-nut, an Indian name for the nut of *Strychnos potatorum*, a plant belonging to the same genus as the nux vomica. If the seeds are rubbed on the inside of an unglazed earthen vessel containing muddy water for a minute or two, the water becomes clear by the deposition of impurities. This is due to the presence of albumin and casein, which act as fining agents, like the analogous agents employed for wine and beer.

Clear Lake, a lake in the N.W. part of California. It is irregular in shape, tapering down from a width of 10 m. at its upper end, and is about 23 m. long, extending N.W. and S.E. It is situated in Lake co.

Clearwing, a moth of the Sesiidæ, a family of moths remarkable for translucent wings. Many of the clearwings show a striking resemblance to bees, wasps, and flies.

Cleat, a block of wood bolted to the vertical member of a timber structure to support the foot of a diagonal strut, or to afford a bearing for a subsidiary beam. In ships, an attachment of wood or metal to which ropes are made fast.

Cleavage is the property possessed by certain minerals and rocks of splitting readily in certain directions, and yielding in consequence thin plates or fragments which have a smooth surface. The cleavage of crystals is quite distinct from that of rocks, and the two must not be confounded, as the resemblance between them is only superficial. Cleavage in minerals depends on the regular disposition or arrangement of the molecules of which a crystal is built up. It is as natural a property of mineral as its color. Some crystals possess almost no cleavage (tourmaline, garnet, quartz). Mica, on the other hand, has a very perfect cleavage, and can readily be split into thin plates which have a smooth and glancing surface. Other minerals cleave in two, three, or even more directions—*e.g.* calcite, fluor-spar, rock-salt, anhydrite. The planes of cleavage are always intimately connected with the crystalline structure of the mineral, and are, in fact, always parallel to possible or actual faces of the crystal.

The cleavage of rocks is also known as slaty cleavage. A slate can be split into thin slabs, which, as a rule, are not parallel to the bedding-planes, but inclined to them at high angles. When the beds are of uniform composition and the cleavage very facile, large thin slabs may be obtained, as in the slates of Vermont, but in most cases the cleavage is rude, and the fragments more or less irregular in shape. The origin of slaty cleavage has been much discussed by geologists. Some regard it as due to a crystalline structure in the rock, an incipient foliation; but the experiments of Tyndall and others have shown that it can be produced artificially in such a substance as beeswax by subjecting it to pressure acting uniformly in a certain direction, and may be interpreted as a mechanical orientation of particles, or perhaps the development of shear planes so closely set as to produce the same effect. Where slates exhibit cleavage, they are mostly thrown into close-packed folds (see ANTICLINE, ISOCLINAL STRATA), and this indicates that compression has taken place in a direction at right angles to the axes of the folding. See Bulletins 239 and 241, U. S. Geol. Survey (1905), for rock cleavage.

Cleaveland, MOSES (1754–1806), American settler, was born in Canterbury, Conn., and graduated (1777) at Yale. He studied law and practised at Canterbury until 1796, with the exception of several years' service in the Continental army, in which he was captain of an engineering company. In 1796, as a shareholder in the Connecticut land company, purchasers of Connecticut's share of the Western Reserve, he was appointed to supervise the survey of the allotted tract and to negotiate with the Indians. His expedition for the most part sailed by way of the Great Lakes. After negotiations with the Indians Cleaveland decided (July 22, 1796) upon a site for a city on the shore of Lake Erie at the mouth of the Cuyahoga R., the party naming the new town Cleaveland in their leader's honor. The spelling 'Cleveland' was adopted in 1830.

Cleaveland, PARKER (1780–1858), American mineralogist, was born at Rowley, Mass., and graduated (1799) at Harvard. He was appointed (1805) professor of mathematics and natural history at Harvard, and lecturer on chemistry and mineralogy in Bowdoin College, retaining this position until his death. Prof. Cleaveland declined the presidency of Bowdoin in 1839, and refused numerous offers from other institutions of learning. He made extensive studies of the mineralogy of the White Mountains, and his *Mineralogy and Geology* (1816; enlarged eds. 1822 and 1856) established his reputation as the pioneer mineralogist of the country.

Cleavers, or GOOSE-GRASS (*Galium aparine*), is a naturalized annual plant recognized by its prickly stem and whorled leaves, and by its little fruits, which are armed with hooked prickles that cause them to adhere to the clothes.

Cleburne, city, Tex., co. seat of Johnson co., 56 m. S.W. of Dallas, on the A., T. and S. Fé, the Mo., Kan. and Tex., and the Trinity and Brazos Val. R. Rs. The manufactures include cotton, cotton-seed oil, flour, etc., and there are large shops of the A., T. and S. Fé R. R. It is a shipping point for live stock, cotton, and grain. Pop. (1910) 10,364.

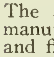
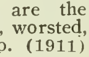
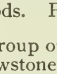
Cleburne, PATRICK RONAYNE (1828–64), an Irish-American soldier, born near Cork, Ireland. After a short service in the British army, he emigrated to the U. S. in 1849, was a druggist first at Cincinnati, O., and then at Helena, Ark., was admitted to the bar in 1855 and practised until the outbreak of the Civil War, when he entered the Confederate service. He became a brigadier-general in March, 1862, and a major-general in Dec., 1862, took a conspicuous part, as commander of a brigade, in the battles of Shiloh and Perryville, and, as commander of a division, in the battles of Stone River, Chickamauga, and Chattanooga. He participated in the Atlanta campaign against Gen. Sherman; and on Nov. 30, 1864, was killed in the battle of Franklin.

Cleckheaton, par. and tn., W. Riding, Yorkshire, England, 10 m. S.W. of Leeds; has extensive coal mines in the vicinity. The staple industries are the manufacture of woollen, worsted, and flannel goods. Pop. (1911) 12,867.

Clee Hills, group of hills, partly basaltic ('Jewstone,' from *dhu*, 'black'), partly Carboniferous, Shropshire, England, 10 m. N.E. of Ludlow. The chief heights are Titterstone Clee (1,750 ft.) and Brown Clee (1,806 ft.); outlying tracts on these summits form the Clee Hill coal field. The 'Jewstone' is quarried for macadam.

Cleethorpes, tn. and wat.-pl., 2 m. S.E. of Great Grimsby, N. Lincolnshire, England, with a fine stretch of sand. Its pier (1872), sea-wall (1 m. long), and oyster beds are its chief attractions. Pop., with Thrunscoe (1911) 21,419.

Cleeve Cloud. See COTSWOLD HILLS.

Clef, in music, a sign placed at the beginning of a stave to indicate the pitch and name of notes. There are now only three clefs in use—the treble or G clef ; the bass or F clef ; and the C clef . The G clef consists of the five highest lines, the F clef of the five lowest lines, of the great stave. (See STAVE.) The C clef is now used only for alto and tenor staves (formerly it was also used for others), and has two positions on the great stave; but the line on which the sign is placed is always the sixth line of the great stave —*i.e.* middle C.

Cleft Palate, a congenital condition due to incomplete development of the roof of the mouth. Cleft palate may be of any degree, from a splitting of the uvula to a cleavage (or, more accurately, a non-junction), which separates the two halves of the soft and hard palate from each other, and the premaxilla on one or both sides from the maxillary bones. It is often associated with harelip. Its tendency is to interfere with deglutition, taste, smell, hearing, and speech. The child with a pronounced cleft palate cannot suck, and liquids tend to be drawn into the posterior nares, and to be expelled through the nose. The treatment is by operation, performed with the intention of bridging over the gulf between the separated halves. The parts of the soft palate, being movable, are joined by roughening their edges and stitching them together. In the case of the hard palate, longitudinal strips of mucous membrane and periosteum, of the whole thickness down to the bone, are separated from the bony foundation, and slid inwards from either side to the middle line, where they are stitched together. Sometimes the necessary strips are transplanted from elsewhere. A strip has been taken from the tongue, being left attached by one end, until the rest was strongly grafted to the roof of the mouth. Authorities differ as to the age at which the operation should be performed, but there is no doubt that mortality is high among cases which are left unoperated on; and recently, Dr. Wolff (*Samml. Klin. Vorträge*, No. 301, 1901) has given statistics of three hundred and eleven cases operated on by him, and has shown good evidence for his plea in favor of early operation. Others hold that with early operation there is a risk of atrophy of the upper jaw, and that speech becomes just as easy if the operation is left until the age, say, of six years.

Cleg, the British name of the bloodsucking flies of the family Tabanidæ. See GADFLY.

Cleishbotham, JEDEDIAH, schoolmaster and parish clerk of Gandercleuch, ostensible editor of Sir Walter Scott's *Tales of My Landlord*. See the introduction to *The Black Dwarf*.

Cleland, WILLIAM (?1661–89), Covenanting colonel and poet, acted as captain at Bothwell Bridge (1679). Appointed lieutenant colonel of the Cameronians, he was shot dead defending Dunkeld against the Jacobite clansmen. He is the author of *A Collection of Several Poems and Verses* (posthumous, 1697).

Clem′atis, a genus of plants, of the order Ranunculaceæ, embracing many species, mostly with a trailing habit, widely disseminated throughout the world. The flowers are apetalous, and have four colored sepals, with a profusion of anthers and pistils. The leaves are often three-parted, and raise the climbing species over bushes and walls by their twisting petioles, or by tendrils. The fruits are numerous one-seeded achenes with long—generally feathery—awns.

Clematis hybridizes readily, and a large number of varieties have been produced. *C. viticella*, a leading garden type, climbs to a height of 8 to 12 feet, bearing flowers about two inches across, either singly or in groups of three. *C. lanuginosa* climbs to 5 or 6 feet, and bears large lilac-colored, star-shaped blossoms, from June to September. It is one of the parents of the popular *C. Jackmani*, whose large, velvety purple blooms usually occur in panicles of three at the ends of the branches. *C. cærulia* or *patens*, also the parent of a number of beautiful hybrids, is a hardy, spring-blooming species with delicate lilac-colored flowers.

Clematis vitalba
1. Fruit; 2. achenium.

C. florida is a slender Japanese specimen, with creamy white flowers barred with purple. *C. viorna*, sometimes known as the leather flower, has solitary blossoms with four drooping, thick purple petals. Like the beautiful *C. crispa*, it is found in the southern half of the United States. The most common fall-blooming species in American gardens is *C. panniculata*, with axillary and terminal panicles of dull white blooms. Another important native variety is *C. virgineana*, or virgin's bower (q.v.).

Other species are the bright blue *C. alpina;* the evergreen or everbronze *C. calycina; C. montana*, which bears white flowers in May; the nearly evergreen *C. flammula;* the fragrant purple-flowered *C. aromatica; C. vitalba*, known as traveller's joy in Great Britain; and the yellow Indian virgin's bower, *C. orientalis*, which blooms in autumn.

In general, it may be said that clematis likes deeply dug, rich soil, a certain amount of shelter, plenty of light and air, and some support upon which to climb. The plants of the Jackmani, viticella, and lanuginosa varieties in winter should be cut well back to the old wood, as they bloom on the shoots of the current year. On the other hand, the Florida, Patens, and Montana sections should be pruned as little as possible, as they flower on the previous year's wood. Propagation is most commonly effected by grafting on the roots of *C. flammula*, or other vigorous species, early in the year, in heat; but layering or cuttage is easier to perform.

Clemenceau, kl*e*-män-sō′, GEORGES BENJAMIN EUGÈNE (1841–1929), French statesman, was born in Mouillerou-en-Pareds, and educated as a physician. He went to the United States in 1865, and settled in New York City, where he began the practice of medicine. Failing in this venture, he turned to teaching, in which he engaged until 1870, when he returned to France. He was mayor of Montmartre during the Franco-Prussian War and the siege of Paris, and was elected a member of the National Assembly in 1871, was a member of the Paris Municipal Council from 1871 to 1875, and in 1876 entered the Chamber of Deputies, in which he became leader of the Radical Party (Extreme Left). He was radically Republican, and from the outset of his career was known for his eloquence and independence of action. In 1880 he founded the famous *La Justice*, and as chief editor greatly increased his influence in the world of politics.

From 1883 to 1893 Clemenceau was looked upon as the maker of ministries in France. He was responsible for the downfall of the Fourton-Broglie administration, of Boulanger, Jules Grévy, Jules Ferry, Monsieur de Freycinet, and of the Rouvier government. In 1893, however, he lost his office in the Deputies under suspicion of complicity in the Panama Canal scandals, even though he made an adequate defence in the Chamber. In 1903 he founded the daily *L'Aurore* in which he published a series of brilliant articles defending Captain Dreyfus (see DREYFUS AFFAIR). The famous *J'accuse*, by Zola, also appeared in this journal, which Clemenceau continued to edit until 1907.

In May, 1906, Clemenceau was appointed minister of the interior, and in November became prime minister. He lost his premiership in 1909. Upon the outbreak of the World War (1914–18) he again entered the government and became prime minister for the second time, Nov. 17, 1917. He was elected a member of the French Academy in 1918 and after the Armistice he presided and dominated at the Paris Peace Conference in 1919. His book of memoirs, *Grandeurs et Misères d'une Victoire* (1930) was interrupted by his death in Paris, Nov. 24, 1929.

Clemens, SAMUEL LANGHORNE, (1835–1910), American humorist, better known as MARK TWAIN, was born November 30, in Florida, Missouri. His parents, John Marshall and Jane Lampton Clemens, of Virginia and Kentucky families, caught up in the westward surge of pioneers seeking El Dorado, moved to Florida, Missouri, shortly after their marriage. In 1839 the family moved to Hannibal on the Mississippi River, where Twain spent his childhood and youth. Mark had little formal schooling but learned much by closely observing the odd and varied characters that visited Hannibal, the superstitions and social problems of the Negroes, and the small-town figures which he later immortalized under such names as Tom Sawyer, Aunt Polly, the Judge, the Negro Jim, and Huckleberry Finn.

John Clemens died in 1847, leaving his wife and four children without independent means; fifteen months later Mark was obliged to quit school to help support the family. He began as apprentice to Joseph P. Ament, owner of the *Missouri Courier*, changed in name in 1850 to the *Hannibal Journal*, later bought by Mark's brother Orion. In the *Journal* appeared his earliest writings, contributed while he served as printer's devil and compositor. In 1853, at age eighteen, he began his first career as "journeyman printer" in St. Louis, in New York, and later in Philadelphia, where he worked on the *Inquirer*.

In 1857, rearoused by his boyhood ambition to become a steamboat pilot, Twain joined Horace Bixby, a famous river boatman, who agreed to 'learn' him the river with all its sandbars, snags, and 'sawyers.' Twain called the Mississippi River his 'university' and later told of his rigorous training there in *Life on the Mississippi*.

During the Civil War, after a brief, inglorious period in the Confederate Army, Twain accompanied his brother Orion to Nevada to engage in mining. There, as in the Middle West, he was influenced by the exaggerated 'tall tales' which characterized frontier humor in those days. Failing as a miner, he turned to the writing of stories and sketches whose merits won him a job on the *Enterprise* in Virginia City, Nev., where he soon became known as a humorist. While employed by the *Enterprise*, he began signing his articles 'Mark Twain,' a term used by river pilots, meaning two fathoms, a safe depth of water.

After two years in Virginia City, Twain went to San Francisco, a center for western men of letters. There, while continuing to write for newspapers, he profited from association with such men as Artemus Ward, Bret Harte, and Charles Warren Stoddard. While in California he wrote the *Celebrated Jumping Frog of Calaveras County*, based on an anecdote picked up while panning for gold at Angel's Camp; its publication in the *New York Saturday Press* (1865) brought him his first taste of national fame. This reputation soon was enhanced by a successful series of letters from the Sandwich Islands, where he was sent by a San Francisco newspaper. Returning to San Francisco, he lectured on his tour of the Islands, and the story of this experience, together with hilarious notes on his western life, appeared later in *Roughing It*. In December 1866 he went to New York and there joined an excursion to the Holy Land. The story of this experience appeared in *Innocents Abroad*, an uproarious satire on the excessively romantic attitude toward the Old World then common in America. During this voyage a fellow traveler showed Clemens a picture of Olivia Langdon whom he met and married shortly thereafter. Thus ended Twain's wandering life, and then began his close contact with the staid, bourgeois society of his wife's home town, Elmira, N. Y.

He worked briefly as editor of the *Buffalo Express*, then moved in 1871 to Hartford, Connecticut, because his publishers were located there. In Hartford he built the beautiful home which he occupied for the next seventeen years, spending his summers in Elmira. Books written by Twain in these two cities include *Roughing It*, *Tom Sawyer*, *The Adventures of Huckleberry Finn*, and *Life on the Mississippi*. All these works show clearly the exuberance, the intense pleasure in the world's variety, and the sharp perception of the frontier humorist.

His idyllic existence at Hartford was brought to an end when the bankruptcy of a publishing firm he had financed, and the commercial failure of the Paige typesetting machine invention, left him owing a hundred thousand dollars. Vowing to pay off this debt, Twain mapped out a world lecture tour, planning to touch even the remote countries of Australia and India. While his good friend, H. H. Rogers, reorganized his finances, Mark spent a few months in Florence, Italy, where he finished *Personal Recollections of Joan of Arc*. Soon after, he started out on his world tour, lecturing on the way and writing of his travels under the title of *Following the Equator*. The combined results of these efforts—lectures and books—more than recouped his financial losses. Returning to the United States, he spent the remaining ten years of his life as America's most spectacular literary figure. He died April 21, 1910.

Mark Twain is known to the world chiefly as a humorist, but he is now recognized as being also an outstanding stylist. Too, the posthumous publication of certain works by Twain has further altered the popular conception of this great humorist by emphasizing another, inner life of disillusionment and underscoring his contempt for the humbuggery of pitiable human society. This side of his character, as well as his attitude toward the 'damned human race,' was partly hidden from the world by his gaiety during his lifetime.

The year 1898, when Mark Twain finished paying off his debts, marks the beginning of the more philosophical period of his life, if we may judge from his works. In that year he wrote *The Man That Corrupted Hadleyburg*, a tale blasting greed and smugness, and *What Is Man?*, a querulous, bitter exposition of the futility of mankind. The same mood is carried even further in *The Mysterious Stranger*. Such attitudes as were displayed in these works may be seen as the natural reactions of a profound humorist who had survived bankruptcy, the death of his devoutly beloved wife, Olivia, and close contact with the ugly, materialistic tendencies of the times. In 1907 Oxford University honored Clemens by bestowing upon him the honorary degree of Doctor of Literature.

The philosophic side of Mark Twain's nature, however, did not serve to mar the charm of *Tom Sawyer* and *Huckleberry Finn*. These examples of his genius are not only among the most significant works ever produced by an American, but they inevitably find their place among the most keenly cherished books of all literature. In addition to works already mentioned, Twain's publications include *A Connecticut Yankee at King Arthur's Court* (1889); *The American Claimant* (1892); *Merry Tales* (1892); *The £1,000,000 Bank Note* (1893); *The Tradgedy of Pudd'nhead Wilson* (1894); *Tom Sawyer Abroad* (1894); *Christian Science* (1907); *Captain Stormfield's Visit to Heaven* (1908).

Consult William Dean Howells' *My Mark Twain* (1910); Albert Bigelow Paine's *Mark Twain* (1912); *Mark Twain's Letters 2 vols.*, 1917); *Autobiography* (1924); Bernard De Voto's *Mark Twain's America* (1937).

Clem'ent, the name of fourteen Popes of the Roman Catholic Church, beginning with Clemens Romanus, or CLEMENT OF ROME, (q.v.), and of three schismatical Popes.

CLEMENT IV. (1265–8) was occupied chiefly with the question of Sicily and vigorously supported Charles of Anjou.

CLEMENT V. (1305–14) was closely associated with Philip the Fair, under whose influence he removed the papal residence to Avignon, and agreed to the suppression of the Templars.

CLEMENT VII. (1523–34), Giulio de'Medici, joined France, Milan, Venice, and Florence in the Holy Alliance against the Emperor Charles V., which brought about the occupation of Rome by the Imperialists under Pompeo Colonna (1526), the sack of the city (1527) by the same forces under the Constable of Bourbon, and the Pope's personal surrender to this captain. Clement VII. was a main cause of the reformation in England, by his excommunication of Henry VIII. for marrying Anne Boleyn.

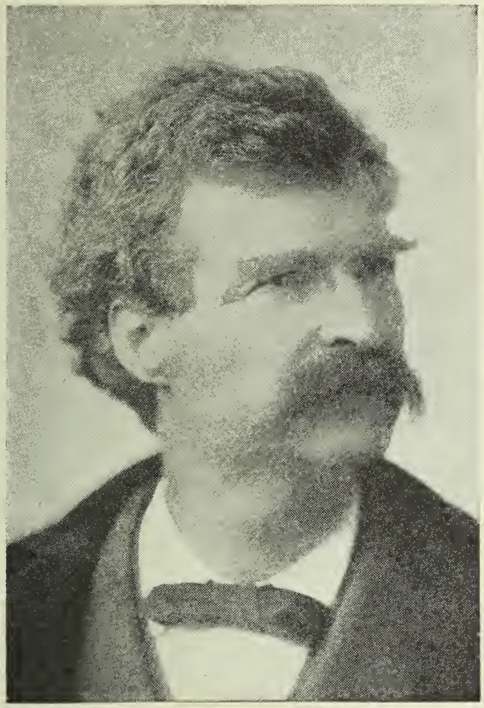
CLEMENT VIII. (1592–1605) received the recantation of Henry IV. of France. A patron of learning, he founded the Collegio Clementino at Rome, and issued a new edition of the *Vulgate*, the *Breviary*, and the *Missal*.

CLEMENT XI. (1700–21) intervened in the Jesuit-Jansenist quarrels, and issued the famous bull *Unigenitus* against Jansenism (q.v.,).

CLEMENT XIII. (1758–69) worked hard to reinstate the Jesuits in lands whence they had been expelled, and is commemorated by a splendid monument by Canova in St. Peter's.

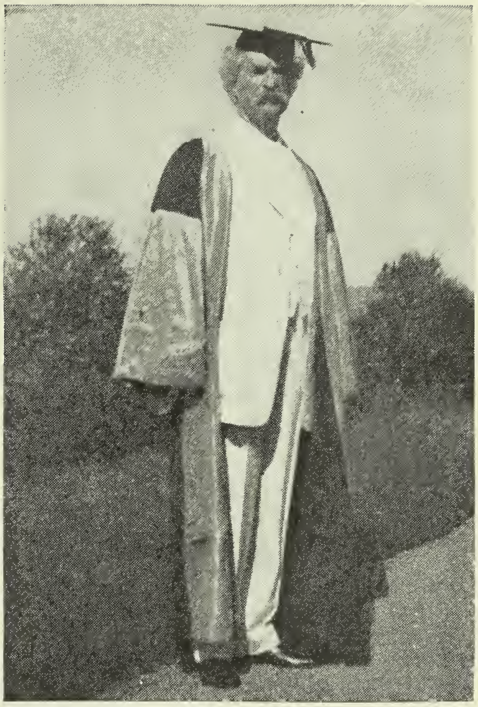
CLEMENT XIV. (1769–74) was Giovanni Vincenzo Antonio Ganganelli (b. 1705), one of the best and most enlightened of Popes. To secure the 'peace of the church' he issued his *Dominicus ac Redemptor noster* encyclical, suppressing the Jesuits (1773).

Clément, JACQUES (1564–89), a



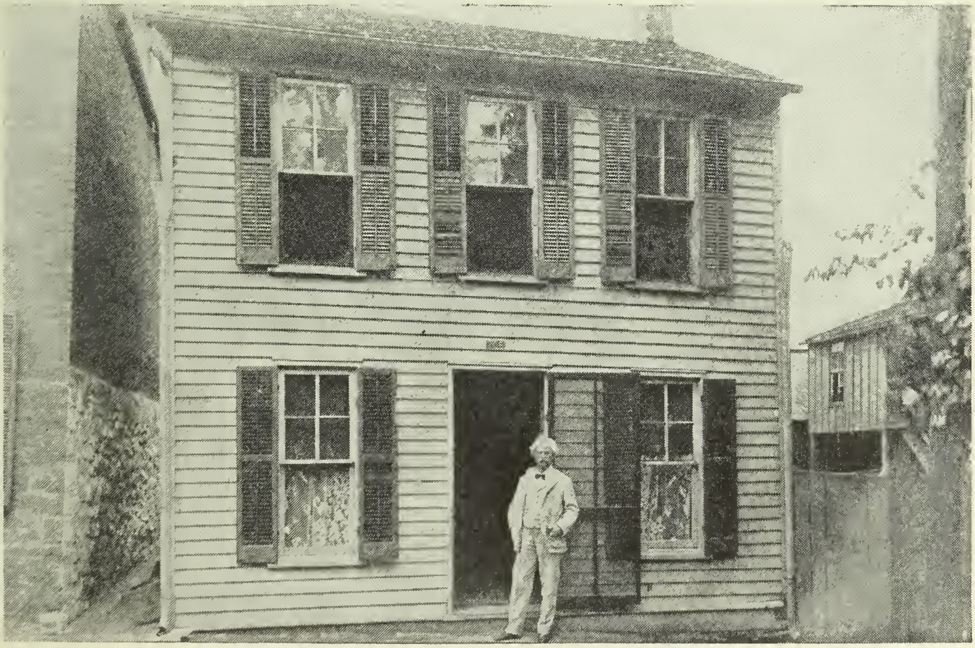
Courtesy Franklin J. Meine

MARK TWAIN AT THE HEIGHT OF HIS CAREER



Courtesy Franklin J. Meine

MARK TWAIN IN OXFORD CAP AND GOWN



MARK TWAIN AT HIS BOYHOOD HOME
Hannibal, Missouri, 1902

fanatical French Dominican, who assassinated Henri III. at Saint Cloud, and was immediately slain by the king's attendants.

Clement of Alexandria, Titus Flavius Clemens, one of the church fathers, the teacher of Origen. Of heathen parentage, he grew up with a remarkable thirst for truth. Platonism and Stoicism attracted him for a time, but, coming into touch with the Christian teaching of Pantænus at Alexandria, he was arrested by the ethical and religious depth, but especially by the speculative affinities, of Christianity. He became a teacher in the renowned catechetical school, eventually succeeded Pantænus (*c.* 200 A.D.), and died *c.* 220 A.D. His principal writings are the *Missionary*, an apologetic, a searching and yet remarkably sincere examination of pagan religion; the *Instructor*, or *Pædagogos*, which sets forth the Logos (*i.e.* Jesus Christ) as the true guide to moral life; and the *Stromata*, in eight books (ed. of book vii. by Mayor, 1902), an agglomeration of learned discussions designed to show the completeness and comprehensiveness of the Christian religion, in contrast to the fragmentariness of Greek metaphysics. A man of sincere piety, withal of candid and liberal mind, he seeks out the better elements of Greek speculation, and recognizes its propædeutic place in the divine plan of redemption. But his distinction between the *faith* of the ordinary believer and the *gnosis*, or perfect knowledge, of the finished disciple is hardly so happy, and bespeaks a heathen rather than a Christian origin. See Clement's works by Dindorf (4 vols. 1869); Bigg's *Christian Platonists of Alexandria* (Bampton Lecture, 1886); Hitchcock's *Clement of Alexandria* (1899); and W. Moller's *Church History* (1898, i. 207 *f.*)

Clement of Rome, an early Christian writer, whom tradition asserts to have been bishop of Rome. He is identified by Origen with the fellow-worker of Paul mentioned in Phil. 4:3, more recently with the Titus Flavius Clement who was put to death under Domitian (his cousin), 95 A.D. The name is too common to permit of a satisfactory conclusion, but the first of these identifications is, from chronological reasons, hardly tenable. The *First Epistle of Clement* (to the Corinthians) is one of the most valuable productions of the sub apostolic age, particularly in virtue of the glimpses it gives of the church organization and the theological conceptions of the time. In its reprimand of the Corinthian community for its dissensions and its insubordination to the presbyters, there is something of an anticipation of the later Roman claim of primacy. It is found (incomplete) in the Codex Alexandrinus (see BIBLE); but the Greek metropolitan Bryennios discovered a complete MS. at Constantinople (published 1875). About the name of Clement a mass of spurious literature has sprung up—*e.g.* the *Second Epistle of Clement*, the *Clementine Homilies* and *Recognitions* (Greek and Latin respectively). See Lightfoot's *The Apostolic Fathers: St. Clement of Rome* (1890), and W. Moller's *Church History* (1898, i. 87, 109, 123), also Krüger's *History of Early Christian Literature* (1897).

Clementi, Muzio (1752–1832), Italian pianist and composer, born at Rome, and studied music there. When he appeared as a pianist in London he was at once recognized as a master (1770). He held the post of conductor at the Royal Italian Opera (1776-80). After a professional tour on the Continent, during which he had his famous piano contest with Mozart, he returned to England, and embarked in business as a musical instrument maker, while he also conducted at the Opera. His fame rests chiefly on his *Gradus ad Parnassum* (1817), a series of one hundred studies for the piano; but he wrote over a hundred sonatas, of which sixty are for the pianoforte alone. See Ferris, *Great Violinists and Pianists.*

Clemson Agricultural College, a non-sectarian institution at Clemson, South Carolina, founded in 1889 and opened in 1903. It occupies the former home of John C. Calhoun, bequeathed to it by T. G. Clemson. The college offers seven regular four-year courses in agriculture, chemistry and geology, architecture, chemistry-engineering, mechanical, electrical, and civil engineering, textile industry, and vocational education, together with special, irregular, and pre-professional courses.

Cleobulus, of Lindus, in Rhodes (fl. *c.* 580 B.C.), one of the Seven Wise Men of Greece. Many of his sayings are preserved by Diogenes Laertius.

Cleombrotus, king of Sparta (380 to 371 B.C.), carried on war against the Thebans (378 and 376 B.C.) with little energy. At Leuctra (371 B.C.) the Thebans won a decisive victory, and Cleombrotus died of his wounds.

Cleomedes, the astronomer, must not be confounded with the Olympian athlete Cleomedes. He published about the 2d cent. A.D., a Greek treatise, *On the Circular Theory of the Heavenly Bodies*, containing such truths as the earth's sphericity and the moon's revolutions (published Venice, 1498; Leipzig, 1832 and 1891).

Cleomenes, a name borne by three kings of Sparta, of whom two are of some note. (1.) Cleomenes I. (reigned 520-491 B.C.) is remarkable for having attempted to restore the power of the Spartan royalty, which had been curtailed by the institution of the ephorate. In 510 he expelled the Athenian tyrant Hippias. He also won a great victory over the Argives. Herodotus says that he became mad and killed himself.—(1.) Cleomenes III. (reigned 236-222 B.C.), following the example of Agis IV., restored the ancient Spartan constitution of Lycurgus. After gaining several victories over the Achæan League, and conquering nearly the whole of Arcadia (226), he returned home, abolished the ephorate, and redistributed the land, with the object of increasing the population. He was defeated at Sellasia in 222 B.C. by Antigonus, king of Macedonia, and by Aratus, and fled to Egypt, where he committed suicide in 220.

Cleon, a leader of the extreme democratic party at Athens, after the death of Pericles, in 429 B.C., became one of the leading statesmen. In 425 his influence caused the rejection of the Spartan peace proposals, due to the shutting up of a force of Spartans in Sphacteria; and in the same year Cleon himself overpowered this force, and brought most of them prisoners to Athens. In 422 he commanded the Athenian forces against Brasidas, in Thrace, and lost the battle of Amphipolis, himself falling in the fight. Cleon is generally regarded as a type of the unscrupulous demagogue. Grote, however, has proved that this view must be received with caution, as our chief authorities for his political actions are Thucydides and Aristophanes, both of whom were, for private reasons, his enemies.

Cleopatra (68–30 B.C.), third and eldest surviving daughter of Ptolemy Auletes, king of Egypt, who on his death (51 B.C.) associated her with her brother Ptolemy in the royal power. He or his advisers expelled her from the throne, and she was endeavoring to regain power when Julius Cæsar arrived in Alexandria (48 B.C.). She soon won his affection and support. Ptolemy having perished in the ensuing war, Cæsar made her queen of Egypt with her younger brother. Having borne a son, Cæsarion, to Cæsar (47), she followed the conqueror to Rome (46 or 45), and was apparently there at the time of his death. Returning to Egypt, she assisted the triumvirs, Augustus, Antony, and Lepidus; and over Antony she soon secured the same ascendency she had enjoyed over Cæsar (41). Their association and ambition led to war between Antony and Augustus, decided by the battle of Actium (31), Cleopatra's flight with her ships contributing largely to the defeat. When Augustus next year landed in Egypt, she negotiated with him, being ready to betray Antony. She spread a false report of her death, whereupon Antony stabbed himself, and was brought to die in her arms. As she failed to fascinate Augustus, and saw he meant to carry her captive to Rome, she killed herself by the bite of an asp. She was a woman of great ability and of boundless ambition. Popular tradition stated she was of Egyptian nationality and swarthy complexion; but she was of pure Macedonian descent, and therefore no darker than a Greek. She had three children by Antony. See Shakespeare, *Antony and Cleopatra* and *Life* by A. E. Weigall.

Cleopatra's Needles, the inaccurate designation of two obelisks of red syenite brought from Heliopolis (B.C. 14) to Alexandria, where they remained until they were presented by Ismail Pasha—the one to Great Britain, and the other to the United States. The British government did not think the obelisk worth the cost of removal, but Sir Erasmus Wilson successfully brought it home at his own expense in 1878. It was erected on the Thames Embankment. The American obelisk, which was brought to the U. S. in 1880 by Lieut. Commander H. H. Gorringe, U. S. N., now stands in the Central Park, New York, opposite the Metropolitan Museum of Art.

The Obelisk, Central Park, New York City.
Copyright (1903) by Detroit Photographic Co.

Clepsydra, a water-clock, constructed to raise a float gradually by means of water dropping from above through a small hole. The float as it rose indicated the hour by a scale of numbers marked at the side of the vessel; or, by a more elaborate arrangement, turned a hand on a dial by means of a pulley or ratchet wheel. Both in Egypt and Babylonia the ancient astronomers used the clepsydra to measure intervals of time. An ingenious form in Hindustan was a floating metal basin, which gradually sank when placed in a vessel, from the influx of water through a small hole. In the Roman law courts another form was used, which allowed the water to trickle through, on the same principle as a sand-glass. The legionaries certainly had a clepsydra to measure the three hours' watches of their sentries; and Cæsar, during the campaign in Britain, speaks of time being measured by 'accurate water-measures.' The Danish astronomer Tycho Brahé used this time-measurer in his observatory in the 16th century. The Chinese still use the clepsydra; and in Great Britain Captain Kater ingeniously utilized the principle in order to measure short intervals of time. He used mercury instead of water.

Clerestory, one of the subdivisions of the internal wall of a cathedral. In Gothic architecture it is applied to the range of windows which lights the nave and forms the upper story of the structure. Its position is over the arcade which forms the triforium, and immediately below the vault of the roof.

Clergy, a name given loosely to all ministers of the Christian religion, in contrast to the laity. The word is derived from the Greek *kleros,* 'a lot' (specially through its connection with *kleronomia,* 'an inheritance'), used in the Septuagint to describe either the chosen people or the Levites (Deut. 4:20, 18:1, 2). As the Christian church seemed to succeed to the privileges of Israel, and the Christian apostolate to those of the Levites, it was natural that the later institutions should come to be spoken of as God's inheritance (1 Pet. 5:3; Acts 1:15-26). But gradually the application of the term clergy (*clerici*) to the spiritual chiefs prevailed over the more general usage. Very early in the history of the church we find the ordained bishops and elders regarded as standing in a special relation to God over against the people at large. Monasticism and celibacy strengthened, while a peculiar costume and the use of official insignia emphasized, their unique position. Much of the power of the clergy (though not all their claims) has been diminished in nearly all countries; but even to this day in England they constitute one of the three estates of the realm. Clergymen of the Church of England do not serve on juries, nor hold municipal offices, nor sit in the House of Commons, nor practise at the bar.

In the Roman Catholic and Greek Churches the *secular* clergy are the ordinary priests, bishops, etc., while the monks and abbots who live according to any rule or order are known as the *regular* clergy.

See Benefit of Clergy; Orders, Holy; Bishop; Priest; Rector.

Clergy, Benefit of. See Benefit of Clergy.

Clergyman's Sore Throat. See Sore Throat.

Clergyman's Pensions. See Pensions.

Clericis Laicos, kler'i-sis lā'i-kos, the opening words of a bull promulgated by Boniface viii. in 1296, which visited with excommunication every prelate, clerk, or monk who should pay, or promise to pay, to the laity any tax or any portion of his income or possessions, on any pretext, without the permission of the holy see; the same punishment being meted out to every king, prince, or official who should exact the taxes, or should seize ecclesiastical belongings—universities only being excepted. The bull was provoked by the action of Philip iv. of France in subjecting the French clergy to taxation.

Clerk (Latin *clericus*), originally a man in a religious order, a cleric, a clergyman (see Clergy); before the Reformation, and in the Roman Catholic Church, a member of any of the eight orders, sometimes excluding the bishop. Loosely used, it meant one who was able to write, *i.e.*, a scholar. After the Reformation, the title was applied to laymen who performed certain offices in cathedrals, churches, or chapels, as the parish clerk (see Clerk, Parish).

At the present time the term clerk is used of an officer attached to synods, courts, and corporations, who keeps the records; a lawyer's assistant; a booking or a railway clerk; a bookkeeper and in the United States, a salesman or assistant in a shop or store.

Clerk, Parish, an official in the Church of England who used to lead the responses in a congregation, and who assists in the services of public worship, at funerals, etc. There is usually one in each parish. In cathedrals and collegiate churches there are several of these clerks, who in some cases form a corporate body, having a common estate besides payments from the chapter. Before the Reformation, the duties of parish clerk were always discharged by clergymen in minor orders; now they are usually laymen. At present many of the duties formerly devolving upon the parish clerk are discharged by the sexton.

Clerk, Synod, a Scottish Church official who takes the minutes at synods, keeps the records, and does other work in connection with a diocese or presbytery. In the Episcopal Church, where there is a cathedral, the synod clerk is always one of the canons.

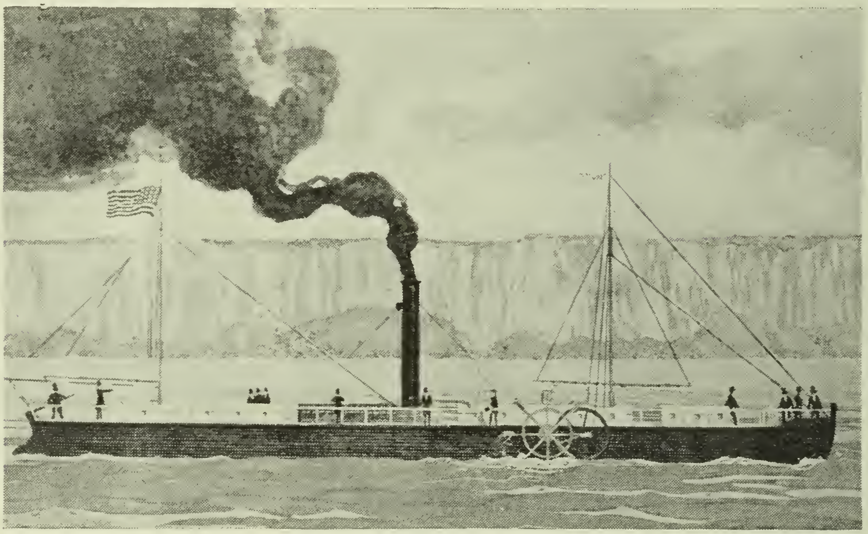
Clerke, klärk, Agnes Mary (1842–1907), British writer on astronomy, was born in Ireland. She resided in Italy from 1870 to 1877, when she began to write for *The Edinburgh Review*. She made extensive astronomical observations at the Cape of Good Hope (1888) and also on board the yacht *Palatine* in a voyage to Copenhagen, Stockholm, and St. Petersburg (1890). Her published works include: *The System of the Stars* (1890; new ed. 1905); *The Herschels and Modern Astronomy* (1895); *Astronomy* (1898); *Problems in Astrophysics* (1903); *Modern Cosmogonies* (1906). In 1893 she received the Actonian Prize for her work in astronomy.

Clerkenwell, klärk'en-wel *or* klûrken-wel, parish, London, England, lying within the borough of Finsbury, and due north of St. Paul's. The original village sprang up round the Priory of St. John of Jerusalem, founded by Jorden Briset about 1100, of which the gatehouse yet remains. It takes its name from its holy well, where the parish clerks of London formerly congregated once a year to perform miracle plays. It has been for many years a centre for jewellers and watch and clock makers. See London.

Clerk-Maxwell. See Maxwell.

Clerk of Parliaments, the designation of the chief permanent official of the British House of Lords.

Clermont, klär'mont, the steamboat designed by Robert Fulton (q. v.) and launched on the Hudson River in September, 1807. She made the trip from



Courtesy Chicago Historical Society

THE *CLERMONT*

New York to Albany, about 150 miles, in thirty-two hours; but in 1817 she made the same voyage in eighteen hours. She was the first steam vessel that was kept in continued commercial service.

Clermont, kler-môn′, chief town, department Oise, France; 41 miles north of Paris, on the Northern railway. Its *hôtel-de-ville,* castle and ancient church all date from the 14th century. The English sacked Clermont in 1359 and 1415. Pop. (1931) 5,870.

Clermont-Ferrand, kler-môṅ′-fā-räṅ′ (ancient Augustonemetum), city, capital of the department Puy-de-Dôme, France, stands at the foot of the extinct volcano, Puy-de-Dôme, overlooking the Limagne; 87 miles east of Limoges. The city comprises the two former towns of Clermont and Mont Ferrand. It is the seat of a bishopric and a university. Important buildings are the Cathedral (1248–1346), built of lava from the surrounding district, and finished in the nineteenth century; Notre Dame Church, where the first crusade was preached by Peter the Hermit, in 1096; the Public Library, Hospital, *Musée Lecoq* or Museum of Natural History, and *Musée d'Art et d'Archéologie.* There are several mineral springs in the vicinity, the most noted being St. Allyre and Puits-Loiselet. Manufactures include india-rubber goods, preserves, chemical products, clothing, farinaceous foods and confectionery. It has markets for agricultural products. The bishopric of Clermont was founded in 253; and seven ecclesiastical councils were held here during the Middle Ages, the most remarkable of which was that in 1095, at which the First Crusade was instituted by Urban II. Gregory of Tours (*c.* 538) and Pascal (1623) were natives. Pop. (1936) 101,128.

Clermont-Ganneau, ga′nō′, Charles Simon (1846–1923), French Orientalist. He was dragoman and consul in Jerusalem, Constantinople, and Jaffa; government interpreter of Oriental languages at Paris (1882); professor of the same subjects at the Collège de France; and minister plenipotentiary (1906). Besides exposing Shapira's forged MSS. and the modern botching of the tiara of Saitapharnes, he conducted archæological investigations in the Orient (1874–5), and discovered the *stele* of Mesha or Moabite Stone (1870). His published works include: *Études d'Archéologie Orientale* (1880–96); *Les Fraudes Archéologiques* (1885); *Recueil d'Archéologie Orientale* (1885–1924); *Archæological Researches in Palestine* (1896); *Album d'Antiquités Orientales* (1897). He edited the *Répertoire d'Epigraphic Sémitique.*

Clermont l'Hérault, lā′rō′, town, department of Hérault, France; 22 miles west of Montpellier. It has leather and textile manufactures and trade in wine. Pop. (1931) 5,657.

Clerodendron, klē-rō-den′dron, a genus of verbenaceous stove and greenhouse plants, some of which are climbers, while others are of shrubby habit. *C. trichotomum,* however, is a hardy shrub, bearing, in September, flowers of mixed red, white, and brown, of much beauty. The shrubby sorts require a soil composed of equal parts of peat, fibrous loam, and well-decayed manure. As soon as the plants have done flowering they should be cut down close, and placed in a lower temperature; but the winter temperature should never fall below 50°, and during that season little water should be given. Early in February growth should be stimulated by increasing the heat, and the plants should be repotted. Propagation is by cuttings, taken when the plants are cut down, and placed in sandy soil in a minimum temperature of 65°.

The climbing clerodendrons do not require quite so rich a soil, and leaf mould may replace the manure suggested for the shrubby sorts. They also should be cut back after flowering. The most brilliant and best known of the climbing kinds is *C. Thompsonæ,* which is evergreen, and bears forked panicles of beautiful white-and-red flowers. Of the shrubby species, the best are the white-flowering *C. fragrans,* which blooms in late autumn; the scarlet-flowered *C. infortunatum;* and *C. fallax,* bearing brilliant scarlet flowers in September.

Clery, klē′ri, Sir Francis (1838–1926), British general. He was professor of Tactics at Sandhurst (1872–5), and served as deputy assistant adjutant-general in Ireland (1875–7) and at Aldershot (1877–8). His active campaigning goes back to the Zulu war of 1878–9, where he served in the force under Lord Chelmsford, and was present at Ulundi, where Lord Chelmsford routed Cetewayo. He served in Egypt on the headquarters staff (1882–5), was appointed (1884) chief of staff in Sir Gerald Graham's Sudan expedition, and took part in the battles of El Teb and Tamai. He served throughout the Nile expedition (1884–5) for the relief of Gordon, and from 1886 to 1888 was chief of the staff in Egypt. In the South African War (1899–1902) he commanded the Second Infantry Division. He was at the Battle of Colenso, and took part in the operations which led to the relief of Ladysmith.

Clésinger, Jean Baptiste Auguste (1814–83), French sculptor and painter. His notable works include a bust of Eugène Scribe (1844), and his marble figures of *A Woman Bitten by a Serpent* (1847), *A Young Nereid* (1847), and *A Bacchante Lying Down* (1848). In 1853 he exhibited *Tradegy,* whose features resemble Rachel; and *Literature,* with a resemblance to George Sand. Among his other works are *Cornelia and Her Children* (1861), two statues of *Sappho* (1859), *Cleopatra before Cæsar* (1869), and two equestrian statues of *Francis I* and *Napoleon I.* In 1847 he married a daughter of George Sand.

Cleve, or Cleves. See Kleve.

Clevedon, klēv′dun, parish and watering place, Somerset, England, on the Great Western Railway; 16 miles southwest of Bristol. Its church contains the tombs of the historian Henry Hallam (1777–1859), and his son Arthur Hallam (1811–33), whose death inspired Tennyson's *In Memoriam.* Clevedon is referred to as 'the haven under the hill.' Castlewood of Thackeray's *Henry Esmond* is identified with Clevedon Court, which was largely destroyed by fire in 1882. Coleridge lived at Myrtle Cottage in 1795. There are a fine promenade, beach and pier. Pop. (1931) 7,033.

Cleveite, clēv′īt, a rare mineral found in the Arendal district of Norway, an oxide of uranium associated chiefly with uranates of lead and thorium, and of metals of the yttrium group in smaller quantity. It is considered to be a weathered variety of *broggerite,* another Norwegian mineral, from which it differs little in composition.

Cleve′land, the largest city in Ohio and the sixth in population in the United States, the county seat of Cuyahoga county, is located on the south shore of Lake Erie, at the mouth of the Cuyahoga River, in lat. 41° 31′ 5″ N. and long. 81° 42′ 6″ W.; 576 miles by rail west of New York, and 339 miles east of Chicago. Seven trunk railway lines touch Cleveland: the New York Central, the Pennsylvania, the Cleveland, Cincinnati, Chicago and St. Louis, the Baltimore and Ohio, the New York, Chicago and St. Louis ('Nickel Plate'), the Erie, and the Wheeling and

Lake Erie. Large passenger steamships supply daily service between Cleveland and other ports on the Great Lakes.

Cleveland has 14.2 miles of Lake frontage, protected by 2 breakwaters constructed by the Federal Government, forming an outer harbor, five miles long and from 1600 to 3800 feet wide. The inner harbor is the lower 5½ miles of the Cuyahoga River, which is 150 to 325 feet wide, and the 'old river bed,' one mile long and from 175 to 200 feet wide. The harbor has a wide entrance and a minimum depth of 19 feet, maintained by dredging, especially in the river channel, where are located about 13 miles of docks. The narrow strip next the river, 'The Flats,' is the city's storehouse and trading and shipping center. Cleveland has not developed her lake front residentially as have Bratenahl to the east and Lakewood to the west, but has chosen home sites in the second height of land on either side of the valley, particularly toward the south and southeast on the Heights, the finest residences appearing on Fairmont Boulevard and tributary streets and in suburban East Cleveland, Cleveland Heights, Shaker Heights, and Lakewood.

The city occupies 73.43 square miles, mostly plateau, 75 to 95 feet above the lake; 580 feet above the sea. Public Square, about ½ mile from the lake and east of the river, is the transportation center from which the main thoroughfares radiate like spokes in a wheel. It is quadrisected by the two principal streets: Ontario, which divides the city into east and west sections and Superior Avenue, one of the city's widest thoroughfares which runs east and west. Originally planned to be Cleveland's most important business street, Superior Avenue has been overshadowed by Euclid Avenue running from the southeast corner of the Public Square on which are located large department stores, theatres and banks, and east of East 22nd Street the mansions of a generation or two ago which earned for that section the title of *Millionaires' Row.* The eastern and western districts of the city are connected by viaducts. The streets are very wide and bordered by fine shade trees giving Cleveland the name of 'Forest City.'

Parks.—Public Square has been a public place since Cleveland's establishment in 1796. It covers 4.4 acres and is the site of Soldiers' and Sailors' Monument containing relics of war days; and monuments to Tom L. Johnson, a famous mayor, and Moses Cleaveland, the city's founder.

The city's parks cover about 3,655 acres, the more attractive being Gordon Park, 119 acres, and Edgewater, 117 acres, both located on Lake Erie; Brookside Park and Zoological Gardens, 159 acres, south of the city limits; Shaker Heights Park, 250 acres, running from Ambleside Drive to Cleveland Heights; Woodland Hills Park, 113 acres, on Kinsman Road; Wade Park, 86 acres, on Euclid Ave., east of 107th St.; Rockefeller Park, 273 acres, running from Cedar Ave., through Wade Park and continuing 4½ miles to St. Clair Ave. In Gordon Park is a monument to Commodore Perry, commemorating his victory over the British on Lake Erie in the War of 1812. There are 45 miles of winding boulevards lined with rare plants and lawns. Liberty Row, an avenue of red oaks, extending 9 miles from the lake at Gordon Park through Rockefeller, Wade and Ambler parks to Shaker Heights, is a most attractive parkway dedicated to the 835 Cleveland soldiers who fell in the World War. Lakeview Cemetery, one of the most beautiful burying grounds in the country, contains the remains of President Garfield, a handsome monument to his memory and the Wade Memorial Chapel, costing nearly $400,000.

The Metropolitan Park system extends through the whole county and two other counties and is supported by taxes from all of them. It comprises about 10,000 acres in an almost continuous line of reservations, covering the outer section of metropolitan Cleveland with parks of great beauty. Boulevards connect these metropolitan reserves with the city park system. In general the larger park belt follows Chagrin River on the east, Tinkers and Chippewa Creeks on the south and Rocky River on the west.

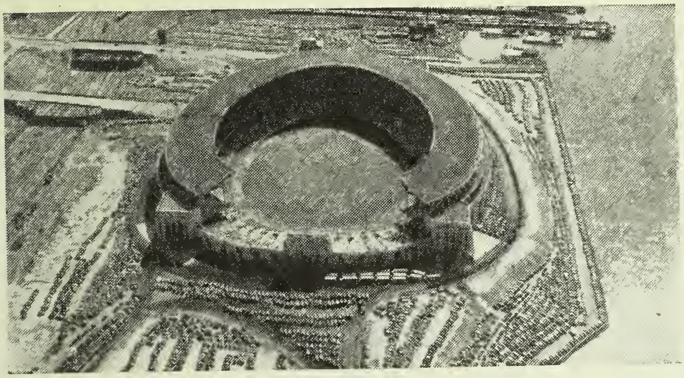
Buildings.—The group plan, conceived in 1902, provided for the grouping of public buildings about a mall, 600 feet wide, extending from Superior Avenue to the lake front. Here are the Federal Building, Public Library, Federal Reserve Bank, Board of Education, City Hall, County Court House, Public Auditorium, and Municipal Stadium. University Circle, the cultural and educational center located on Euclid Avenue, 5 miles from Public Square, in the vicinity of Western Reserve University, includes the Historical Society's Museum and various churches and colleges, all privately supported. The Public Square assumed even greater importance with the completion of the Union Terminal in 1930 (cost $150,000,000). The immense development about the Terminal includes the Hotel Cleveland, Republic Building, Builders' Exchange, Midland Building and Higbee Company's great store. To the north of these, other large buildings front that section of the Square, the Marshall, Ulmer, Illuminating Society for Savings, Engineers, Standard Bank and Cleveland College buildings. Eastward from Public Square on Euclid Avenue are fine office buildings, such as Williamson, Guardian, National City Bank, Hickox, Citizens' Cleveland Trust, Union Commerce, Swetland, Cleveland Athletic, and others. Elysium, a huge indoor ice rink, adjoins Wade Park; beyond the lake is the Museum of Art (cost $1,000,000). Other important buildings are the Ohio Bell Telephone Building, Masonic Temple, Cleveland Museum of Natural History, and Highland Park Mausoleum.

Playhouse Square, at 14th Street and Euclid Avenue, and other parts of downtown Cleveland are made notable by moving-picture houses, fine hotels and stores. Keith's Palace was long the largest theatre between New York and Chicago. Other theatres are Hanna, Hippodrome, State, Allen, Stillman and Lake. The city had in 1940 600 churches, 100 hotels (10,000 rooms), and 10 legitimate theatres. Among the handsome church edifices are Trinity Protestant Episcopal Cathedral, Euclid Avenue Presbyterian, St. Michael's and St. Agnes' (Roman Catholic), East End Baptist, First Methodist Episcopal, Presbyterian Church of the Covenant, and St. Paul's (Episcopal).

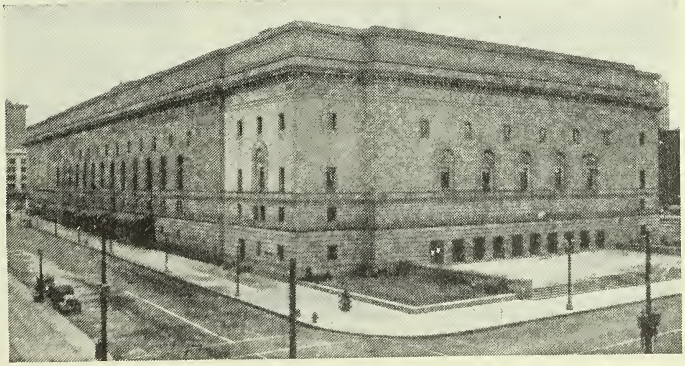
Libraries and Museums.—The Cleveland Public Library contained in 1940 about 2,112,129 volumes. Aside from the main library there are 33 neighborhood branches occupying their own buildings, 39 school branches, besides deposit stations in factories, etc. Other important libraries are the Hatch Library of Adelbert College, the library of the Flora Stone Mather College, the Case Library, the Cleveland Medical Library, and the library of Western Reserve Historical Society.

Education. — Cleveland's schools have few equals in the country. They provide for the several branches of education in art, science, literature, mechanical and manual training. All

TERMINAL TOWER GROUP OF BUILDINGS IN CLEVELAND

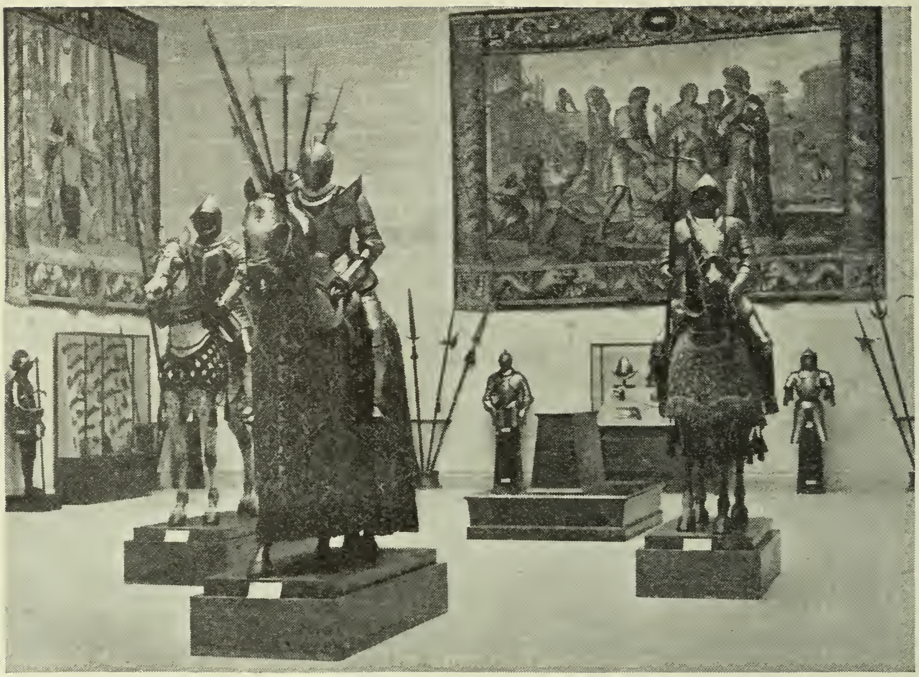


AIR VIEW OF CLEVELAND STADIUM, BUILT ON LAKE FRONT

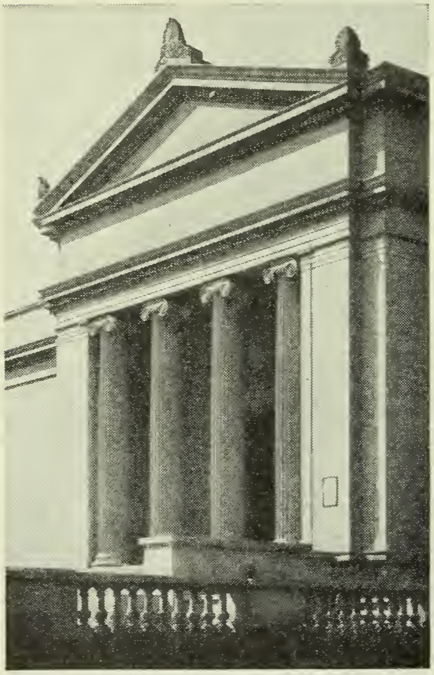


THE PUBLIC AUDITORIUM IN CLEVELAND

All photographs on this page courtesy Cleveland Convention & Visitors' Bureau, Inc.



THE ROOM OF ARMOR, CLEVELAND MUSEUM OF ART



THE CLEVELAND MUSEUM OF ART

ROMAN GARDEN IN THE MUSEUM

school buildings are fireproof and the new ones are conspicuous for completeness of detail. There are five colleges and two universities and one engineering school. Cleveland is the seat of Case School of Applied Sciences (q. v.), Western Reserve University (q. v.) and John Carroll University, all three recognized by the Carnegie Foundation as in the first rank. Cleveland Law School, the John Marshall School of Law, the Cleveland Institute of Music, the Schauffler College of Religious and Social Work, and the Cleveland School of Art offer training in their respective fields. There are numerous private commercial schools, and special schools for nurses' training, music, art, drama; and also professional and technical schools.

Charities.—The Welfare Federation of Cleveland, through its affiliated organizations, renders practically every kind of humane service. Upon its board of trustees it has specific representation of organizations, donors and the city-at-large. The Cleveland Community Fund, considered the pioneer of such community efforts, has raised more than $90,000,000 in 23 annual campaigns for the operating expense of these 100 organizations. Warrensville Farm Colony, municipally owned, is a widely known institution of charity and correction. Upon its 2,000 acres are located buildings for the care of tubercular patients; a home for the aged and infirm, with cottages where old couples can spend their last years together; a municipal work house, with fields for employment of its inmates at outdoor labor during open weather, and shops for winter. Cleveland had 30 organized hospitals, with a total of 5,614 beds in 1941. The Goodrich House, the Hiram House and Alta House are model social settlements. The city maintains a Boys' Home and a Girls' Home for incorrigibles, in connection with the juvenile court. Outstanding among institutions is the Western Reserve Hospital Group on the grounds of the university, dedicated to public welfare, including the Maternity Hospital, and the Babies' and Children's Hospital; City Hospital (municipal); Charity; Lakeside; Marine; Huron Road Hospital; Mt. Sinai; St. Luke's. The Cleveland Foundation was the pioneer community trust. In 1940 its active endowment was $6,750,000, third in size in the United States. Its main interest is to assist charitable and educational activities for the benefit of the community.

Public Health, etc.—The average annual mean temperature of Cleveland is 50.02° F.; the normal rainfall, 32.59 inches. The Department of Public Health includes the Bureaus of Communicable Diseases, of Child Welfare, of Food and Dairy Inspection, of Sanitation, and the Diagnostic Clinics.

Cleveland receives its water supply from Lake Erie through 2 tunnels with water stations or cribs some distance from shore; the waterworks have a capacity of 420,000,000 gallons per day. The municipality conducts 10 retail community markets for food products of all kinds. There is a municipal garbage plant.

Transportation.—Fine viaducts and bridges span the river, including the mammoth High Level Bridge, of reinforced concrete, double-decked, 2,880 feet long, joining Detroit Avenue and Superior Avenue, also the Lorain Central Viaduct and Maine Avenue Bridge, new structures of equal size. Cleveland is served by the City Railway Company. A private rapid transit line operates to Union Terminal from Shaker Heights and South Moreland Boulevard. Great railroads and ships link land and water-borne trade. Commercial air lines of coast-to-coast and other routes operate from the municipal airport. The Union Terminal, dedicated in 1930, offers facilities for all railroads entering the city.

Commerce.—Cleveland's remarkable growth in wealth and population is due mainly to its excellent geographical situation. It is the economic focus of the Lake Superior iron and the Middle State coal regions; and nowhere else in the United States can these two products be brought together with less cost for transportation. It is the greatest iron-ore market in the world and boasts the largest group of iron-ore docks. It is a port of entry and has a worldwide trade.

Manufactures.—The value of iron and steel products made here equals one-third the worth of all other Cleveland products, although the city is unrivaled for diversified manufactures (over 15,000 different articles). It leads in output of heavy machinery, malleable castings, wire nails, bolts and screws and ranks high in the production of steam hammers, punches, drills, forges, and automatic screw machines. It produces important amounts of tools, wire springs, fences, hoisting and conveying machinery, railroad supplies, stoves, scientific instruments, rayon, ships and boats, office furniture, tow-motors, sewing machines, kitchen utensils, washing machines, aluminum wares, lamps, reflectors, plumbing supplies, roofing materials, dental goods, cooperage products, toilet articles, clothing, brick and clay products, paint, automobiles and automobile parts and accessories, oil, printing presses, paper cutters, brooms and brushes, bakery products, and multigraphing machines. Meat packing, printing and publishing are important and the making of airplanes, butter, coffee and spices, canned goods, chemicals, and astronomical instruments.

Government.—In 1913 the people adopted a charter under which they were governed by a mayor and council until, by charter amendment in 1921, they adopted the city manager plan of municipal government with a council elected by proportional representation. The new plan did not become effective until 1924 and lasted only 7 years. It was said that it was unsuccessful because of unwise selection of members of the council—a fault which might occur under any form of city rule; nevertheless, in 1931, the people returned to the strong mayor form (effective in 1932). There is a council of 25 members of which the Standing Committee are the directors of the departments of finance, utilities, legislation, parks, public service, transportation, welfare development, safety, and river and harbor.

Population.—In 1940 the population was 878,375; in 1930, 900,429; 1920, 796,841; in 1910, 560,663; in 1900, 381,768.

History.—In 1786 the first cabin was built near the Cuyahoga by fur-traders and on July 22, 1796, Moses Cleaveland's surveying party laid out a city here for the Connecticut Land Company, which had purchased from Connecticut a vast tract of Western lands (see WESTERN RESERVE). During the War of 1812 the place was an important strategic point. It was incorporated as a village in 1814, as a city in 1836. The completion of the Ohio Canal to Portsmouth on the Ohio River, in 1834, opened up the commerce of the State with the South; and after 1850, railroad communication with Pittsburgh, the growth of Cincinnati and Chicago, and the improved harbor and lake navigation resulted in more rapid development. In July, 1896, the city celebrated the centennial of its founding, and in July, 1921, devoted nine days to a celebration of its one-hundred-and-twenty-fifth anniversary.

Cleveland's attempted solution of municipal ownership problems, especially that of street railways, has attracted wide attention. From 1901 to 1907, on that issue, it elected as mayor Tom L. Johnson (q. v.). Public ownership projects were checked, however, by the rejection of a three-cent-fare bill in 1908, and the defeat of Johnson in the mayoralty election of 1909. In 1910 the people approved the street railway franchise under which the company is now operating.

In 1913 a charter was adopted. During the third decade of the century the following buildings were completed: in 1925 the Baldwin Filtration Plant and Reservoir, costing $7,000,000, the largest covered reservoir in the world (14 acres); in 1928 the Terminal Tower Building (52 floors); in 1930 the Union Terminal (17 acres); in 1931 the Municipal Stadium on the lake (area, 12 acres, seating capacity, 102,129, cost $1,500,000). On May 15, 1929, an explosion in the Clinic Hospital killed 124 persons, including seven staff physicians. In 1938 the administration of the police department was reorganized and a two-way radio system installed in police cars. In 1939 Cleveland was adjudged the city having the most effective program for meeting public health problems, and also was credited with being the safest big city, together with Milwaukee. Between 1929 and 1939 Cleveland's 1,000-acre Municipal Airport was on several occasions the scene of the National Air Races which attracted world famous flyers. However, in 1941 the stands which often held 100,000 spectators were razed to make way for the $25,000,000 Aircraft Engine Laboratory operated by the National Advisory Committee for Aeronautics.

Consult W. R. Coates, *History of Cuyahoga County and the City of Cleveland* (3 vols., 1924); C. E. Kennedy, *Fifty Years of Cleveland* (1925); R. I. Kutak, *Manual of Cleveland* (1927); C. A. Post, *Doans Corners and the City Four Miles West* (1930); publications of the Cleveland Foundation.

Cleveland, city, Tennessee, county seat of Bradley county, on the Southern Railroad; 30 miles N.E. of Chattanooga. There are lead, manganese, kaolin, and silica mines in the vicinity. Stoves, flour, lumber, and chairs are manufactured. Pop. (1930) 9,136; (1940) 11,379.

Cleveland, parliamentary district in Northeast Yorkshire, England. It is in great part moorland, crossed by the Cleveland Hills, which are noted for their exceedingly rich deposits of iron ore (see CLEVELAND IRONSTONE). Effective working began about the middle of the nineteenth century; and the output rapidly increased, until at the end of the century it reached about 6,000,000 tons. Numerous blast furnaces are in operation. Middlesbrough (q. v.) is the center of the district. Cleveland also gives name to a fine breed of horses. Area, 420 square miles; pop. district (1931) 95,045.

Cleveland, CHARLES DEXTER (1802–69), American author and elucator, was born in Salem, Mass. He was professor of Latin and Greek in Dickinson College (1832–4), and professor of Latin in the University of the City of New York (1834). From 1861 to 1867 he was U. S. consul at Cardiff, Wales. He published: *Compendium of Grecian Antiquities* (1828); *Compendium of English Literature* (1850); *English Literature of the Nineteenth Century* (1851); *Compendium of American Literature* (1858); *Concordance to the Works of John Milton* (1867).

Cleveland, CLEMENT (1843–1934), American surgeon, was born at Baltimore, Md. He was a second cousin of President Grover Cleveland. A specialist in gynecology, Dr. Cleveland was one of the foremost leaders in his field. He was educated at Harvard and took his M.D. degree at the College of Physicians and Surgeons (Columbia) in 1871. He was attending surgeon at City Hospital (N. Y.) 1873–1880; attending surgeon, 1882–1915, surgical director, 1915–1920 (emeritus) at the Woman's Hospital, and consulting surgeon at the Memorial Hospital from 1882 for 52 years. He was a member of the American Gynecological Society (President, 1906–7); the New York Obstetrical Society (President, 1894–99), and vice-president of the American Society for the Control of Cancer. Dr. Cleveland was the inventor of many surgical instruments and appliances, the most noted of which was the Cleveland Operating Table. He also devised a ligature carrier which had wide use, and modified the speculum for gynecological work.

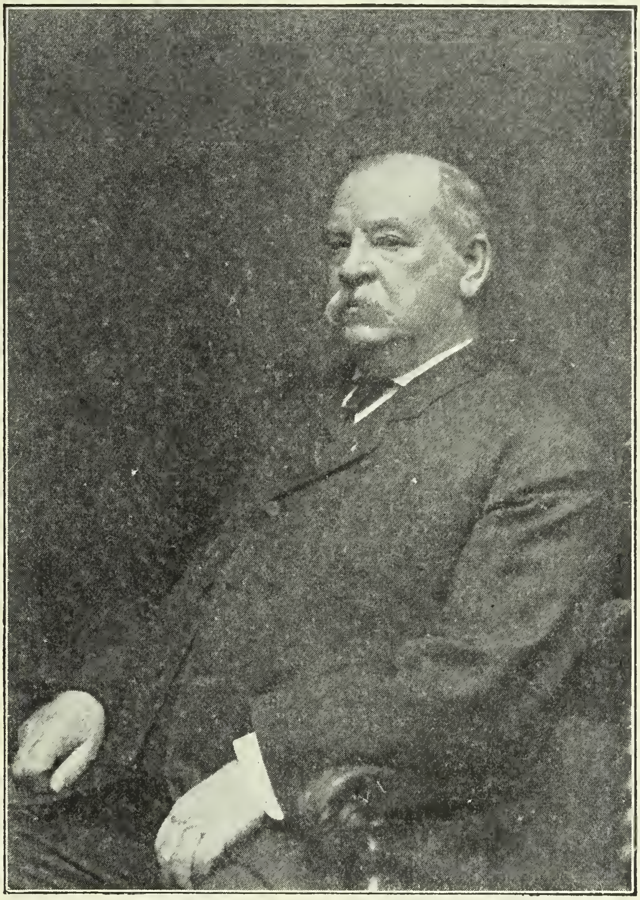
Cleveland, FREDERICK ALBERT (1865–), American lawyer and economist, born in Illinois. In 1896 he took up the study of economics and political science at the Universities of Chicago and Pennsylvania; was instructor in finance at the University of Pennsylvania (1900–03); professor of finance at the New York University School of Finance (1903–05); on commission on the finances of New York City (1905); and director of the New York Bureau of Municipal Research (1907–17). From 1911 to 1913 he was chairman of President Taft's Commission on Economy and Efficiency. He assisted in the organization of the National Institute of Government Research in 1916, was secretary of the Industrial Service and Equipment Company (1917–18); professor of U. S. Citizenship on the Maxwell Foundation, Boston University (1919–20); member of the commission of Financial Advisors to the Chinese National Government (1929–30) and chief inspector of salt revenue, China (1931–35). He wrote *Growth of Democracy in the United States* (1898); *Railroad Finance* (with F. W. Powell, 1912); *Organized Democracy* (1913); *The Budget and Responsible Government* (with A. E. Buck, 1920); *American Citizenship, as Distinguished from Alien Status* (1927); *Modern Scientific Knowledge* (1929).

Cleveland Heights, a city of Cuyahoga county, Ohio, adjoining Cleveland on the east. It is a residential suburb, was incorporated a village in 1903 and became a city in 1922. Pop. (1930) with part of South Euclid village, annexed in 1928, 50,945; (1940) 54,992.

Cleveland, JOHN (1613–58), English Cavalier poet, was a fellow of St. John's College, Cambridge (1634–43), but forfeited his fellowship for having opposed Cromwell's election to the Long Parliament. He acted as judge advocate at Newark, and was arrested at Norwich (1655), but after three months' imprisonment was released by Cromwell. He wrote satires, and published *Poems.*

Consult the bibliography of Cleveland's poems in J. M. Berdan, *The Poems of John Cleveland* (N. Y. 1903); this work describes no fewer than 23 editions, chief among them being *The Character of a London Diurnal, with Several Select Poems* (1647), and *Poems. By John Cleavland, with additions never before printed* (1659).

Cleveland, (STEPHEN) GROVER (1837–1908), the twenty-second and twenty-fourth President of the United States, was born in Caldwell, Essex county, N. J., the son of Richard F. Cleveland, a Presbyterian minister, whose ancestor, Moses Cleveland, an Englishman, settled in Massachusetts in 1635. The family removed (1841) to Fayetteville, N. Y., and later to Clinton, N. Y. For a short time (1853) Grover was a teacher in the New York Institution for the Blind. In 1855 he began to study law in Buffalo, and there in 1859 was admitted to the bar. He was assistant district-attorney of Erie co., N. Y. (1863–5), was sheriff of Erie co. (1870–3), and as a member of the law firm of Cleveland and Bissell gained a large practice. In 1881, as the Democratic candidate but largely by independent votes, he was elected mayor of Buffalo, where the Republicans were normally predominant. In this position he attracted such general attention by his efficiency and independence—he became known as the 'veto mayor'—that in 1882 he was made the Democratic candidate for governor of New York, and, partly because the Republican Party was then weakened by dissension, two factions, the 'Stalwarts' and the 'Halfbreeds,' bitterly contending for the mastery, he was elected by an enormous majority over his Republican opponent, Charles J. Folger. As governor he insisted on the application of strict business methods in the administration of public affairs, he did much to bring about the passage of a civil service law, he worked unremittingly, supervising even the details of the executive department, and he again showed his independence by making a liberal use of his veto power. His administration of this office, indeed, gave him a national reputation, and in 1884, when the national political situation was somewhat similar to what the political situation in the state had been two years before, he was nominated for the presidency by the Democratic Party. The Republicans had previously nominated James G. Blaine (q.v.), who was bitterly opposed by a large faction, later known as 'Mugwumps,' within his own party, and it was believed that Cleveland, whose sincerity and sturdy honesty were generally recognized, was the only prominent Democrat who could draw the support of these Republican dissidents. Cleveland, however, also met with factional opposition in the Democratic Party, Tammany Hall in particular being strongly against him. The campaign which followed was marked by almost unprecedented vituperation, the personal characters of each candidate being assailed and both candidates being mercilessly lampooned and vilified. The result of the election was for several days in doubt, but Cleveland was finally declared elected by an electoral vote of 219 to 182. As President (1885–9) Cleveland did much for civil service, also for army pension reform, and once more showed his independence by an unprecedentedly free use of the veto power, particularly as regards private pension bills. On June 2. 1886, he married Miss Frances Folsom, the daughter of his former law partner. The wedding was celebrated at the White House. In his annual message of 1887 he vigorously advocated a revision of the tariff in the direction of free trade, and it was largely on this issue that, renominated by his party in 1888, he was defeated for re-election by his Republican opponent, Benjamin Harrison, though he received a plurality of the popular vote. In 1892, however, once more the candidate of his party, he defeated Harrison by an electoral vote of 277 to 145, the tariff issue being again to the front, particularly because of the passage, during Pres. Harrison's administration, of the McKinley Act, obnoxious to a large element of the electorate. Pres. Cleveland's second administration (1893–7) was marked by his immediate withdrawal from the Senate of the Hawaii annexation treaty negotiated by his predecessor, by the repeal of the Sherman Silver Purchase Act of 1890, by the dispersal of rioters in Chicago by U. S. troops during the great Pullman strike (1894), by the enactment of the Wilson Tariff Bill, which the President allowed to become a law without his signature, by the difficulty with England concerning the boundary dispute between that country and Venezuela, Pres. Cleveland sending to Congress a somewhat belligerent message on this subject in Dec., 1895, and by the irreconcilable division of the Democratic



Grover Cleveland.

Copyright, Pach Bros., N. Y., 1904.

Party between the Free Silver and Gold Standard elements, the President standing at the head of the latter. (See Free Coinage; and for a more complete account of Cleveland's two administrations, see United States.) In the dispute with Great Britain over the Venezuela boundary, Cleveland's insistence upon the Monroe Doctrine (q.v.) fixed its fundamental claim and meaning in the national consciousness. His vigorous repudiation of Free Silver drew the financial line of Democratic cleavage in 1896; and it may be said that his firm, though conservative, advocacy of his party's principles has been memorably epitomized in the phrase 'a Cleveland Democrat.' After leaving office, at variance with the majority of his own party, which refused in national convention to commend his administration, he retired to private life at Princeton, N. J. He subsequently delivered before the students of Princeton University a series of lectures, a collection of which was published as *Presidential Problems* (1904). In June, 1905, he was made a member of a board appointed to reorganize the Equitable Life Assurance Society, as the result of the investigations of the Armstrong Committee of the N. Y. legislature. Consult *Messages of the Presidents;* R. M. McElroy, *Grover Cleveland* (1923); D. T. Lynch, *Grover Cleveland* (1932); A. Nevins, *Grover Cleveland* (1932).

Cleveland Ironstone, a well-known and important band of clay ironstone which occurs in the Middle Lias of Cleveland in Yorkshire, England. It is generally dark green in color, and contains about 60 per cent. of carbonate of iron, with a certain amount of clay, silica, phosphates, and other impurities. Its structure is usually oolitic, and this, together with the presence of shells, such as Avicula and Pecten, renders it fairly certain that the bed has originally been a limestone, and that carbonate of iron has replaced the carbonate of lime. The seam is sometimes twenty feet thick, and is extensively worked in the neighborhood of Middlesbrough.

Cleves. See Kleve, Anne of.

Clew Bay, on W. coast of Co. Mayo, Ireland, is about 14 m. long by 8 m. wide, and contains many small islands. Clare I. stands at its entrance.

Clews, the lower corners of square-sails and the aftmost corner of fore-and-aft sails, the other lower corner being the tack. The clews of a hammock are the combination of small lines by which it is suspended.

Clews, Henry (1830–1923), American banker, was born in Staffordshire, England, and when visiting New York in 1845 decided to enter business there. He became a partner in the firm of Stout, Clews and Mason in 1858, which under its later name, Livermore, Clews & Co., acted as the agent of the U. S. Government in selling bonds during the Civil War. In 1877 the firm of Henry Clews & Co. was organized and has been since a most flourishing house. Mr. Clews published *Twenty-eight Years in Wall Street* (1888) and *The Wall Street Point of View* (1900).

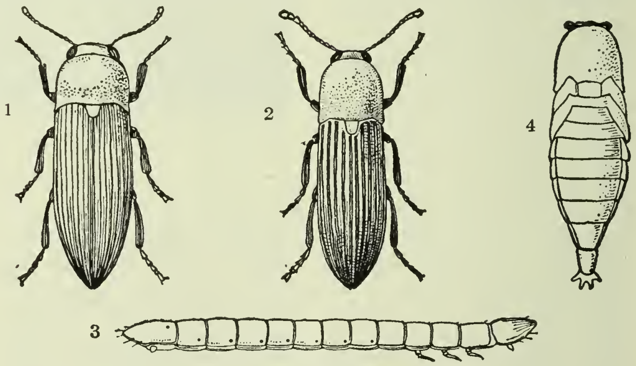
Clianthus, a small genus of tender shrubs belonging to the order Leguminosæ, with pinnate leaves and uniquely showy flowers. The parrot's beak, or glory vine (*C. puniceus*), when protected from extreme cold, produces bunches of quaint scarlet, boat-shaped flowers, with large keels. The plant should be frequently syringed. The glory pea (*C. Dampier*) may also be grown out of doors south of Washington. It bears racemes of rich scarlet-and-black flowers. The treatment is the same as for *C. puniceus*, though frequent syringings are even more important. It has a variety (*C. Dampier marginatus*) which has one of its petals almost white. *C. Dampier* is usually raised from seed, and *C. puniceus* from cuttings.

Clichy, or Clichy-la-Garenne, tn. forming a N.W. suburb of Paris, France, on r. bk. of Seine, and between the river and the fortifications. It was founded by the early Merovingian kings, and has starch, oil, candle, and chemical works. Pop. (1926) 50,427.

Click-beetles, or Skipjacks, insects belonging to the family Elateridæ, whose larvæ, often called 'wireworms,' are very destructive to crops. The adults live on herbs of various kinds, and when alarmed drop suddenly to the ground; here they often alight on their backs, and the legs are too short to be used in righting the body. The beetles then bend back the hinder part of the body, and suddenly releasing the tension are tossed into the air and alight on their feet. The spring is accompanied by a clicking sound (whence the popular name). An example is *Agriotes lineatus*, the striped click-beetle.

Client in modern law. See Principal and Agent. The name was given in ancient Rome to a class of citizens to describe their dependence on a patron, who was a patrician. It was the duty of the patron to advise and protect his clients in legal affairs, and generally to guard their interests as he did those of his own children; of the client to contribute to the dowry of his patron's daughters, to his ransom, or to payment of his legal or official expenses, and generally to serve his interests. Neither party could accuse the other, or appear as evidence or vote against the other. In modern usage it is applied to one who employs an attorney or counsellor at law to conduct a lawsuit for him or to take charge of his legal affairs.

Cliff Dwellings. This term is specially applied to certain remarkable ruins found in Arizona, Utah, New Mexico, and W. Colorado. The original dwellings consisted of one or more well-built houses of stone and lime, two or three stories in height, with rectangular doors and windows, in some degree suggesting an affinity with the Indian *pueblos* of the same region. Indeed, recent research has demonstrated that they owe their existence to the immediate predecessors of the Pueblo Indians. But the situation of these cliff dwellings is



Click Beetles.

1, 2, Click Beetles, or Elaters; 3, Wire-worm (larva of 1); 4, Pupa of Elater.

what constitutes their most remarkable feature and gives them their name; for they are perched in cavelike, horizontal recesses of the almost perpendicular cliffs that line the gorges or cañons of that territory, appearing, at the first glance, inaccessible either from the cliff-top or from the valley below. In some cases—as in one ruin in the valley of the Rio de Chelly, Arizona—a winding staircase or ladder of footholes has been cut in the steep rock face, from the valley up to the ledge on which the house is placed. But in most instances the ascent must have been made by a series of ladders of wood or of rope. Among the most important and interesting of the cliff dwellings are those in Mesa Verde National Park, Colorado (see illustration). Consult Fewkes' *Archæological Expedition to Arizona* and *Antiquities of the Mesa Verde National Park;* G. Nordenskiold's *The Cliff Dwellers of the Mesa Verde.*

Clifford, Sir Hugh (1866–Dec.19,1941), English government official, entered the Malay States civil service in 1883; was British resident at Pahang till 1899, governor and commander-in-chief of Labuan and British North Borneo (1900–1); British resident at Negri Sembilan (1901); acting colonial secretary at Trinidad (1903–7). He administered the government of Trinidad (1904–1906); of Ceylon (1907, 1909, 1911, 1912); was governor and commander-in-chief of the Gold Coast (1912–19); governor of Nigeria (1919–25); of Ceylon (1925–7); of the Straits Settlements and high commissioner for the Malay States and British agent for Borneo (1927–29). He wrote *In Court and Kampong* (1897); *Further India* (1904); *The Downfall of the Gods* (1911); *The Further Side of Silence* (1916); *The German Colonies* (1918); *In Days that Are Dead* and *A Prince of Malaya* (1926); *Bush-Whacking and Other Asiatic Tales and Memories* (1929); *Malay Dictionary* (with Swettenham, 1894).

Clifford, John (1836–1923), English Baptist minister, was one of the leading Nonconformists of his time. At the age of ten he went to work in a factory. Following his conversion and baptism he entered Midland Baptist College at Leicester in 1855 and three years later became pastor of the Baptist Church in Praed-street, London. The congregation removed to Westbourne Park in 1877, and became an extraordinary religious, philanthropic and educational center. Continuing his studies at the London University, Clifford took the B.Sc., LL.B. and M.A. degrees with highest honors. For nearly 50 years he preached to overflowing congregations; with the fiery spirit of a crusader he thundered from pulpit and platform for the uplift of humanity and honesty in politics. He fiercely opposed the South African War (1899–1902) and denounced the government's Education Act of 1902, when he founded the 'Passive Resistance League' for refusing to pay taxes that would go to denominational education. He at first opposed Great Britain's entry into the World War, but changed his mind later. Consult C. T. Bateman, *John Clifford* (1904); D. Crane, *John Clifford* (1908); Rev. Sir James Marchant, *Life and Letters of Dr. John Clifford* (1924).

Clifford, Lucy Lane (d. 1929), English novelist, daughter of John Lane, and widow of William Kingdon Clifford. Her novels include *Mrs. Keith's Crime* (1885); *Aunt Anne* (1893); *A Flash of Summer* (1895); *Woodside Farm* (1902); *Sir George's Objection* (1910); *The House in Marylebone* (1917); *Mr. Webster and Others* (1918); and *Miss Fingal* (1919). She also wrote plays and books for children.

Clifford, Nathan (1803–81), American jurist, was born in Rumney, N. H. He served in the Maine Legislature (1830–4), and was attorney-general of Maine from 1834 until his election to Congress as a Democrat (1839–43). In 1846 President Polk made him U. S. Attorney General, and two years later he was appointed U. S. commissioner to Mexico to arrange peace terms and a treaty. In 1858 he was appointed by Buchanan associate justice of the U. S. Supreme Court.

Clifford, William Kingdon (1845–79), English mathematician, was born in Exeter. He was appointed professor of mathematics and mechanics at University College, London, in 1871, and was made a fellow of the Royal Society in 1874. His works include *Elements of Dynamics* (1878), and *Lectures and Essays.*

Cliffside Park, borough, New Jersey, Bergen county, on the Hudson River, opposite New York City and overlooking the Palisades. It is a residential place and has a lumber yard, moving picture laboratories and manufactures of buttons and embroidery. Pop. (1930) 5,057.

Clif'ton, town, Arizona, county seat of Greenlee county, on the Southern Pacific Railroad; 180 miles southeast of Phoenix. Important industries are copper mining and stock raising. Pop. (1930) 2,305.

Clifton, watering place, England, a suburb of Bristol, notable for the beautiful wooded gorge of limestone rocks through which the Avon here flows. The river is spanned by a suspension bridge 703 feet in span and 245 feet in height. Clifton is the site of Clifton College (q. v.), and a commodious spa and pump room have replaced the famous Hotwells known since the days of Fanny Burney. Observatory Hill has traces of Roman occupation.

Clifton, city, New Jersey, Passaic county, on the Erie Railroad; 5 miles south of Paterson and 15 miles northwest of New York City. Pop. (1930) 46,875.

Clifton College, public school in Bristol, England, founded in 1862, and chartered in 1877. It has classical, modern, and military courses.

Clifton Forge, city, Virginia, Alleghany county, on the Chesapeake and Ohio Railroad; 192 miles northwest of Richmond. Manufacturing establishments include foundries and machine shops, and flour and planing mills. Limestone and iron ore are found in the surrounding territory. Pop. (1930) 6,839.

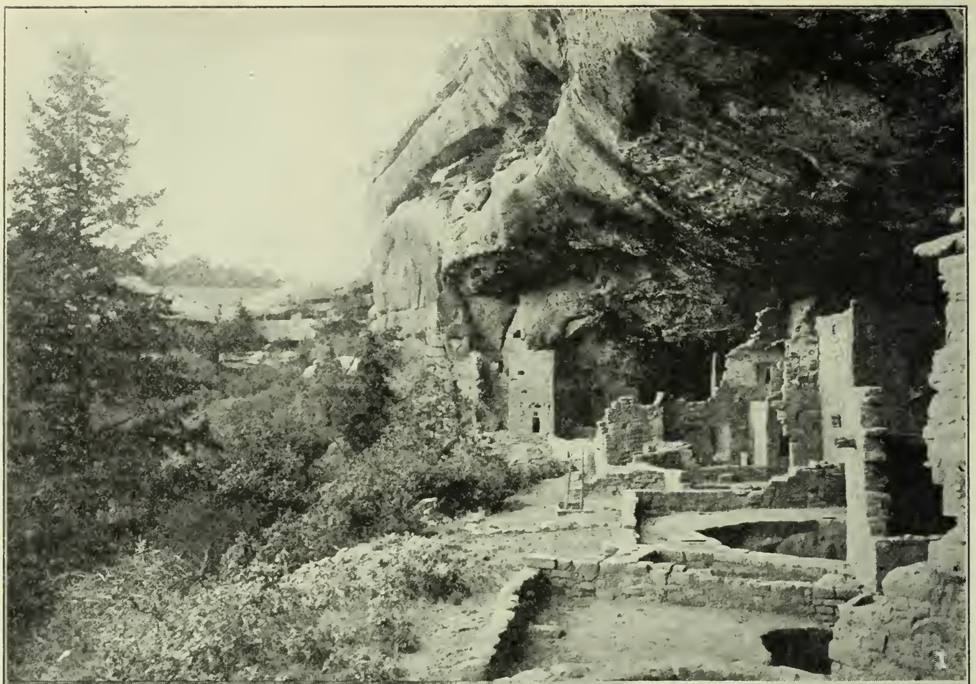
Clifton Heights, borough, Pennsylvania, Delaware county, a suburb of Philadelphia, on Darby Creek, and on the Pennsylvania Railroad. It has manufactures of textiles. Pop. (1930) 5,057.

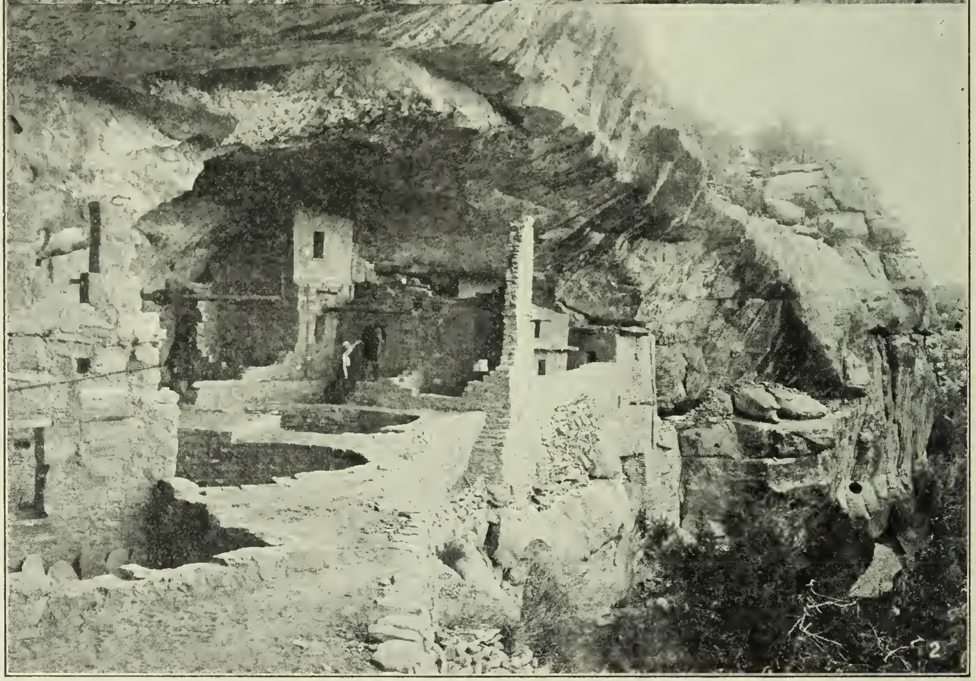
Climacteric. See Menopause.

Climac'teric Years, a term formerly applied to the seventh and ninth years of man's life, with their multiples by the odd numbers, which were considered critical points in one's life and fortunes. The sixty-third year —the multiple of the mystical numbers 7 and 9 was the *grand climacteric.*

Climate, a generalized term for the characteristic weather of a locality or region. The important climatic elements are temperature, moisture, wind.

The division of the world by Parmenides of Elis (*c.* 430 B.C.) comprised 5 zones; a central torrid zone, a north and a south temperate zone, and frigid zones. According to Ptolemy, the climate was solely a matter of latitude, and this is an important factor, the effect of the solar rays being greatest at the equator, where they fall perpendicularly, and least at the poles, where practically all their heat is absorbed by the atmosphere before they reach the earth. On ascending a mountain, one finds the same sequence of climates, so far as determined by tempera-





CLIFF DWELLINGS, MESA VERDE NATIONAL PARK, COLORADO

1. Spruce Tree House, 216 feet long, 89 feet at the widest part, contains the ruins of 114 rooms, 8 of which were circular kivas or ceremonial rooms built beneath the ground. The remainder were used as living, storage, or mortuary chambers. Some of the rooms have had one or even two stories built above them. It is estimated that the structure housed 350 persons.

2. Balcony House, so named from the well preserved balcony skirting the precipitous lower edge of the cliff. The chief character of Balcony House is its defensive site and the extra works constructed to increase its inaccessibility, the approach to the southern end being only through a narrow tunnel.

Vol. III.—

ture, which are met with in travelling from the same station to the polar regions. The decrease of temperature with height is normally 1° F. for every 300 feet.

The relative distribution of land and water is a very potent factor in climate, and especially in the presence of large deserts or oceans. At Verkhoyansk, Siberia, the hottest month has a mean temperature of 58.6 F. the coldest a mean of −61.2 F., while the corresponding values in the Falkland Islands were 49.5 F. and 36.0 F. respectively.

Climate is profoundly affected by oceanic currents, which bring, to a certain extent, the climate of the region whence they come. The Galapagos Islands, for example, are much colder than islands northwest of them, due to the chilling influence of a large quantity of Antartic water, which is turned equatorward by the extremity of South America.

Proximity of mountain ranges materially affects the climate of places situated to leeward of them, deflecting the winds, which they drain of much of their moisture. Localities thus placed have much colder winters and hotter summers than regions lying to windward, which are protected by a screen of aqueous vapor from the full effects of both solar and terrestrial radiation. The excessive dryness of the climate of Colorado, just under the lee of the Rocky Mountains, is due to the fact that the prevailing winds have their moisture discharged by contact with the windward side of a mountain range.

The permeability or impermeability to moisture of various soils, also affects the climate. Sandy soils retain little moisture; but clays hold from ten to twenty times as much, and thus render the air in contact with them cold and damp. Vegetation also affects climate, which is comparatively uniform and humid where the growth of trees and plants is luxuriant. The effect, however, varies with the nature of the vegetation; evergreens cause less dampness than deciduous trees, and grass meadows than ploughed lands.

The effect of winds on climate is marked, for they bring with them the characteristic climatic features of the region of their origin. The mildness of the British Islands, for example, is mainly attributable to the prevailing southwest winds, which reach them after having traversed a wide expanse of ocean.

Frequency and seasonable distribution of rainfall is also important. A moderate downfall spread over many days, as in Ireland, constitutes a wet climate; while a much greater rainfall confined to a few months of the year may be characteristic of what is essentially a dry climate, as in India and other tropical regions. The effect of snow is marked. Being a poor conductor of heat, it protects the soil from excessive cold, but, at the same time, materially lowers the air temperature over it, so that the severest frosts usually occur when the country is covered with a deep coat of snow.

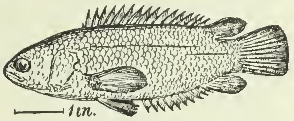
Comparisons of temperature are expressed by isotherms, lines drawn on a map through places which have the same temperature for any period. Except in lowlands, they give little useful indication of real climate since they ignore the effect of altitude; they are, however, instructive in theoretical investigation and also in determining climate at sea level.

Climatic change in geological time is evidenced by the nature of fossils and rocks. Boulder clays indicate glacial climates; salt and gypsum, aridity; coal, tropical. Thus, the British Isles seem to have experienced the following changes—tropical (Upper Carboniferous), sub-tropical (Triassic), cool temperate (Cretaceous); warm temperate (Eocene), and arctic (Quarternary). In historical time, climate appears to have oscillated above and below a certain mean of temperature or humidity. So complicated are the facts involved in the many hypotheses relating to the causes of climatic change as to leave scientists guessing. Changes in relief and level are no doubt major elements.

See Meteorology; consult publications of U. S. Weather Bureau; K. C. Edwards, *The ABC of Climate* (1930); W. G. Kendrew, *Climate* (1930); A. A. Miller, *Climatology* (1931).

Cli′matolog′ical and Clin′ical Association, American, a society for research in climatology, hydrology, and diseases of the respiratory and circulatory systems founded in New York in 1883. Annual meetings are held, and the association convenes every third year at Washington as a participant in the Congress of American Physicians and Surgeons. An annual volume of transactions is published.

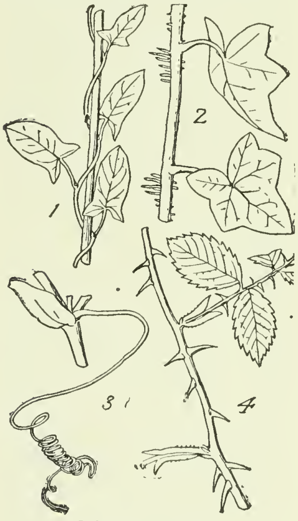
Climbing Perch (*Anabas scandens*), a bony fish, found in the East, particularly in the Ganges region of India. It is about six inches long, reddish olive in color, and has a remarkable superbranchial organ above the gills, which apparently assists the process of respiration when the fish is out of water. By means of the strong spines of its pectoral fins, it can move over land surface, and is even said to climb trees.



Climbing Perch

Climbing Plants, plants which climb by means of twining, or by tendrils, aerial roots, or other structures. In the tropics they are often of imposing size and splendor, and even in temperate regions exhibit many forms of beauty. Some, as the convolvulus (q. v.), climb by twining the main stem around a support, revolving in, or opposite to, the direction of the sun's passage, according to species; some, like the grapevine, the pea, and the passion flower (qq. v.), climb by tendrils; others, as the rose (q. v.), by means of prickles; and yet others, as the ivy (q. v.) and certain varieties of ampelopsis (q. v.), by means of aerial roots.

In gardens, climbing plants are of the greatest possible value for covering walls and trellises, concealing unsightly buildings, and covering arches, bowers, pergolas, old tree-stumps, pillars, and poles. In order to flourish properly, they must have space, depth of rich soil, and suitable objects up which to climb. Certain plants also require that their lower parts, which in nature are



Climbing Plants

1. Convolvulus (twining stem). 2. Ivy (aerial roots). 3. Sweet pea (tendrils). 4. Rose (prickles).

concealed by the herbage about them, be shaded from direct sunlight.

Climbing plants are both annuals and perennials. Of the former, some are hardy, and may be sown in the open air, as nasturtiums, the canary creeper, and sweet-peas. The number of perennial climbing plants is much greater. Roses, brambles, clematis, vines, ampelopsis, hops, tropæolums, honeysuckles, wistaria, jasmine, and perennial peas are but a few of the deciduous species. Among climbers which are evergreen, at least in many regions, are the ivy, passion flower, Bignonia capreolata, white jasmine, and some of the smilaxes. Consult Darwin's *Climbing Plants* and S. Arnott's *The Book of Climbing Plants and Wall Shrubs*.

Clinch River, a river of Virginia and Tennessee. It rises in the western part of Virginia near the Sandy Ridge of the Alleghenies, flows southwest, and joins the Holston River at Kingston, Tenn., to form the Tennessee. Its length is about 250 miles.

Clinedinst, klīn'dinst, BENJAMIN WEST (1859–1931), American artist, was born in Woodstock, Va. He attended the Virginia Military Institute, studied art at the École des Beaux Arts, Paris, and later became a pupil under Cabanel and Bonnat in that city. His work in black and white has been largely devoted to the illustration of books and magazines, and his paintings in oil and water color have been principally genre work and portraits. He was elected a member of the National Academy in 1898.

Cling'man, THOMAS LANIER (1812–97), American political leader and soldier, was born in Huntsville, N. C. He was graduated from the University of North Carolina in 1832, studied law, entered politics, as a Whig, and was elected to the North Carolina House of Commons in 1835 and to the State Senate in 1840. He was a representative in Congress (1843–5 and 1847–58), first as a Whig and then as a Democrat; was a U. S. Senator (1858–61); and in the period before the Civil War was one of the most prominent of the Southern leaders. In January, 1861, he withdrew from the Senate (from which he was formally expelled in July), and after May, 1862, was a brigadier-general in the Confederate army, taking part in the defense of Charleston, S. C., in the battles of Drewry's Bluff and Cold Harbor, and in the operations in 1864 about Petersburg, Va. He devoted considerable attention to science; explored the mountains of North Carolina, determining the altitude of Clingman's Peak, named in his honor, and discovered the existence of various minerals in his native State. A peak of the Great Smoky Mountains in North Carolina, known as Clingman's Dome, was also named in his honor. A volume of *Selections from the Speeches and Writings of Thomas L. Clingman* was published in 1877; he also published *Follies of the Positive Philosophers* (1878).

Clin'ic, strictly the examination and treatment of a patient in the presence of a class of students for their instruction. The term is popularly applied to an institution, usually in connection with a medical school, for the free treatment of patients who are able to go to and from their homes. A clinic may be differentiated from a dispensary in that its primary object is to teach, treatment being offered as a means to this end.

Clin'ical Medicine (Gr. *kline*, 'bed'), the practical teaching of medicine or surgery by demonstration of disease and its treatment at the bedside, in hospital wards, etc.

Clinker-built (formerly 'clincher-built'; from *clinch*, 'to rivet'), a term applied to a boat or ship built with the lower edge of each plank overlapping the one below it, like the shingles on a roof.

Clink'stone. See PHONOLITE.

Clinometer, klī-nom'i-ter, an instrument used by surveyors, mining engineers, miners, and geologists for measuring the inclination or slope of surfaces. In its simplest form it consists of a plummet attached to a divided scale, so arranged that when the instrument is placed on a horizontal surface the extremity of the plummet is opposite the zero of the graduation, and if the surface is inclined, the angle of slope is recorded by the position of the plummet on the scale.

Clinton, town, Ontario, Canada, Huron county, on the Canadian National Railway, 130 miles west of Toronto and 50 miles north of London, Ontario. It is a shipping centre for livestock and agricultural products, and has saw-, planing-, knitting-, flour- and grist mills, foundries, piano, organ, sash, door, clothing and automobile factories. The town owns its light and water systems. Niagara electric power is available. There is excellent fishing and fine scenery. Pop. (1931) 1,789.

Clin'ton, city, Illinois, county seat of Dewitt county, on the Illinois Central Railroad; 45 miles northeast of Springfield. Railroad shops and garment factories are located here. Pop. (1930) 5,920.

Clinton, city, Iowa, county seat of Clinton county, on the Mississippi River, here crossed by bridges, and on the Chicago, Milwaukee, St. Paul and Pacific, the Chicago, Rock Island and Pacific, the Chicago and North Western, and the Chicago, Burlington and Quincy Railroads; 140 miles west of Chicago on the Lincoln Highway. Clinton is the seat of Wartburg College (Luth.), and has a modern high school, hospitals, a coliseum, and Y. M. C. A. and Y. W. C. A. buildings. It has large railroad shops, bridge works, corn syrup and glucose factories, and manufactures of furniture, gasoline engines, stock feeds, shoes, builders' hardware, and wire cloth. Pop. (1930) 25,726.

Clinton, town, Massachusetts, Worcester county, on the Nashua River and on the Boston and Maine, and the New York, New Haven and Hartford Railroads; 35 miles west of Boston. It has rayon, carpet, worsted, and wire factories. Pop. (1930) 12,817.

Clinton, city, Missouri, county seat of Henry county, on the Missouri-Kansas-Texas, and the St. Louis-San Francisco Railroads; 75 miles southwest of Kansas City. It is a shipping centre for agricultural produce, has manufactures of flour, shoes, and creamery products, and is in the vicinity of hard wood timber, coal mines, and clay pits. Pop. (1930) 5,744.

Clinton, village, New York, Oneida county, on the New York, Ontario and Western Railroad; 9 miles southwest of Utica. It is the seat of Hamilton College (q. v.). There are vegetable canneries and manufactures of paint and knit goods. Iron mines and stone quarries are in the vicinity. Pop. (1930) 1,475.

Clinton, city, Oklahoma, Custer county, on the Washita River, and on the Chicago, Rock Island and Pacific, the St. Louis-San Francisco, the Atchison, Topeka and Santa Fé, and the Panhandle and Santa Fé Railroads; 80 miles west of Oklahoma City. It is in an agricultural region, is a wholesale trading centre for poultry, dairy produce and oil; manufactures flour, feed, oil, and bricks, and has a packing plant and creamery. Pop. (1930) 7,512.

Clinton, town, South Carolina, Laurens county, on the Seaboard Air Line, and the Atlantic Coast Line Railroads; 60 miles northwest of Columbia. It is the seat of the Presbyterian College of South Carolina, of the State Training School, and of Thornwell Orphanage. Cotton is manufacfactured. Pop. (1910) 3,272; (1920) 3,767.

Clinton. See NEWCASTLE, DUKES OF.

Clinton, DE WITT (1769–1828), American political leader, was born in Little Britain, N. Y. He was graduated from Columbia College in 1786, studied law, and was admitted to the bar in 1788. In 1790–95 he was private secretary and an ardent supporter of his uncle, George Clinton, then governor of New York. In 1798 he was a member of the State Assembly, and in 1799–1802 of the State Senate, during part of this time being also a member of the influential Council of Appointment, in which capacity he engaged successfully in a contest with Governor John Jay over the question of the appointment and removal of public office-holders. He was a member of the U. S. Senate (1802–3), was three times mayor of New York City (1803–7, 1808–10, and 1811–15), was again a State senator (1806–11), and was lieutenant-governor of New York (1811–13). Gradually he came to be the most influential leader of his party, the Democratic-Republican, in New York—in later days, indeed, he would undoubtedly have been called a party 'boss'—but his control was not undisputed (see BUCKTAILS), and his own adherents came to be designated as 'Clintonians.' In 1812, under circumstances which are generally regarded as being not altogether creditable to him—Stanwood calls his canvass 'one of the most unpleasant chapters in American political history'—he was the coalition candidate of the peace Republicans (though he himself does not seem to have been against war with Great Britain until Madison definitely favored it) and the Federalists for the presidency against Madison, but was defeated by an electoral vote of 89 to 128. His principal service was rendered as canal commissioner of New York and as governor of the State (1817–22 and 1824–7), in which capacities he helped to establish the free-school system, secured the modification of criminal laws, did much for the promotion of science and did more than any other one man to bring about the construction of the Erie Canal, which by his opponents was long called derisively 'Clinton's Ditch.' Consult Renwick's *Life of De Witt Clinton*, and Campbell's *Life and Writings of De Witt Clinton*.

Clinton, GEORGE (1739–1812), American statesman, was born in Little Britain, N. Y. He served under his father, Charles Clinton (1690–1773), in the French and Indian War; then studied law under Judge William Smith, and practised successfully in Ulster county, N. Y. In 1768 he was elected to the lower house of the New York legislature; and in the period immediately preceding the Revolutionary War he was prominent as a Whig or Patriot. He was a member of the Continental Congress in 1775–7, and served during that time as a brigadier-general in the Continental Army, being in command for a time in the Highlands of the Hudson, and carrying on a brave but unsuccessful defense of Forts Montgomery and Clinton. He was the first governor of the State of New York, serving in that capacity for eighteen consecutive years (1777–95), and again in 1801–4. In 1788 he presided over the New York convention, which notwithstanding his opposition, ratified the Federal Constitution. After the organization of the national government, he became the leader in New York first of the Anti-Federalists and later of the Democratic-Republicans. He received electoral votes for the vice-presidency in the elections of 1789, 1792, and 1796, and in 1804 was elected, serving, by reelection in 1808, until his death.

Clinton, SIR HENRY (?1738–95), British soldier, prominent in the American Revolution, was born in Newfoundland. He entered the British army in 1751, became a major-general in 1772, and in 1775, with Generals Howe and Burgoyne, joined General Gage at Boston. He took part, as a volunteer, in the battle of Bunker Hill (June 17, 1775), and in the summer of 1776 he commanded the land forces sent by sea to South Carolina, but returned to Staten Island after the failure of the attack on Fort Moultrie (q. v.) in Charleston Harbor. He then took part in the battle of Long Island (Aug. 27, 1776), was for some time in command in New York City, captured Forts Clinton and Montgomery in the Hudson River Highlands in 1777, and in 1778 at Philadelphia succeeded General Howe in command of the British forces in America. On his way across New Jersey from Philadelphia to New York he fought Washington at Monmouth (q. v.). In December, 1779, he led an expedition against South Carolina, which captured Charleston, returning to New York in June, 1780. In May, 1781, he was superseded by Sir Guy Carleton. He was a member of Parliament (1772–84), and in 1794 became governor of Gibraltar.

Clinton, HENRY FYNES (1781-1852). English chronologist, was born in Gamston, in Nottinghamshire. He represented Aldborough in Parliament (1806–26). His works on ancient chronology, *Fasti Hellenici* (1824–34) and *Fasti Romani* (1845–51), are still of value.

Clinton Stage, in geology, a subdivision of the Silurian (q. v.).

Clintonville, city, Wisconsin, Waupaca county, on the Chicago and North Western Railroad; 128 miles north of Milwaukee. Pop. (1910) 1,747; (1920) 3,275.

Clio, klī'ō, the muse of history. See MUSES.

Cliona, klī'ō-n*a* *or* klī ō'n*a*, a boring sponge, important in that it brings about the rapid disintegration of shells.

Clione, klī'ō-nē *or* klī-ō'nē, a genus of pteropod molluscs. It includes the little *Clione limacina*, important because it furnishes a large part of the food of the whalebone whale. There is no shell, and the animal swims by means of two lateral lobes of the foot placed at the sides of the head.

Clipper, a sailing ship built expressly for speed. Aberdeen, Scotland, was long celebrated for building swift tea-clippers, which since 1860 have been gradually superseded by steamers. The Baltimore clippers were also famous. The *Lightning*, built in Boston, Mass., in 1854, during a voyage from Melbourne to Liverpool ran 2550 English miles in one week, or at the rate of about 15½ miles an hour during the whole period.

Clip'perton Island, an uninhabited coral atoll in the Pacific Ocean, almost opposite the entrance to the Panama Canal. Mexico took possession of it in 1898, though it had previously been recognized as a French possession. In 1908 France proposed to Mexico that the claims of the two countries to its possession be submitted to arbitration. Its only value is its guano deposits.

Clisthenes, klis'thē-nez, famous Athenian reformer and lawmaker, was the leader of the Alcmæonid family, who were banished from Athens during most of the 6th century B.C. He obtained his restoration by the help of the Spartans, who expelled the tyrant Hippias in obedience to the Delphic oracle. Immediately afterward the aristocratic party, under Isagoras, endeavored to expel him once more; but Clisthenes and his party prevailed. He is known especially for his reforms of the Solonian constitution, which included the substitution of ten new Ionic tribes, named after Attic heroes, for four old ones, the establishment of a new council of five hundred, of a new magistracy, and of the generals (ten in number), and the introduction of ostracism (q. v.).

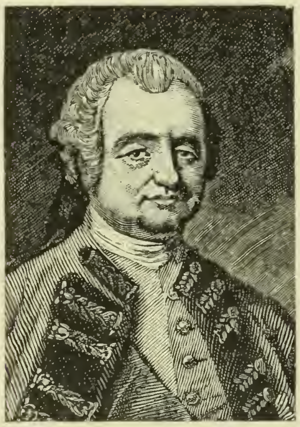
These reforms, which laid the foundations of the democratic *régime* in Athens, are generally dated 508 B.C.

Clitheroe, klith′ẽr-ō, market town, England, in Lancashire; 34 miles north of Manchester. It is situated on an eminence overlooking the Ribble, which here forms the boundary between Lancashire and Yorkshire. The church of St. Mary Magdalene is an ancient foundation, rebuilt, with the exception of the tower, in modern times. There is a sixteenth-century grammar school and the ruins of a Norman castle occupy a commanding position on the heights. Cotton manufacture forms the staple industry, and there are paper mills and chair works, as well as important lime and cement works, for which the excellent limestone quarried in the vicinity supplies material. Pop. (1921) 12,204.

Clitus, klī′tus, a Macedonian, one of Alexander's generals and friends, who not only took a prominent part in the Asiatic campaign, but also saved Alexander's life at the battle of the Granicus in 334 B.C. Seven years later, at a banquet, when both were half intoxicated, Clitus provoked Alexander by ascribing his victories to his troops rather than to himself, and by reproving the king for his love of luxury and flattery, and was slain by Alexander, whose remorse was afterward inconsolable.

Clive, klīv, Catherine (1711–85), English actress, popularly known as Kitty Clive, was born in London, her maiden name being Raftor. Having attracted the notice of Cibber, manager of the Drury Lane theatre, she made her appearance on the stage at the age of seventeen, and soon became the favorite comedienne of her time. About 1732 she married George Clive, a barrister, but they soon separated. In 1746 she became a member of Garrick's company, where she remained, except for a brief interval, until her retirement in 1769. She was a favorite with Handel, Garrick, and Horace Walpole, was admired by Fielding for her probity of character, and praised by Dr. Johnson for her intelligence and 'sprightliness of humor.' Consult *Life*, by P. Fitzgerald; also Austin Dobson in Matthews and Hutton's *Actors and Actresses of Great Britain and the United States.*

Clive, Robert (1725–74), Baron Clive of Plassey, known to the natives of India as *Sabat Jung*, 'the Daring in War,' and justly called the creator of the Anglo-Indian empire, was born in Styche, near Market Drayton, where his father, the descendant of an old Shropshire family, was a lawyer and small landowner. At the age of eighteen he was shipped off to India as an incorrigible scapegrace, and entered the service of the East India Company as a writer. The great struggle between the French and the British for the possession of India was then in progress, and Clive, finding his clerkship distasteful, obtained a commission as ensign and distinguished himself at the disastrous siege of Pondicherry. The French by this time were masters of Southern India, and Clive persuaded the government of Madras to entrust him with a few hundred sepoys to attack Arcot, the capital of the nawab of the Carnatic, a mere creature of Dupleix, the French governor. His success in seizing the citadel, and in holding out for fifty days until the troops of Chanda Sahib raised the siege, turned the tide in favor of the British, and Clive became a marked man, his marvelous energy and skill having turned defeat into victory. In 1753 he returned to England, worn out by anxiety and fatigue. He had gone out ten years before without friends and influence; he returned to be acclaimed by Pitt as 'the youth of twenty-seven years' who had accomplished the deeds of a 'heaven-born general.' Honors were showered on him; and with the prize-money which he had accumulated he paid off the debts on his parental estate, and unsuccessfully attempted to enter Parliament.



Lord Clive

In 1755 Clive returned to India, and was appointed governor of Fort St. David. The next year he hastened to Bengal to avenge the horrible outrage of the Black Hole. In conjunction with Admiral Watson, who commanded the fleet, he speedily recovered Calcutta, and forced Suraj-ud-Dowlah, the perpetrator of the outrage, to treat for peace. The nawab, however, intrigued with the French, and Clive saw that a crisis had arisen. Entering into negotiations with Mir Jaffier, the general of Suraj-ud-Dowlah, and others of his disaffected subjects, Clive met the nawab's army at Plassey (June 23, 1757), and drove it in utter confusion from the field. Mir Jaffier was placed on the throne of Bengal, and granted territorial and zemindary rights to the company, Clive receiving from him a gift of £200,000.

After becoming head of the government of Calcutta, and winning other victories, Clive returned to England in 1760 and was received as the hero of the hour. He was returned as M.P. for Shrewsbury; an Irish peerage was conferred on him; and his fortune—acquired by spoils, presents, and grants—yielded him £40,000 a year. In 1765 he returned to India as governor-general, and set himself to the work of purifying the administration. The company's officials and military commanders received but small salaries, which they turned into fortunes by blackmail, extortion, and corruption of all kinds. Clive's efforts at reform were bitterly opposed; and he raised up a host of enemies, who in 1767, when he finally returned to England in shattered health, brought about his impeachment for corrupt practices. It was during the parliamentary inquiry that Clive, confronted with certain hostile evidence, made the characteristic and much-quoted remark, 'By God, Mr. Chairman, at this moment I stand astonished at my own moderation!' The House of Commons passed a resolution that 'Robert, Lord Clive, had rendered great and meritorious services to his country'; but its acquittal was practically a censure and Clive, broken in health, keenly sensitive to the disgrace of the verdict, and morally enfeebled by the use of opium, committed suicide in November, 1774, when but fifty years of age.

Consult *Lives* of Clive by Sir J. Malcolm and the Rev. G. R. Gleig; Mill's *India*; Macaulay's *Essays;* Colonel Malleson's *Clive*, in the Rulers of India Series; *Lord Clive*, by Colonel Sir Charles Wilson, in the English Men of Action Series; Arbuthnot's *Lord Clive;* Holmes' *Four Heroes of India;* Forrest's *The Life of Lord Clive* (1918). For the battle of Plassey, consult Creasy's *Fifteen Decisive Battles.*

Cloaca, a sewer. In ancient Rome there were many of great size, of which the most famous is the *cloaca maxima*, 'the largest sewer,' which passed under the Forum, and is still in use to-day. It is said to have been built in the reign of Tarquinius Priscus. See ROME.

Cloaca, in vertebrates, the common chamber into which the ducts of the reproductive organs and of the kidneys open, together with the alimentary canal. A cloaca is present in birds and reptiles, and in the lowest mammals (monotremes). It is replaced in the higher mammals by the anus and the urinogenital aperture.

Clock and Watch Making. See HOROLOGY.

Clodd, EDWARD (1840), English writer on evolution, born at Margate; entered the London Joint Stock Bank, of which he was promoted to be secretary in 1872. Twice president of the Folk-lore Society, he has written numerous works on folk-lore, evolution, and cognate subjects, including *The Childhood of the World* (1872), *Myths and Dreams* (1885), *Story of Primitive Man* (1895), *Primer of Evolution* (1895), *Pioneers of Evolution* (1897), and biographies of Grant Allen (1900) and T. H. Huxley (1902). DIED MAR 17, 1930

Clodius, Roman tribune and enemy of Cicero. See CLAUDIUS.

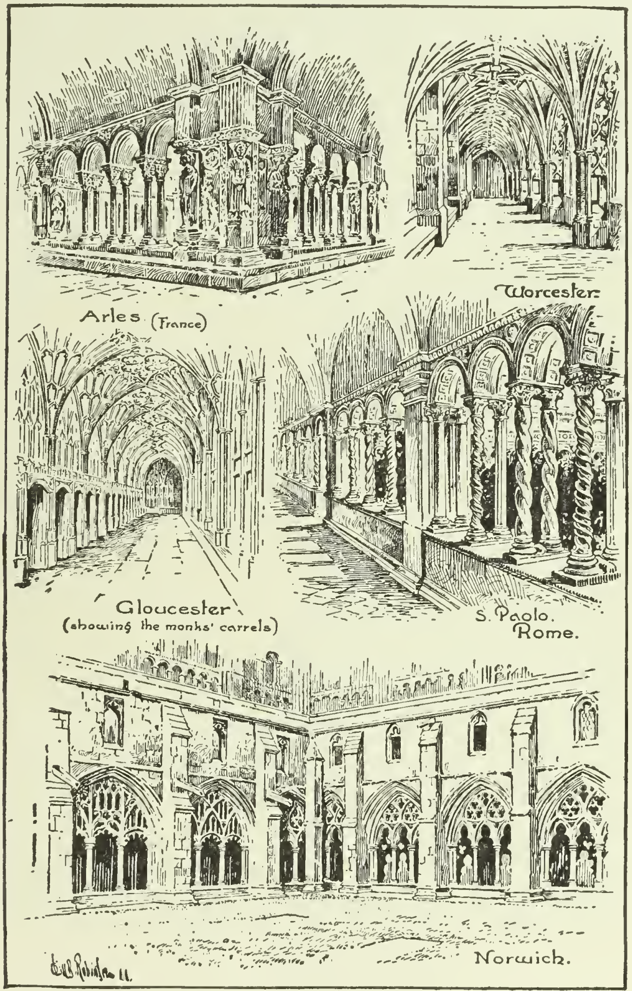
Clœlia, a Roman maiden, who, according to the ancient story, was sent as a hostage to Porsena when he attacked Rome. She escaped, however, and swam back to Rome across the Tiber; but the Romans sent her again to Porsena, who was so impressed by her honor and courage that he liberated her and her companions.

Cloisonnée. See ENAMELS.

Cloister, a vaulted arcaded corridor surrounding the quadrangle or courtyard of monastic, ecclesiastical, and collegiate buildings of the middle ages. It was used for recreation and exercise, and adjoined the principal houses of the group. Its position was generally on the south side of the church, sheltered in the angle of the south nave and transept. Canterbury cathedral in England, whose cloister is on the north side, is an exception to the rule. There are many beautiful examples of the cloister remaining, though few are complete. At Oxford Priory church three sides 54 ft. wide remain. Wells cathedral shows interesting examples of different dates. Worcester cathedral is in the Perpendicular style. Other fine specimens exist at Salisbury, Gloucester, and Hereford, and in Italy and France.

Clonmacnoise, par., King's Co., Ireland, on river Shannon, 8 m. S.W. of Athlone. One of the most venerated places in Ireland. In 548 St. Kieran established a Culdee college, which became an important seat of learning. The 'Seven Churches,' with their crosses, towers, and graveyards, constitute an important group of ecclesiastical antiquities; the most celebrated is that of Teampull M'Dermott (904). Pop. (1901) 2,320.

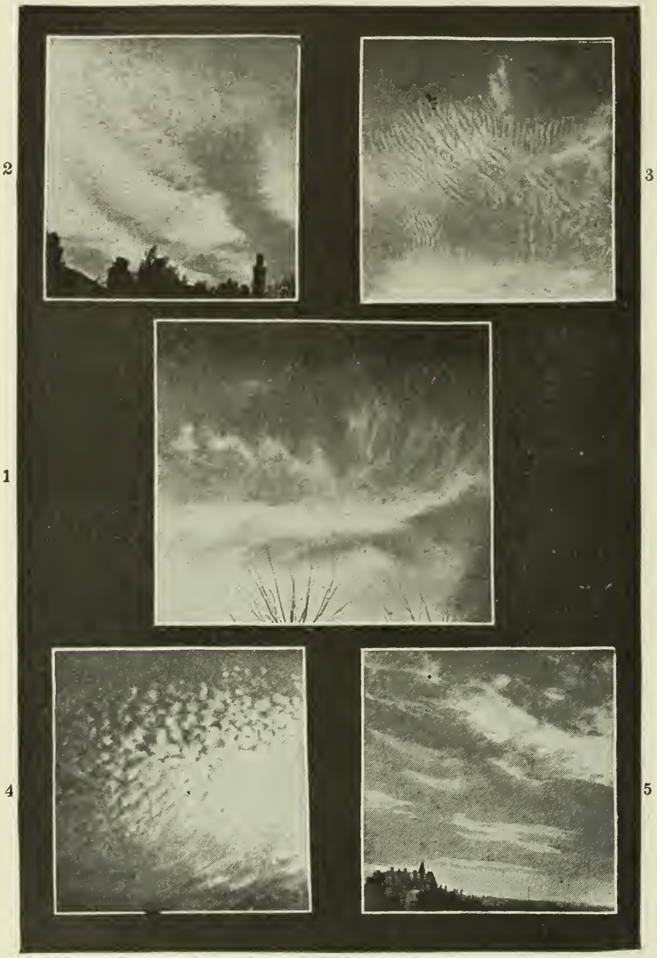
Clonmel, munic. bor. and mrkt. tn., chiefly in Co. Tipperary, but partly also in Waterford, Ireland, 31 m. W.N.W. of Waterford, on the Suir. Industries include brewing and tanning; there are large grain-mills. Laurence Sterne, the author of *Tristram Shandy*, was born here. Area 1,301 ac. Pop. (1911) 10,277.



Some Interesting Examples of Cloisters.

Clontarf, par. and wat.-pl., Co. Dublin, Ireland, 3 m. N.E. of Dublin, of which it forms a suburb. In 1014 the Danes were defeated here by Brian Boru, monarch (*ard-reagh*) of Ireland. Pop. (1901) 5,104.

Clonus, a rapidly alternating contraction and relaxation of muscles, resulting in violent tremors of part of a limb. Ankle clonus is produced in certain diseased conditions of the brain or spinal cord, when the nerve centres are in an irritable condition. It cannot be set up in perfect health. It is shown most easily when a person is lying flat, by taking hold of the foot when the muscles are relaxed, and pressing it firmly and suddenly upward—*i.e.* flexing it forcibly. This starts a series of jerking movements, the strength and duration of which depend on the amount of disease.



Typical Forms of Cloud.—I.

1. Cirrus. 2. Cirro-stratus. 3. Cirro-cumulus. 4. Alto-cumulus. 5. Alto-stratus.

Cloots, Jean Baptiste du Val de Grâce, Baron de, better known as 'Anacharsis' Cloots (1755–94), a notable figure of the French revolution. Born at Gnadenthal, near Cleves, he settled at the age of twenty-one in Paris. A rationalist, in response to Bergier's *Certitude des Preuves du Christianisme* he published, under the pseudonym of Ali Gier-Ber, a satirical *Certitude des Preuves du Mahométisme* (1780). An enthusiast for the new ideas, he joined the Jacobin Club, in the spirit in which the Scythian Anacharsis entered Athens. He was returned to the Convention by the department of Oise, and voted for the king's death. Among his other political and philosophical works are *Adresse d'un Prussien à un Anglais* (1790); and *La République Universelle* (1792). See Avenel's *A. Cloots* (2 vols. 1865).

Cloquet, vil., Carlton co., Minn., 18 m. s.w. of Duluth, on the St. Louis R., and on the Gt. N. and the N. P. R. Rs. The industrial establishments include lumber, shingle, and lath mills and a paper mill. Pop. (1910) 7,031.

Close, the enclosure and buildings reserved, in the precincts of a cathedral, for the domestic use of the bishop and canons. The word is also applied in Scotland to the narrow passages leading from main streets to courts containing tenements or to adjoining streets.

Close-hauled, the trim of a ship's sails when sailing near to the wind—*i.e.* sailing in the nearest direction possible to the point of the compass from which the wind blows. When a ship is close-hauled, her tacks are hauled close down to her side to windward, and her sheets are hauled close aft. In this manner of sailing, square-rigged ships will make an angle of six points with the line of the wind; but fore-and-aft rigged ships will sail much closer. In each case there is always a certain amount of leeway.

Close Times. See Game Laws.

Closter-Seven. See Kloster-Zeven.

Clotaire I. (497–561), king of the Merovingian Franks, youngest son of Clovis and Clotilde, received the northern third of the kingdom when it was divided between himself and his brothers (511); then he joined Childebert in the slaughter of the sons of their brother Clodomir, and in the conquest of Burgundy, which they divided between them (532); and by the death of a fourth brother (555) and of Childebert (558) he became sole king of all the Franks, and warred against the Saxons and Thuringians.

Clotaire II. (584–628) succeeded his father, Chilperic i., as king of the Franks, at the age of four months (584), under the guardianship of his mother Fredegonda, becoming sole king in 613. He overran Austrasia and Burgundy, captured and put to death Brunhild, seized her dominions, and reunited under his sway the empire of Clovis.

Cloth. See Fabrics, Textile.

Clotho, one of the Fates.

Clothilde, St. (475–545), daughter of Chilperic, king of the Burgundians. She was married to Clovis, king of the Franks, whom she converted to Christianity. After Clovis's death she retired to a monastery at Tours, and was canonized by Gregory of Tours with the sanction of Pope John iii.

Clothyard, old measure of length. (See Yard.) The clothyard shaft was distinctive of English bowmen.

Cloud. Mist is caused by the condensation of the aqueous vapor in the air into minute globules of water, and clouds may be defined as elevated mists. Sometimes the condensed vapor of clouds is frozen into minute crystals of ice and snow. Clouds were first systematically classified by Lamarck in 1801, but it is to Luke Howard that we are indebted for the nomenclature of cloud forms which has served as a basis for more extended classification. In Howard's *Essay on the Modifications of Clouds* (1803), three primary types and four compound types of clouds are recognized. The primary types are: (1) cirrus, or 'mares' tails'; (2) stratus, or 'ground fog'; (3) cumulus, or 'wool-pack.' The secondary or compound cloud forms are: (1) cirro-stratus, or 'sheet-cloud'; (2) cirro-cumulus, or 'mackerel sky'; (3) cumulo-stratus, or 'shower-cloud'; (4) nimbus, or 'rain-cloud'. Howard's classification was that universally adopted until about 1891, when at the International Meteorological Congress held at Munich a new classification was proposed by Messrs. Abercromby and Hildebrandsson, which had been adopted in the *Cloud-Atlas* of H. H. Hildebrandsson, W. Kôppen, and G. Neumayer (1890). This was recognized as the first satisfactory attempt to attain uniformity in the classification of cloud-forms. In August, 1894, another meeting of the International Meteorological Congress was held at Upsala, when over 300 cloud pictures from different parts of the world were exhibited, and typical examples selected. These are given in the *International Cloud-Atlas* by H. H. Hildebrandsson, A. Riggenbach, and L. Teisserence de Bort (1896). The following classification was finally adopted:

A. Upper Clouds (average alt. 30,000 ft.).

1. *Cirrus* (Lat. 'a hair').—These consist of delicate detached clouds, generally of a white color, taking the form of feathers or thread fibres, often arranged in belts which cross a portion of the sky in great circles, converging by an effect of perspective towards one or two opposite points of the horizon from which they seem to radiate. Observations of cirrus are of great importance in weather forecasting, as its formation is connected with the atmospheric changes which take place in the front of an advancing cyclone. It moves generally with great rapidity, a velocity of 150 m. an hour being sometimes attained from the N.W. Cirrus and other clouds of this class, such as cirro-stratus and cirro-cumulus, are composed not of water particles, but of ice crystals which refract light and produce the phenomena of halos.

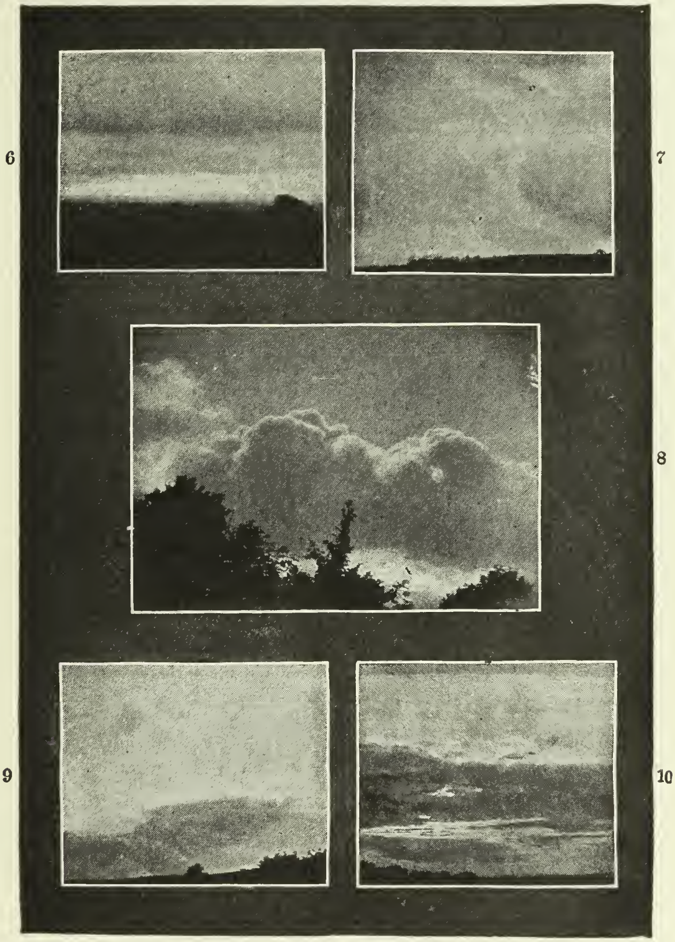
2. *Cirro-stratus* is a thin whitish sheet which at times completely covers the sky, and is sometimes known as a pallium (Lat. 'a cloak'). On it solar and lunar halos are formed, and it produces the watery aspect in the sky which is frequently the precursor of unsettled weather.

B. Intermediate Clouds (between 10,000 and 23,000 ft.).

3. *Cirro-cumulus* consists of small globular masses or white flakes arranged in groups and lines, which have been compared to the markings of a mackerel; hence the expression 'a mackerel sky.' Cirro-cumulus is essentially a fine-weather cloud.

4. *Alto-cumulus* consists of fairly large globular masses of white or gray cloud arranged in groups and lines, and often very closely packed, so that their edges appear confused. At the centre of the group the detached masses are usually larger and more compact than at the margin, where they form into finer flakes.

5. *Alto-stratus* is a thick sheet of a grayish or bluish hue, which presents a brilliant appearance in the vicinity of the sun or moon, and which may give rise to coronæ without causing halos.



Typical Forms of Cloud.—II.
6. Strato-cumulus. 7. Nimbus. 8. Cumulus. 9. Cumulo-nimbus. 10. Stratus.

C. Lower Clouds (6,500 ft.).

6. *Strato-cumulus* is the name applied to large globular masses or rolls of dark clouds which frequently cover the whole sky. It is a common cloud in winter, and may be distinguished from nimbus by its globular appearance, and also by its being a fair-weather cloud.

7. *Nimbus*, or 'rain-cloud,' consists of a thick layer or system of clouds with ragged edges from which rain is falling. An upper layer of cirro-stratus or alto-stratus is almost invariably discernible through openings in these clouds. When the gray lower portion of nimbus begins to break into shreds, or if small loose clouds are visible floating

at a low elevation underneath a large nimbus, they may be described as *fracto-nimbus* or 'scud.'

D. CLOUDS OF DIURNAL ASCENDING CURRENTS.

8. *Cumulus*, or 'wool-pack' clouds, have an average elevation of 6,000 ft. for the apex and 4,500 ft. for the base. Their upper surface is usually dome-shaped, and exhibits protuberances, while the base is horizontal. This modification of cloud appears at its best when evaporation is taking place rapidly, and when strong ascending currents carry the warm moist air from rivers and lakes into the colder regions of the atmosphere above the line of saturation.

9. *Cumulo-nimbus*, or the 'thunder cloud,' has an apex which varies from 10,000 to 26,000 ft., while the average height of the base is only 4,500 ft. It takes the form of heavy mountainous turrets of cloud, usually with a sheet or screen of feathery appearance above, known as 'false cirrus,' and, underneath, a cloud mass similar to nimbus. Heavy local showers of rain, snow, or hail are usually precipitated from the base.

E. HIGH FOGS (under 3,300 ft.).

10. *Stratus*, as the name implies, is a horizontal sheet of lifted fog, usually formed by condensation. Stratus is usually a fine-weather cloud, appearing in settled weather during the evening and morning hours. At times it covers the whole sky in the form of a gloomy canopy, the atmosphere being generally foggy underneath it.

The formation of clouds has been recognized as due to two causes—the mixing of two currents of different temperatures, and the dynamical cooling of air by diminishing pressure. Mr. John Aitken has shown (*Trans. Roy. Soc. Edin.*, vol. xxx. p. 337) that unless there be some nucleus or dust particles floating in the atmosphere, no cloud can result from the condensation of aqueous vapor. See FOG, DUST, NEPHOSCOPE; also *Cloudland* (1894) by W. Clement Ley, and numerous papers by Professor F. H. Begelew in Reports of U. S. Weather Bureau and Monthly Weather Review.

Cloudberry, or GROUND MULBERRY, the orange-colored fruit of a dwarf herb (*Rubus Chamæmorus*). The plant grows only in swampy, northern districts. In June it bears large white or flesh-colored solitary rosaceous flowers. These are followed by the fruit which is pleasantly subacid. Large quantities are eaten in Scandinavia and sub-Arctic America, partly in the raw state, partly after being made into preserves.

Cloud-line is the level below which clouds seldom form. The elevation varies in different parts of the world, being about 9,000 ft. in S. America and about 5,000 ft. in Tyrol, while out of a large number of observations of cloud-levels taken in Washington, D. C., there was a variation in the mean height of clouds from over 30,000 feet in the case of the cirrus to about 3,000 feet for the stratus.

Clouet, the name of a family of French portrait and miniature painters of Flemish origin. JEAN CLOUET, the elder (d. 1490), was employed by the duke of Burgundy.—JEAN CLOUET, the younger (?1482–1541), was court painter and valet to Francis I. of France, being called, in documents, Jehan, Jehannot, and Jehannet. Two portraits at Hampton Court, near London, and one in Liverpool, are assigned to him.—His son, FRANÇOIS (?1510–77), was born at Tours. His miniatures and portraits are distinguished by delicacy of form, pale simple tones without chiaroscuro, Flemish love of finished detail, and French elegance. He succeeded his father as court painter to Francis I., and held the post under Henry II. and Charles IX. A fine series of his drawings is in the National Library, Paris; some crayon heads in the British Museum; also examples of portraiture are in Hampton Court, Hertford House in London, and Castle Howard in Yorkshire (*Catherine de' Medici*); and in Berlin, Vienna, Munich, Florence, Dresden.

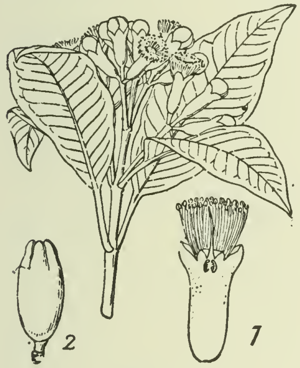
Clough, ANNE JEMIMA (1820–92), first principal of Newnham College, Cambridge, and sister of Arthur Hugh Clough; born at Liverpool. The family went to S. Carolina, where Anne stayed till 1836, when, returning, she became a school teacher in Wales, afterward establishing a school at Ambleside, in Westmoreland (1852), which she closed in 1862, to organize the scheme for the higher education of women, especially in Cambridge, where Miss Clough was appointed head of a house of residence—the nucleus of Newnham College, opened under her principalship in 1880. Here she worked quietly but successfully till her death. See *Memoir* by B. A. Clough (1897).

Clough, ARTHUR HUGH (1819–61), English poet, born in Liverpool though of Welsh blood; spent some years of childhood in S. Carolina, but was a pupil at Rugby of Dr. Arnold. Attracted by the political and social movements of the day, he visited both Paris and Rome in times of revolution. Already a pamphlet, occasioned by the potato famine in Ireland, had earned him the reputation of a socialist. Hampered by straitened means and the want of a definite career, he spent two years in London as head of University Hall, but found the life unattractive, in spite of a friendship with Carlyle. He sailed for the U. S. in 1852, and settled at Cambridge, Mass., living by literary and scholastic work and enjoying the friendship of Lowell, Longfellow, and Emerson, the latter of whom he had previously met, first in England in 1847 and again in Paris in 1848, until brought back to England (1853) by the offer of a post in the Education Office. About 1859 his health began to fail, and two years later he died at Florence, where he is buried. Clough's poetry is remarkable rather for purity and dignity of thought than for literary finish. His lovable personality and vexed life inspired the beautiful monody of *Thyrsis*, written upon him by his Balliol friend, Matthew Arnold. Works: *A Consideration of Objections against the Retrenchment Association at Oxford* (1847); *The Bothie of Toper-na-Fuosich*, afterward *Toper-na-Voulich* (1848); *Ambarvalia*, with Thomas Burbridge (1849); *Plutarch's Lives*, a revision of Dryden's translation (begun while residing at Cambridge, Mass., in 1852–3), (1859). Collected works: *Poems* (ed. F. T. Palgrave, 1862, with Memoir); *Poems and Prose Remains*, with a selection from his *Letters* and a *Memoir* (ed. by Blanche Clough, 1869). *Selections* (1894; ed. by E. Rhys, 1896); *Monograph* by S. Waddington (1883).

Clough-Leighter, HENRY (1874), American musician and composer, was born in Washington, D. C., and was educated at Columbian University and (in music) at Trinity University, Toronto. He was organist and choir master of churches at Washington and at Providence, R. I., from 1889 to 1900, after which he acted as instructor in musical ethics and theory at the Howe School of Music at Boston. In 1901 he accepted an editorial position with a Boston music publishing house. His compositions include several oratorios, cantatas, and church services, besides many songs.

Clous, JOHN WALTER (1837–1908), Amer. soldier, b. in Germany. He emigrated to the U. S. in 1855, and enlisted as a private in the U. S. army in 1857. In the Civil War he served on the Federal side, becoming a first lieutenant in Mar., 1865, and being brevetted first lieutenant and captain for his services at Gettysburg. He subsequently served in various campaigns against the Indians in the West between 1868 and 1886, and in the Spanish-American War served on the staff of Gen. Miles, and in Sept., 1898, became a brigadier-general of volunteers. He was admitted to the bar after the Civil War, and his principal service in the U. S. army was as a judge-advocate. In May, 1901, he was made judge-advocate-general, with the regular rank of brigadier-general, and immediately afterward retired from active service.

Clove, the dried, unexpanded flower-bud of a beautiful evergreen shrub, *Eugenia caryophyllata*, or *Caryophyllus aromaticus*, belonging to the order Myrtaceæ. The plant is a native of the Moluccas. For two and a half centuries there existed a monopoly in the supply of this spice, first owing to the exclusive possession (down to about 1600) of the E. Indies by the Portuguese, then to the deliberate destruction of the plants and their rigid restriction to the island of Ambyona (down to 1770) by the Dutch, the successors of the Portuguese in the E. Indies. At the date last named the French succeeded in carrying the tree to the Mauritius and Réunion. Thence it was transported, ten years later, to the W. Indies; and since 1830 it has been especially cultivated in Zanzibar. The clove was, however, known to the ancient Romans from at any rate early in the Christian era, and in China and S.E. Asia it was used from a very early age. Dried cloves are about half an inch long, of a dark-brown color, and consist each of a cylindrical tube, surmounted by a four-toothed calyx and a round knob—the unopened corolla. They are possessed of a characteristic hot and aromatic taste and smell, and contain about 16 per cent. of volatile oil, or essence of cloves. Cloves are used medicinally as a carminative and stimulant; and as a spice in cookery. See De Candolle's *Origin of Cultivable Plants* (1884), p. 161, and Lindley's *Med. Bot.* (1849), p. 75.



Clove.
1, Section of flower; 2, fruit.

The ripened fruit is sometimes sold, when dried, and is called 'mother cloves.' *Pimenta acris*, of the West Indies, is called wild clove-tree.

Clovelly, par. and vil., Devonshire, England, 11 m. s.w. of Bideford, standing on a cliff 400 ft. high. It is noted for its picturesque scenery. Dickens describes it in *A Message from the Sea.* Near it is an ancient British camp, called Clovelly Dykes. The chief industries are mackerel and herring fishing. Pop. (1901) 621.

Clover, a genus of annual, biennial and perennial plants of the order Leguminosæ, containing many widely distributed species, of which red clover (*Trifolium pratense*), alsike clover (*T. hybridum*), crimson or Italian clover (*T. incarnatum*), and white clover (*T. repens*) are most commonly known. Berseem or Egyptian clover (*T. alexandrinum*) is the great forage crop of Egypt. Numerous species of clover of little or no importance grow wild in both hemispheres. In addition to the true clovers or plants of the genus Trifolium there are a number of plants commonly called clovers which belong to other genera of the order, as for instance bur clover (*Medicago denticulata* and *M. maculata*); snail clover, represented by several species of the genus Medicago; sweet or Bokhara clover (*Melilotus alba*); Japan clover (*Lespedeza striata*); and several species of Lespedeza under the name of bush clovers.

White Clover (Trifolium repens).

Red Clover (Trifolium pratense).

The great value of clover lies in its varied uses. It is grown for green fodder, silage, hay, pasturage, green manuring, and as a cover crop. Its culture improves the land, and hence it is generally found in crop rotations wherever its growth is successful. That benefit accrues to land by growing clover on it has long been known, but it was as late as 1888 that scientists discovered that this enrichment of the soil is due to the appropriation of the free nitrogen of the air through the agency of certain soil bacteria found in the nodules occurring on the roots of the plants. Storing the free nitrogen of the air in the soil for the use of future crops is not a characteristic of the clovers alone, but one that belongs to leguminous plants in general. The large and deep root system of clover in itself improves the physical condition of the soil and adds to its fertility.

Red Clover.

Red clover, a biennial and the most important species for the U. S., is almost universally grown. From 15 to 20 lbs. of seed per acre are sown in the spring, either alone or with a nurse crop. The crop succeeds best on a deep, fertile loam, well supplied with lime and properly drained. On wet soils it suffers from frost, and on light sandy soil it is likely to dry out. Two cuttings for hay, or from 2 to 4 tons per acre, are obtained during the season on good fields. The hay, an excellent animal food, contains about 12 per cent. of crude protein. The yield of seed ranges from 3 to 8 bushels per acre. It is a very important crop in rotations, on account of its fertilizing and physical properties.

Alsike (*Trifolium hybridum*).

Alsike clover, a hardy perennial, is well adapted to wet meadows and low lands. Crimson clover, an annual native in southern Europe, is not hardy in regions with severe winters. It is largely used as a cover crop in orchards. White clover is commonly found as a wild-growing perennial, but is also used for lawns and meadows. From 15 to 20 lbs. of crimson clover seed, about 12 lbs. of alsike, and from 6 to 8 lbs. of white clover seed are used to sow an acre. (U. S. Dept. Agr., Farmers' Bul. 123; Division of Botany Circulars 18 and 24; Division of Agrostology Circular 17; Michigan Experiment Station Bul. 125; *Clover Culture*, by Henry Wallace.)

Crimson Clover (*Trifolium incarnatum*).

Clovis (Ger. *Chlodwig-Ludwig;* Fr. *Louis*), the name of several Merovingian kings of the Franks. CLOVIS I. (465–511) succeeded his father (481) as king of the Salian Franks at Tournai. By his conquest (486) of the Seine territory he founded the kingdom of the Franks, and in 496 became a Christian. Routing (507) the Arian West Gothic king Alaric near Poitiers, he annexed Aquitaine and Toulouse, and transferred his residence to Paris. By contriving the death of all rival kings, he sought to unite all the Franks into one kingdom.

Clowes, SIR WILLIAM LAIRD (1856–1905), Eng. naval writer and historian, born in London; acted as special correspondent in naval matters to the *Standard*, the *Daily News*, and the *Times* (1885–95), and after that, under the pseudonym 'Nauticus' and his own name, wrote much for English and foreign periodicals, exercising considerable influence upon naval opinion. His works are *The Naval Pocket-Book* (annually), *The Navy and the Empire*, etc.; and he edited *The Royal Navy: a History from the Earliest Times to the Present* (7 vols. 1897–1903), etc. He also wrote *Black America: a Study of the ex-Slave and His Late Master* (1892), and several volumes of fiction, including *The Great Naval War of* 1887 (1886), with Com. C. N. Robinson; *The Great Peril* (1893); *The Double Emperor* (1894). He contributed many articles on naval subjects to this Encyclopædia.

Clown. See JESTER.

Clubbing, CLUB-ROOT, and FINGERS-AND-TOES are names given to a disease which frequently attacks the roots of cabbages, turnips, stocks, and other cruciferous plants. The disease manifests itself in nodular protuberances on the roots, with subsequent gradual decay of the plants themselves. The disease is infectious, for fresh young cruciferous plants, when placed in a tainted soil, soon become affected by it. It is caused by a member of the Myxomycetes or slime fungi, known as *Plasmodiophora brassicæ*. When the plant dies, the spores of this parasite become dormant, and lie resting in the soil until another suitable host presents itself. The most powerful antidote against the disease is lime—either an inch deep of gas-lime on the surface, or quicklime well dug in to the depth of six inches. If infected spots are well isolated by a path of at least twenty-seven inches, the disease will not spread unless carried by infected plants, such as the common shepherd's purse. It is not safe to grow cruciferous plants in land that has been affected by the Plasmodiophora for at least four years, unless the soil is thoroughly disinfected. The least morsel of diseased root will spread infection. Infection is also carried, there is reason to believe, by the soil which adheres to the boots of gardeners, or to their tools.

Club-foot(Talipes). Most commonly this is a congenital deformity. Several possible causes are suggested—nerve lesions, malposition before birth, abnormal growth of bone, and others. A long-continued malposition before birth seems the most likely. In some cases there is an element of heredity, and it is often associated with other physical defects. Acquired talipes most commonly follows on infantile paralysis, the non-paralyzed opposing muscles causing the distortion by contracting. In *talipes equinus* the child treads upon the distal ends of the metatarsal bones, the heel is drawn up, and the tendon of Achilles is tense; and pes cavus follows, with the contraction of the plantar fascia and the tendons and ligaments. One or both feet may be affected. Sometimes the heel can be brought to the ground, but when it is firm the toes cannot be lifted. Sometimes, by unequal contraction, the inner edge of the foot is raised, and the condition of *equino-varus* is produced. This is the commonest form of congenital club-foot. It varies in degree with the different structures involved; sometimes the fault lies almost entirely in a contracted tendon of Achilles, while in the worst cases the astragalus may be deformed or displaced. Where the deformity is slight, and the foot can be brought by manipulation into a proper position, then manipulation, massage, support, and in some cases electricity, to weakened muscles, should all be tried for some time before any operative treatment is used. On the other hand, where manipulation will not bring the foot into a normal position, operative treatment must be used to remove the obstacle, and the foot must then be retained in good position by artificial appliances as long as may be necessary. To this end, in *talipes equinus*, for example, the tendon of Achilles is divided subcutaneously, and the foot is kept at right angles to the leg until the tendon has lengthened and reunited. In *talipes equino-varus* it is often necessary to divide other structures, such as the tendons of the tibiales anticus and posticus, and fascia and ligaments on the plantar surface of the foot.

Club-hand, a rare congenital deformity, in which the hand is fixed in varying degrees of flexion or over-extension of the wrist-joint, with possibly also a lateral twist. The bones of the wrist-joint are not fully developed, and the child is generally ill-developed and does not live.

Clubs, societies of persons combined for the promotion of some common object, whether political, social, or otherwise. The old Athenians had their clubs—friendly meetings where every one sent his own portion of the feast, bore a proportionate part of the expense, or gave a pledge at a fixed price. The Spartans and Romans had similar institutions, those of the latter being referred to in Cicero's *De Senectute*. In the reign of Henry IV. there was an English club called 'La Court de Bone Compaignie,' of which Occleve, the poet, was a member. This was probably the oldest English club. The next in point of time was the famous club at the Mermaid Tavern, among whose members were Shakespeare, Raleigh, Beaumont, Fletcher, and Selden. Ben Jonson had a club, of which he appears to have been the founder, that met at the Devil Tavern. From England clubs spread to the United States, and by the middle of the 19th century well-organized clubs were found in many American cities, while all the large centers now boast clubs second to none in their buildings and appointments.

Clubs, LAW RELATING TO. As regards liability to the outside public, the law affecting the members of a club depends upon the constitution of the club, *i.e.* whether it is incorporated under the corporation laws of a state, or merely organized by means of a contract of association, each member becoming a party to it upon joining the club. An incorporated club may make contracts, sue and be sued in its corporate capacity, and if the members have complied with the law as to such membership corporations they will not be individually liable for the debts of the club. If a club is not incorporated, it is a voluntary association of a special kind. In such a case the club is not a partnership, nor, generally speaking, are the members liable for each other's acts. If liabilities are to be fastened upon any of the members, it must be by reason of their own acts or the acts of their authorized agents; and the agency must be made out by the person who relies on it, for it is not implied from the mere fact of association. It is usual, by the rules, to give the committee some power to make contracts which will be binding on the members, and in minor matters to delegate their authority to a steward or manager; but in the absence of special provisions, the committee will be presumed only to have authority to carry on the club on ready-money principles, using for that purpose the fund provided by the subscriptions of the members and the payments made by them for food, drink, etc., so that a member may generally assume that his liability is limited to his entrance fee and his dues during membership, and if these are paid he may resign at any time without further liability. In all clubs, whether incorporated or not, the contract between the members which regulates their rights, duties, and privileges *inter se* is contained in the rules. The members are the co-owners of the property of the club, and if a member is unjustly expelled his right of property gives jurisdiction to the courts to restrain his expulsion by injunction; but the courts will not interfere if the expulsion has been carried out in good faith and in accordance with rules which are not inconsistent with natural justice. A member who resigns or is expelled has no right to demand any division of or share in the property of the club, but upon dissolution it is divided among those who are members at that time. A so-called proprietary club is more of a business enterprise than a true club, as certain club privileges are furnished by an individual for a consideration, and the 'members' have no property rights and no voice in the management. This type is more common in England than in the United States, where gambling 'clubs' are about the only kind conducted on this principle.

Cluny, or **CLUGNY**, tn., dep. Saône-et-Loire, France, 26 m. S.W. of Chalons-sur-Saône; has an important market for horses, cattle, and pigs. The town owes its origin to the famous Benedictine abbey founded in 910 by William, Duke of Aquitaine. About the end of the 11th century the abbey rivalled Rome as one of the largest and richest seats of learning in Christendom. Its cathedral was only surpassed by St. Peter's. The monks were driven out in 1789, when a great part of the magnificent abbey was destroyed. Pop. (1901) 4,108.

Cluseret, GUSTAVE PAUL (1823–1900), French officer and revolutionist, born in Paris, and after fighting in the Crimea and Africa left the French army, and served under Garibaldi in Italy (1860). He came to the U. S. in 1861, joined the Union Army, and served on the staffs of Gens. McClellan and Frémont during part of the Civil War. He became a brigadier-general in 1862, and in 1864 edited in New York *The New Nation*, urging the nomination of Frémont for the presidency. Returning to France in 1868, he engaged in revolutionary journalism, and was expelled (1869). A prominent member of the Commune, he escaped to England when the government troops entered Paris, and then made a short visit to the U. S., later settling in Switzerland. He fought with the Turks against Russia in 1878, subsequently becoming Radical deputy for the Var to the French Chamber of Deputies; and from 1889 till his death he sat for Toulon. See his own *Mémoires* (1887).

Clusium. See CHIUSI.

Cluster, in astronomy, a collection of stars presumably in physical connection. Globular are distinguished from irregular clusters by their central compression and unmistakably spherical forms. They have, notwithstanding, outlying branches and streaming edges, and it is far from certain that the thousands of stars aggregated in each constitute stable systems. The brightest show to the eye as hazy spots of light, high optical power being needed to resolve them completely. Others, even with large telescopes, look like piles of silver sand. Professor Bailey has recently made the extraordinary discovery that many globular clusters are crowded with stars losing and regaining a large proportion of their light in periods of a few hours. In the magnificent southern group ω Centauri 128 such objects have been identified, and 132 are included in the cluster Messier 3, in Canes Venatici. Yet other similar star globes, such as Messier 13, in Hercules, are virtually exempt from this peculiarity; nor is it marked in the analogue of ω Centauri, the south-polar 47 Toucani. The Pleiades are typical of irregular clusters. They are much less definite assemblages than the globular kind, conform to no perceptible law of compression, and their components fluctuate in light vaguely, if at all. Some are strongly nebulous; others, such as the lovely double cluster in Perseus, and Messier 11, in Scutum Sobieski, are purely stellar. Clusters of both varieties frequent by preference the Milky Way, and clearly belong to the great galactic organization. Their distances being unknown, the real magnitudes of the stars composing them remain largely conjectural.

Clutch is a means by which connection may be made or broken between a motive power and the machinery which it is required to drive. A clutch is used to connect the engine with the driving-wheels of motor cars, etc.

Clutha, or MOLYNEUX, riv. in the S.E. of Otago, the largest in New Zealand, 154 m. long, draining Lakes Hawea, Wanaka, and Wakatipu. It is navigable by small steamers for 40 m. Its alluvial deposits are rich in gold.

Cluver, or CLÜVER (Lat. CLUVERIUS), PHILIPP (1580–1622), German historian and geographer, born at Danzig; studied law at Leyden about 1600, but afterward devoted himself to historical and geographical researches. After an adventurous and necessitous life, travelling in England, Scotland, France, Germany, Switzerland, and Italy, he settled in Leyden, in 1615, and being appointed next year *Geographus Academicus*, was enabled to continue his literary work. Cluver is considered to be the founder of historical geography; and among his works, which were for a long time standard books, are *Germania Antiqua* (1616 and 1630), *Sicilia Antiqua* (1619), and his principal work, *Italia Antiqua* (1624). See Partsch's *Philipp Clüver* (1891).

Clwyd, riv., Denbighshire, Wales, after a course of 31 m. falls into the Irish Sea at Rhyl. The Vale of Clwyd is noted for its picturesque scenery.

Clyde, a large and important river of Scotland, flowing into the Firth of Clyde. It rises, as the Daer Water, in the S. of Lanarkshire, and flows N.W. through that country; as a firth it separates Dumbartonshire from Renfrewshire, and Argyllshire (with Bute and Arran) from Ayrshire. The tributaries are: r. bk., the Little Clydes Burn, Medwyn, N. and S. Calder, Kelvin, Leven; and l. bk., the Elvan, Douglas, Avon, White and Black Cart. The firth is variously regarded as beginning at Glasgow (the highest tidal point), Dumbarton, or Gourock. From Gourock, where it is one mile wide, the firth runs S. for 52 m., and expands to 37 m. wide at Ailsa Craig. The original width below Glasgow has been narrowed since 1800 by embankments. At the junction with the Cart, where in 1800 it was 800 ft. wide, it is now only 500 ft. At that time there was only a depth of 3¼ ft. at high water between Glasgow and Renfrew; at present the depth is 30 ft., and is still being increased. The total length is 105 m. The current is never rapid, for at the source the altitude is only 1,600 ft. above sea-level. Midway between the source and Glasgow are the famous falls of Bonnington, Corra, Dundaff, and Stonebyres Linns. Above Bonnington Linn the altitude is 400 ft., below Stonebyres it is 170; Corra Linn itself makes a triple leap of 84 ft. From Stonebyres to Dumbarton is 42 m., giving a fall of 4 ft. ½ in. in the mile, with a correspondingly sluggish current. The tidal fall at Glasgow is 10½ ft. at spring tide and 9¼ ft. at neap tide. The drainage area is 1,481 sq. m. After leaving the Old Red Sandstone, the river traverses the Lanarkshire coal fields—the 'black country' of Scotland. The entrance gates to this district are the deep cuttings made by the stream at the falls. The valley of the central Clyde is a rich fruit-growing district. The towns above Glasgow—Lanark, Hamilton, Cambuslang—are mining and industrial centres; below Glasgow—Govan, Renfrew, Bowling, and Dumbarton—shipbuilding centres. The salmon fisheries, formerly flourishing, have now been destroyed by the impurities from the great Glasgow chemical works. The Clyde Trust (created by Act of Parliament, 1858), with twenty-five members, including nine town councillors and nine shipowners and ratepayers, has jurisdiction from Glasgow to beyond Dumbarton; it has 'made' the Clyde, having spent over $55,000,000 in the work. The Clyde had no commerce until, at the beginning of the 18th century, the people of Glasgow saw the importance of fostering trade with America. In the second quarter of the 19th century the great shipbuilding industry sprang into existence. Some of the largest vessels of the world are built on the Clyde, and the tonnage launched in a single year has exceeded 400,000. See Deas's *River Clyde and Harbor of Glasgow* (1876); Millar's *The Clyde from its Source to the Sea* (1888); Pollock's *Dictionary of the Clyde* (1891).

Clyde. (**1.**) Vil., Wayne co., N.Y., 44 m. E. of Rochester, on the Clyde R. and the Erie Canal, and on the N. Y. C. and H. R. and the W. Shore R. Rs. The manufactures include canned goods, harness, leather, engines, flour, glass and fertilizers. Pop. (1910) 2,695. (**2.**) Vil., Sandusky co., O., 8 m. E.S.E. of Fremont, on the Big Four, the L. Shore and Mich. S. and the Wheeling and L. Erie R. Rs. The manufactures are automobiles, pianos, edge-tools and flour. Pop. (1910) 2,815.

Clydebank, tn. and par., Dumbartonshire, Scotland, on r. bk. of Clyde, 5½ m. N.W. of Glasgow; shipbuilding yards and sewing-machine works (Singer's, at Kilbowie). Pop. (1911) 37,547.

Clydesdale Horse. See HORSE.

Clydesdale or **Paisley Terrier**, a rare breed of dog similar to the prick-eared Skye terrier; but the coat is silky in texture, and the color a glossy blue on the back, with tan legs and face-markings. The weight should not exceed 20 lbs.

Clytæmnestra, born from one of the eggs produced by Leda when Zeus had visited her in the form of a swan. She married Agamemmon, king of Mycenæ; and (as the Greek tragedians say), in revenge for his having sacrificed Iphigenia to secure the voyage of the Greek force to Troy, transferred her affections to Ægisthus during her lord's absence at the war, and murdered the latter on his return. Ultimately her son Orestes killed her. Homer in the *Odyssey*, Æschylus in the *Agamemnon* and *Choephori*, Sophocles in the *Electra*, and Euripides in the *Electra* and *Iphigenia in Aulis*, tell the story.

C.M., Master in Surgery.

C.M.G., Companion of the Order of St. Michael and St. George.

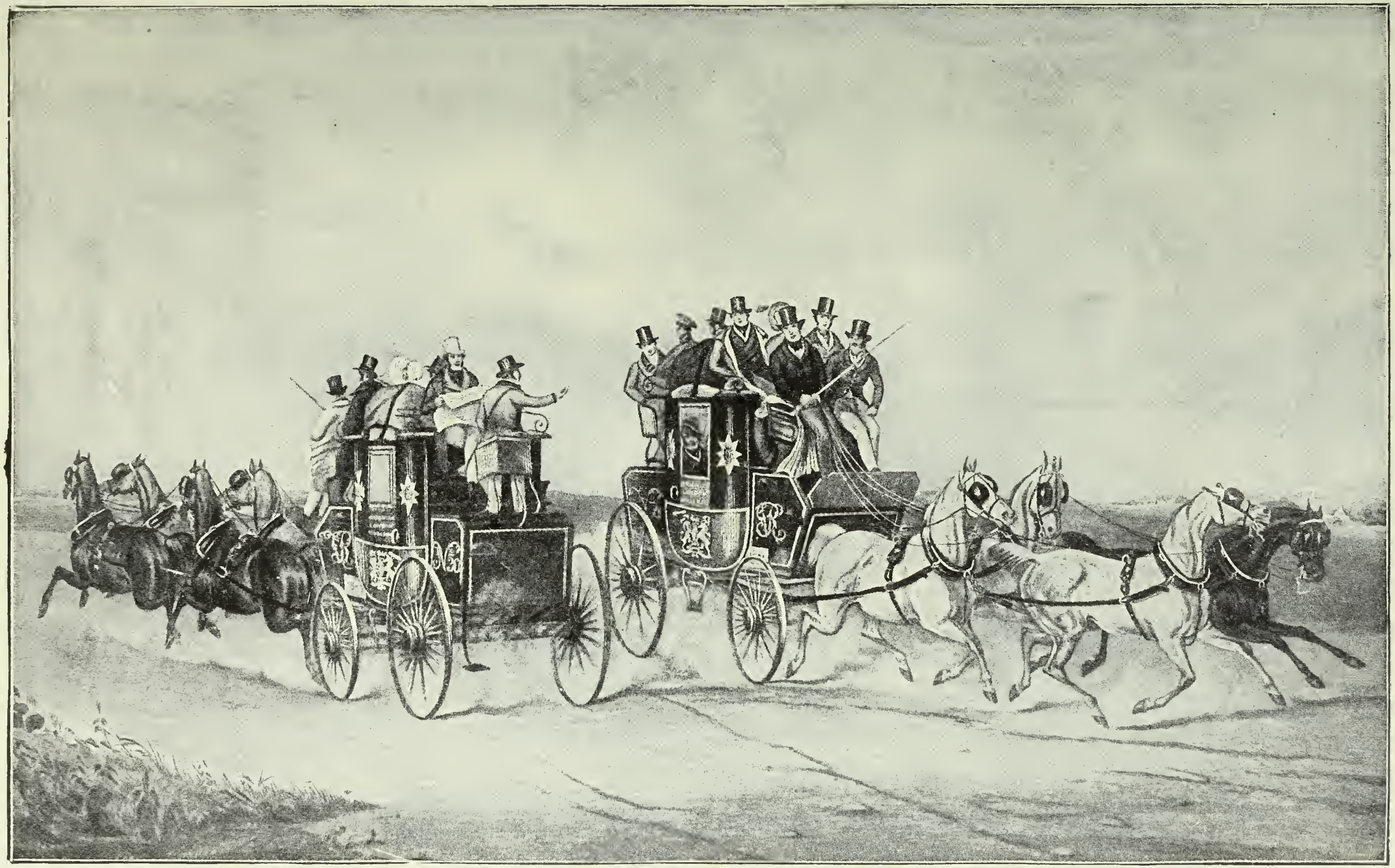
Cnidus, ancient city in Asia Minor, on the promontory of Triopium (now Cape Krio) in Caria; colonized by Dorian settlers from the Peloponnesus. In 394 B.C. the Athenian Conon, commanding the Persian fleet of the satrap Pharnabazus, gained a great victory near Cnidus over the Spartans. Later, Cnidus became famous for a celebrated statue of Aphrodite by Praxiteles. Its ruins still exist.

Cnossus, or GNOSSUS, now Malarotichos, an ancient town in Crete, the capital of Minos. See CRETE.

Coach Dog. See DALMATIAN DOG.

Coaching. The early history of coaching is not clear. It has been maintained with considerable energy, although without much proof, that a rough coach or road-wagon ran as a public conveyance between Edinburgh, Scotland, and Leith as early as 1610, and this may fairly be accepted as the origin of coaching. Pepys writes in his diary under date of 1665 of springs on certain carriages, and it is known that about 1675 at least six stage-coaches existed in England. Coach and carriage building, however, had not progressed very far until a good deal later than this. In the spring of 1669 a coach described as the 'Flying Coach' ran from Oxford to London in one day and was welcomed in the latter city by all the dignitaries of the place. This was looked upon as too high a rate of speed for the roads, and many were the objections made on the ground of damage to them, while in addition it was claimed that the inns along the road would be ruined by not stopping at them, and great harm would be done to the breed of horses by promoting speed at the expense of bone and weight.

In America carriages were in use as early as 1685. The earliest mentioned coach or road-wagon



EARLY ENGLISH COACHING—THE BRIGHTON MAILS. FROM A COLORED PRINT.

ran from Boston to Newport in 1686, and then lines were put on between the cities along the Atlantic Coast, so that there was more or less continuous transportation between Portsmouth, N. H., and Savannah, Ga. The first regular coach was run fortnightly between New York and Philadelphia in 1720. After that many lines were established, and the spirited rivalry was the cause of serious accidents from fast driving. The vehicles first in use carried sixteen passengers and were very cumbersome; but they later gave way to the egg-shaped coach, carrying nine passengers inside and four to seven outside. The Concord coach followed, the first of this type having been built in 1827; it was adopted all over the world with modifications, and is the popular type today.

In the early part of the nineteenth century runs of 135 miles in 24 hours were common, and one record, that of 32 miles in 2 hours and 20 minutes over the bad roads of those times, is impressive. In 1812 the fare from Philadelphia to Pittsburgh over the National Turnpike was $20, and it took six days to go the 297 miles. In 1829, 77 lines were running in New England under one management; in 1832, there were 106, and they did a good business until the railroads put them out of the running.

Amateur Coaching.—Of amateur coachmen and coachmanship in the last century comparatively little is known; but when good roads became the rule instead of the exception, 'gentleman coaching' became a fashionable amusement. Amateur coaching in the United States is usually dated from 1864, when August Belmont put his coach upon the road; and eleven years later, mainly as a result of the efforts of Leonard Jerome, the New York Coaching Club was founded. The first regular service was begun in 1876, between the old Brunswick Hotel in New York City and Pelham Bridge (15 miles). Since that time fashionable coaching has been one of the features of the social life of New York, Newport, and Philadelphia. Coaching is also indulged in by the wealthy and leisure classes of London, Paris, Berlin, Vienna, and other European cities.

One of the most important routes in America is that from the Holland House, New York, to Philadelphia and return (90 miles each way); in England, from the White Horse Cellar, Piccadilly, to Brighton (54 miles); in France, from the New York *Herald* office at Paris to Fontainebleau (60 miles).

See DRIVING. Consult W. O. Tristram, *Coaching Days and Coaching Ways;* G. A. Thrupp, *History of Coaches;* A. Carnegie, *An American Four-in-Hand in Britain;* F. Rogers, *Manual of Coaching;* F. M. Ware, *Driving;* Price Collier, *Riding and Driving.*

Co'adju'tor, an assistant and often the successor of a bishop (q. v.) who, on account of age or infirmity, is unable to discharge the duties of his office. A coadjutor differs from a suffragan in that the latter is assistant to a bishop who, owing to the great extent of his see, cannot fulfil all his obligations.

Coag'ula'tion is the term applied to the separation of a viscid or semi-solid mass from a liquid under the influence of heat or of chemical action. The process varies in various substances. Albumin, or white of egg, coagulates at a temperature of 160° F. Milk is coagulated or curdled by the action of rennet or by acids, etc. The blood and lymph of man and animals coagulate when taken from the body. See BLOOD; CHEESE.

Coahuila, kō-ā-wē'lā, state, Mexico, separated from Texas on the north by the Rio Grande. To the northeast the state is mountainous, the Sierra Madre range connecting with the Apache Mountains of the United States. The west is occupied by the wilderness of the Bolson de Mapimi, while along the valley of the Nasas River, to the south, agriculture is well developed.

Coahuila has an agreeable and healthful climate. The rainfall is somewhat uneven—scarce in the lowlands, but abundant in the southern part. Agriculture is the principal pursuit. The chief products are wheat, maize, and other grains, sugar cane, cotton, beans, peas, and other legumes. Raisin grapes of superior quality are grown. Much fine natural pasturage exists, and stock raising is successful and lucrative. Nine-tenths of the cotton product of Mexico is grown in Southwestern Coahuila. There are large tracts of the guayule rubber plant.

The state is rich in mineral deposits, especially silver and coal, which are mined in increasing quantities. Copper, gold, lead, iron, zinc, sulphur, and onyx are also found. Cotton factories and flour mills are in operation. The chief towns are Saltillo (the capital), Monclova, and Parras. The International Railway of Mexico traverses the state north to south. Area, 63,786 square miles. Pop. (1930) 434,313.

Coaita. See SPIDER MONKEY.

Coal, a compact mineral of vegetable origin, ranging in color from dark brown to black, and consisting chiefly of carbon, hydrogen, oxygen, and nitrogen. It is readily combustible, has a high calorific value, and is one of the important fuels for domestic and manufacturing purposes. When distilled coal yields Coal Gas (see GAS MANUFACTURE) and Coal Tar, the latter the principal source of benzene and numerous other products (see COAL TAR).

Geology.—Coal is found most abundantly in the upper part of the Carboniferous formation or Coal Measures, though it occurs also in strata of many different ages, especially in the Upper Cretaceous series.

The period represented by the rocks of the Coal Measures was one of the most remarkable of which there is any record in the geological history of our planet. Enormous areas of the earth's surface were covered with dense forests, which grew in lagoons and marshes. The climate was warm, equable, and moist; the atmosphere probably relatively rich in carbon dioxide. The growth of vegetation must have been rapid, and dark evergreen plants and ferns lent a sombre aspect to the scenery. As yet there were no flowers, no birds, and none of the higher quadrupeds. For many years the marshy vegetation densely clothed the soil, and was slowly carried down below the water, and covered over with mud or sand. Then, by some slight upheaval or gradual silting up of the sea bottom, a land surface was once more formed, luxuriant vegetation again sprung up, which in course of time decayed, sank, and became overlaid with silt and sand as before. The vegetable layers thus deposited, subject to the heat of the earth and of decomposition, and to the pressure of accumulating masses of stratified matter, were gradually converted into coal.

In other cases great masses of decaying vegetation drifted out into lakes or estuaries, and were there gradually submerged, covered with *débris,* and similarly converted into coal.

The changes which take place in the conversion of vegetable matter into coal are partly chemical and partly structural. The oxygen and hydrogen of the woody fibre tend to be expelled in the form of water, methane (marsh gas) and carbonic acid gas, while the carbon increases in proportion as the process advances, till in anthracite coal it forms nearly the whole of the resultant mass. The color is altered from brown to black; the weight increases; and with the higher percentage of carbon the heat given out during combustion becomes greater. The vegetable structure gradually disappears, and others are formed as peat, lignite, bituminous, and anthracite, more and more removed from wood in composition and character. It is possible that in some cases even the beds of pure graphitic carbon occurring in metamorphic rocks may be merely layers of vegetable matter which have undergone the last stage of chemical change and which have been deprived of all their volatile matter and of all traces of vegetable structure.

The varying quantities of carbon, hydrogen, oxygen, and nitrogen present in the different stages of coal formation are shown in the following table:

	C.	H.	O.	N.
Woody tissue	50.	6.	43.	1.
Peat	50.	6.	33.	1.
Lignite	69.	5.5	25.	0.8
Bituminous coal	82.	5.	13.	0.8
Anthracite	95.	2.5	2.5	trace

The Coal Measures consist chiefly of beds of sandstone, shale, clay and ironstone, through which layers or seams of coal, varying in number from a few to more than a hundred, are unevenly distributed. Occasionally they contain marine limestones, which were formed during periods when the sea temporarily took possession of the area; but the whole aspect of the strata and of the fossils they contain indicates a prevalence of lagoon and fresh-water conditions. The commonest fossils are plant remains, the stems and leaves of many kinds of ferns, the fossil bark of the gigantic Lepidodendron, and remains of extinct Calamites, Coniferæ, and Cordiates. Land and fresh-water shells are also found, along with the remains of fish, myriapoda, insects, molluscs, and air-breathing Amphibia of the Labyrinthodont family.

The thickness of the Coal Measures varies considerably in different areas: In South Wales 10,000 or 12,000 feet, in Nova Scotia 6,000–7,000 feet, in the great Appalachian field 4,000 feet, Michigan 300 feet, Illinois 600–1,000 feet.

The coal seams vary in thickness from less than an inch up to 40 feet or even over 100 feet, as in Wyoming and Pennsylvania; but when they are very thick they consist, as a rule, of a number of beds, which are usually separated by partings of shale and rock. The intervening masses may thin out locally, and the coal seams come together to form a bed of great thickness. A single coal seam is sometimes of considerable extent, and may be traceable over the whole of a field, though perhaps known under different names in different districts. Such a seam may thin out and die away, or pass into a carbonaceous shale; or it may split up into several thin seams separated by partings. Seams under two feet in thickness are worked only in exceptional cases.

Coal seams are not always of the same quality and composition throughout; they may vary in purity in their different parts, or may be broken up by thin layers of shale, which are rejected before the coal is sent to the market. Traced laterally, a coal may be replaced by shale, ironstone, sandstone, or even dolomite. The coal may have been deposited and washed away and these beds laid down in their place, but often the presence of other material may be due to the fact that conditions did not favor the deposition of coal and were favorable to the deposition of the materials mentioned. A seam of coal which is in one place lignitic or bituminous, may elsewhere be semi-bituminous or anthracite. As a whole, however, coal seams are persistent and remarkably pure.

Composition.—As already stated, the chief constituents of coal are carbon, hydrogen, oxygen and nitrogen, the carbon being present partly in a non-volatile state (fixed carbon), and partly in a form that can be distilled by heat (volatile matter). Hydrogen occurs in combination with other elements, but quite largely also, especially with immature coals, of which lignite and bituminous coals are examples, in a form which is termed 'moisture,' because it is readily driven out by heat in that form. Coal may be actually wet with water, but even the so-called 'high-moisture' coals may be entirely or largely free of visible moisture which cannot be removed by pressure, but is evaporated readily by heat or exposure to the air. Lignites, especially in Germany, may contain 60 per cent of moisture. All lignites lose much weight rapidly after mining and tend to crack and disintegrate. In addition, there are present small quantities of sulphur, largely in combination with iron, and of ash, consisting of certain incombustible mineral impurities, as silica, alumina and magnesia, derived in part from the original vegetable matter, and in part from sand and mud mixed with the coal at the time of its deposition.

Besides its solid constituents coal contains certain dissolved or occluded gases, the principal being carbon dioxide, methane, and nitrogen. Carbon dioxide is known as 'choke damp,' or 'black damp,' and methane mixed with air is known as 'fire damp.' These gases possibly were formed long ago in the mineralization of the coal, but it is also believed that present-day chemical changes explain the occurrence of the emitted gasses. Given off in large quantities they are exceedingly dangerous in underground workings (see Coal Mining; Methane; Safety Lamps).

The composition of any particular coal is determined by analysis, two methods being employed—the proximate, and the elementary or ultimate. In proximate analysis the constituents are grouped in their natural associations as they appear under normal burning conditions—as moisture, volatile matter, fixed carbon, and ash; in ultimate analysis the percentage of each chemical element is determined, as carbon, hydrogen, nitrogen, oxygen, sulphur, etc. A proximate analysis is sufficient to indicate the behavior of the coal as a fuel, and serves all ordinary purposes. In fact, a proximate analysis by many is regarded as preferable to an ultimate analysis as more clearly defining the character of the coal.

The heat value of coal is dependent upon the quantity of carbon and hydrogen present, and may be roughly calculated from the proximate analysis, or more closely from an ultimate analysis. The usual method, however, is to burn a sample in a closed steel-bomb calorimeter (see Fuels, Calorific Power of).

Classification.—Various classifications of coals have been made. The simplest, divides them into three main groups, exclusive of peat (q. v.)—Lignites, Bituminous Coals, and Anthracite—with the intermediate groups, Sub-bituminous, Semi-bituminous, and Semi-anthracite.

Lignites, or *Brown Coal*, occupy a position in coal formation between peat and bituminous coals. They are dark brown, sometimes black, often fibrous or laminated, and frequently show distinctly the structure of woody tissue. A few give out much smoke, but most of the lignite of the United States give an almost smokeless flame. Lignites, however, contain so much moisture that they produce less heat by far than the more mature coals.

Finely broken lignite when piled tends to fire spontaneously. Their heating power is small. Lignites predominate in the Tertiary beds of Europe and North America.

See Lignites.

Sub-bituminous coal, often known as Black Lignite, is a connecting link between the lignites and the true bituminous coals. It is black and lustrous, and has a tendency to disintegrate when exposed to the weather. In many ways it resembles lignite, but has less moisture, gives more heat on combustion, is less likely to fire spontaneously and makes more smoke.

Bituminous coals include the larger proportion used for manufacturing and household purposes throughout the world. They are dark brown to pitch black in color; soft, brittle, and opaque; often breaking in rhomboidal or cuboidal blocks; and with certain faces smooth, clean cut, and shining, while others (the bedding planes) are dull. Their specific gravity ranges from 1.25 to 1.4. They are rich in volatile hydrocarbons, and burn with a long yellow smoky flame. When heated they give off large quantities of gas, some of which is combustible, and other moisture and carbon dioxide.

Bituminous coals have been variously subdivided. *Caking coals,* generally so called, are those which soften on heating, swell as gas is evolved, and become fused together, forming a coherent, spongy mass, the caking being due to the formation of a viscid tar, which subsequently chars, binding the whole together in a firm, hard coke. Caking coals often have a large volatile matter content; they give off much gas, are smoky, and burn with a bright yellow or reddish flame. They are the source of the best commercial coke, and are used extensively in the manufacture of illuminating gas (see Gas, Illuminating).

Non-caking coals burn *free* or *open,* as the particles remain separate, and permit the free passage of air between them, which is important, especially in stoking. Caking coals may require to be mixed with non-caking to ensure uniform and complete combustion in a furnace. The difference in the behavior of these two groups of coals apparently depends not so much on their ultimate chemical composition as on the proximate—that is to say, on the manner in which they decompose or break up when heated.

Cannel coal is a hard bituminous coal similar to other varieties in composition, but differing in texture. It is compact, dull in appearance, and does not soil the fingers when handled. Some varieties when heated, make a crackling noise that has won for them the name of *parrot coal.* Cannel coal is rich in hydrocarbons, and gives off much gas, which burns with a bright, clear flame. It is largely used as a domestic fuel and is burned in open grates as it burns readily giving a cheerful blaze.

Semi-bituminous and *semi-anthracite* are intermediate between the true bituminous and true anthracite coals. They kindle readily and burn freely and rapidly with intense heat. Semi-bituminous coal is especially useful in the production of steam for heating and power generation.

The *anthracites* contain the highest percentage of fixed carbon and the lowest percentage of volatile ingredients. The true anthracites are the hardest of all the coals, have a shiny black luster, and a specific gravity of 1.3 to 1.8. They burn slowly, radiating much heat and giving almost no flame. Eastern Pennsylvania, South Wales and Russia are the principal sources of this coal (see Anthracite).

Commercially, coals are classified according to their uses, as domestic, steam, blacksmith, byproduct coking, producer gas, illuminating gas, and cement burning. They are also classed and marketed by size, the standard sizes of Pennsylvania anthracite coal are, egg, stove, chestnut, pea, buckwheat No. 1, buckwheat No. 2 (rice), and buckwheat No. 3 (barley). Other coal often is marketed as run-of-mine lump, nut and slack. Usually, a large number of overlapping sizes are made and many mixtures. When the size of lump is given solely in inches with or without fractions as 4-inch lump, it indicates that all of the coal thus designated has gone *over* a screen having openings of that size. When, on the other hand, the size of slack is given solely in inches and for fractions of an inch, it is indicated that all the slack thus designated has gone *through* a screen having openings of that size. When two sizes are given copulated by X it indicates that the coal has gone through an opening of the larger size and been arrested on an opening of the smaller size.

For powdered coal, see Fuels.

Coal Fields.—Areas in which coal occurs in commercial quantities are known as coal fields.

United States.—The coal fields of the United States rank first in area, the known coal areas aggregating a total of 339,887 square miles, to which may be added 89,482 square miles supposed but not definitely known to contain workable coal, and 28,470 square miles in which the coal lies at depths of 3,000 feet or more.

The U. S. Geological Survey separates the coal areas of the United States into six divisions or provinces, as follows: (1) The Eastern province, which includes all of the bituminous areas of the Appalachian region; the Atlantic Coast region, including the Triassic fields near Richmond and the Deep River and Dan River fields of North Carolina; and the anthracite region of Pennsylvania. (2) The Gulf province, which includes the lignite fields of Alabama, Mississippi, Louisiana, Arkansas, and Texas. (3) The Interior province, which includes all the bituminous areas of the Mississippi Valley region and the coal fields of Michigan. This province is further subdivided into the eastern region, embracing the fields of Illinois, Indiana, and western Kentucky; the western region, including the fields of Iowa, Missouri, Kansas, Arkansas, and Oklahoma; and the southwestern region, including the coal fields of Texas. The Michigan fields are designated as the northern region of the interior province. (4) The Northern or Great Plains province, which includes the lignite areas of North Dakota and South Dakota, and the bituminous and sub-bituminous areas of northeastern Wyoming and northern and eastern Montana. (5) The Rocky Mountain province, which includes the coal fields of the mountainous districts of Montana and Wyoming, and all the coal fields of Utah, Colorado, and New Mexico. (6) The Pacific Coast province, which includes all the coal fields of California, Oregon, and Washington. The anthracite fields of the United States are confined almost wholly to an area of 485 square miles in eastern Pennsylvania.

The Appalachian and anthracite fields of the Eastern province and the fields of the Interior province belong to the Carboniferous period; the Gulf fields and those of the Pacific Coast belong to the Eocene epoch and the Tertiary period; while the Rocky Mountain fields include coals of the Permian, Cretaceous, and Jurassic periods. Extensive fields of various ages also occur in Alaska.

Canada has large supplies of semi-bituminous, bituminous, sub-bituminous, and lignite situated for the most part in the western interior, although there are important fields on both coasts. The total coal areas of the Dominion cover 109,168 square miles, including those for which a fairly close approximation of reserves has been made, probable reserves, and areas in which deeper mining would prove productive.

On the Atlantic seaboard there are productive mines in Nova Scotia and small workable beds in New Brunswick. The interior fields include valuable lignite deposits in Manitoba and southern Saskatchewan; the extensive coal fields of Alberta, containing coals of a wide range of character and constituting Canada's greatest reserve; and the Crow's Nest and Elk River fields in the Rocky Mountains. The Pacific Coast area embraces the fields in Vancouver and Queen Charlotte Island, the latter yielding semi-anthracite and bituminous coals and lignite. Extensive coal and lignite deposits exist also in the Yukon district, the Lower Mackenzie region, and on the Arctic islands.

Great Britain.—The coal fields of Great Britain are the principal source of its mineral wealth. In England and Wales the total exposed area is 2,786 square miles. The principal coal fields are the Newcastle Basin, in the counties of Northumberland and Durham; the Cumberland, covering the northern and western portion of Cumberland; the Lancashire, Cheshire, and Flintshire; the Yorkshire, Derbyshire, and Nottinghamshire; the Midland, including the fields of Denbighshire, North and South Staffordshire, Warwickshire, Leicestershire, and Shropshire; the South Wales Basin, which is the chief source of steam coal for the British navy and mercantile marine, and anthracite, and the Southern Coal Basin, including the Bristol and Somersetshire, Forest of Dean, and Kent fields. Scotland has about 570 square miles along the Firth of Forth and the Clyde. Ireland also has deposits of coal, but these have been little worked.

Germany is the leading coal country of Continental Europe, the principal fields being those of the Ruhr or Westphalian Basin, Upper Silesia, and the Saarbrücken. There are also large deposits of lignite. *France* has numerous isolated deposits grouped in three main fields; while Belgium, Austria, Hungary, Spain, Holland, Poland and Russia have deposits.

Coal is also worked extensively in South Africa, Australia, India, Japan, and China, and there are important beds in South America. The Chinese coal fields are probably the largest in the world, with the exception of those of North America, and they yield coal of all varieties, from hard, dry anthracite to woody lignite (see COAL MINING).

See FUELS; also the sections on *Mining* and *Mineral Resources* in the articles on the various countries and States.

Bibliography.—E. S. Moore, *Coal* (1922); 12th International Geological Congress, *The Coal Resources of the World* (3 Vols., 1913); S. W. Parr, *Analysis of Fuel, Gas, Water and Lubricants* (4th ed., 1932); *Proceedings of Third International Conference on Bituminous Coal* (2 Vols., 1932); R. E. Machin, *Science in a Coalfield* (1932); Museum of Science and Industry, Chicago, *Story of Coal* (1933); A. C. Fieldner and J. D. Davis, *Gas-, Coke-, and Byproduct-making Properties of American Coals and Their Determination* (1934); J. V. Lewis, *Evolution of the Mineral Coals* (*Economic Geology*, Jan.-Mar., 1934); I. Thomas, *Coal in the New Era* (1934); U. S. Bur. Mines pub. many *Technical Papers on Coal.*

Coal'dale, borough, Schuylkill county, Pennsylvania, on the Central of New Jersey and the Lehigh and New England Railroads; 70 miles northwest of Philadelphia. It has coal mining interests. It was incorporated in 1906 from part of Rahn township. Pop. (1930) 6,921.

Coal Fields. See COAL.

Coal Fish. See POLLACK.

Coal Gas. See GAS MANUFACTURE.

Coal'gate, town, Oklahoma, county seat of Coal county, on the Oklahoma City-Ada-Atoka and the Chicago, Rock Island, and Pacific Railroads; 120 miles by rail southeast of Oklahoma City. Coal mining and the raising of cotton are the chief industries. Pop. (1920) 3,009; (1930) 2,064.

Coalin'ga, city, Fresno county, California, on the Southern Pacific Railroad and on the Sierra-to-the-Sea Highway; 158 miles southeast of San Francisco. The city is the center of an important oil field, with more than 1,300 oil wells. There are oil field supply houses, refineries, and machine shops. The city was incorporated in 1906. Pop. (1920) 2,934; (1930) 2,851.

Coaling Ship, the providing of ships at various stations with the coal necessary for their progress and safety. See CONVEYORS.

Coaling Stations, ports where steamers or other vessels may obtain fuel for their operation. In some cases they are government owned and are maintained primarily for naval purposes; they are sometimes acquired by lease from a friendly nation and sometimes obtained by conquest. With the advent of the oil-burning ship, oil bunkering stations have become equally essential.

Coalition, kō-a-lish'un, a name applied both in national and international politics to an arrangement whereby two parties or nations, usually hitherto opposed in interests or ideas, agree to sink their differences in order to secure some common end. In international politics the name is applied only to temporary alliances for specific purposes. In national politics, coalitions generally end in the absorption of one of the parties involved; but they are not intended to result in this way, and are at first thought of as temporary combinations for specific purposes. In the countries of Europe, where political parties are numerous, and frequently no one has a working majority in the legislative body, the coalition is a politic expedient constantly resorted to.

Coal Measures. See COAL, *Geology.*

Coal Mining comprises the processes whereby coal is obtained from its natural position beneath the surface of the earth, and the subsequent operations by which it is prepared for use.

Prospecting.—The first step in the mining of coal is the location of workable deposits by prospecting. In many localities as the measures have been eroded by streams, the coal seams are exposed, or pieces of coal drift can be found in the streams, or in upturned tree roots. As water on the dip side of a coal area escapes from under the coal a 'coal bench,' or offset frequently forms on the side of a hill marking the 'outcrop' or 'strike' of the seam on the surface. A little horizontal digging will usually uncover the edge of the bed enough to determine in some degree its thickness and character. Where the slope of the hill is slight and the wash over the coal heavy, it may be necessary to start higher than the probable outcrop and sink a small shaft or borehole down to the seam. However, borings at points of heavier cover are usually desirable to ascertain thickness, character of coal, levels of measures for drainage and transportation, etc., for these are always uncertain. Where coal beds do not outcrop or have been covered heavily by glacial drift, the existence of coal-bearing strata having been ascertained from knowledge of the geological formation of the district, the thickness of the coal seams, their depth from the surface, and the nature of the coal have to be determined by means of boring. Estimates of the probable expense of sinking shafts, and of the relation between the output and the cost of working the mine, may thus be formed; and information is obtained as to the inclination or 'dip' of the seams, and as to the presence of faults (see BORING; DRILLS AND DRILLING).

Shafts.—Workable seams of coal having been located, the next step in their development is to render them accessible to the miner. Frequently, when surface outcrops occur, the coal can be worked by drifts driven directly into the seam, by slopes driven to follow the coal seam in its descent or in hilly country by tunnels or slopes opened through intervening rock measures. This is usual practice in the United States.

The number of shafts is governed by the extent of the mine and the proposed output of coal, by the system of ventilation, and by legal provisions. In most countries, if not all, at least two shafts for each mine are required. Two means of escape must be provided in case of a fire, the caving of an opening or the vitiation of the air by an explosion. However, some of the older mines are single openings separated by a wall or tight partition. New mines have two entirely separate openings separated by hundreds of feet of rock strata. It is frequently provided that new mines must not be within a certain distance of the breaker or tipple (dump house) so that the fumes of a fire or the fire itself cannot enter the mine.

Drifts should be located where they drain at least much of the coal area tributary to their operations. They are preferably placed at the lowest point in a seam unless more than one drift is provided. The location of shafts is determined by the surface contour of the land; the proximity of transportation facilities, as roads, railways and canals, and of facilities for power generation; the character and inclination of the strata to be penetrated; the presence of faults, which are likely to prove a source of difficulty or even danger; and the method to be employed in working the coal. If the seam has a gentle drip, and is at a moderate depth from the surface, so that the presence of water may be expected, the shafts may with advantage be placed at the lowest point of the seam, it being then possible to run both water and loaded mine-cars to the shaft bottom by gravity. In a deep, level seam, other factors being equal, it is better to place the shafts near the center of the property.

Formerly, only those coal beds lying close to the surface were considered workable; but with the exhaustion of the coal deposits near the surface and with the general improvement in engineering appliances, the depth of shafts has markedly increased. In the Belgian coal fields a shaft has been sunk 3,937 feet; but 3,000 feet is generally considered the limit of depth for profitable coal mining. In form, shafts may be circular, elliptical, or rectangular. Circular shafts are of greater intrinsic strength, are better adapted to lining with brick, stone, or iron, and offer the minimum resistance to the passage of ventilating currents of air. Rectangular shafts are more suitable where wood is the chief lining material. In the United States almost all shafts are rectangular. Being sunk in solid measures they are readily sunk and maintained in that relatively unstable shape. However, some shafts for ventilation are made circular especially as such shafts have less 'rubbing surfaces' to resist the passage of air.

The dimensions of the shaft vary with its depth and the output of the mine, and with the size and number of mine cars to be raised at a single hoisting. There are usually two or more compartments for hoisting, in addition to those for ventilating, timbering, piping, etc. The width of a rectangular shaft seldom exceeds 12 feet; the length depends on the number of compartments. For the methods of sinking, see SHAFT SINKING.

When the shafts have been sunk to the base of the coal seam, and the connection has been made between them, the bottom leading it to each shaft is usually arched over, forming a strong chamber called the *landing*. The thickness of the arch is increased according to the pressure which it may have to bear, wooden blocks being frequently built in Europe into it to give elasticity in case of a sudden increase of weight. An inverted arch may also be built for the floor. In the United States neither of these precautions are necessary as the depths reached are not yet excessive. In order to take rails and other lengthy objects off the cage, the roof has to be sloped back toward the shaft. In Europe men and coal are hoisted in multiple deck cages and a wider space is necessary, so in Europe this approach may have to be arched. In the United States the rock will usually support itself without trouble. Pillars of coal are left for the protection of the shaft they surround, and for the support of the buildings on the surface. However, early mining often was commenced too near the shaft bottom and trouble has occurred; so not infrequently, in the anthracite region, breaker refuse is flushed down boreholes into nearby and abandoned workings where under pressure it hardens much like rock.

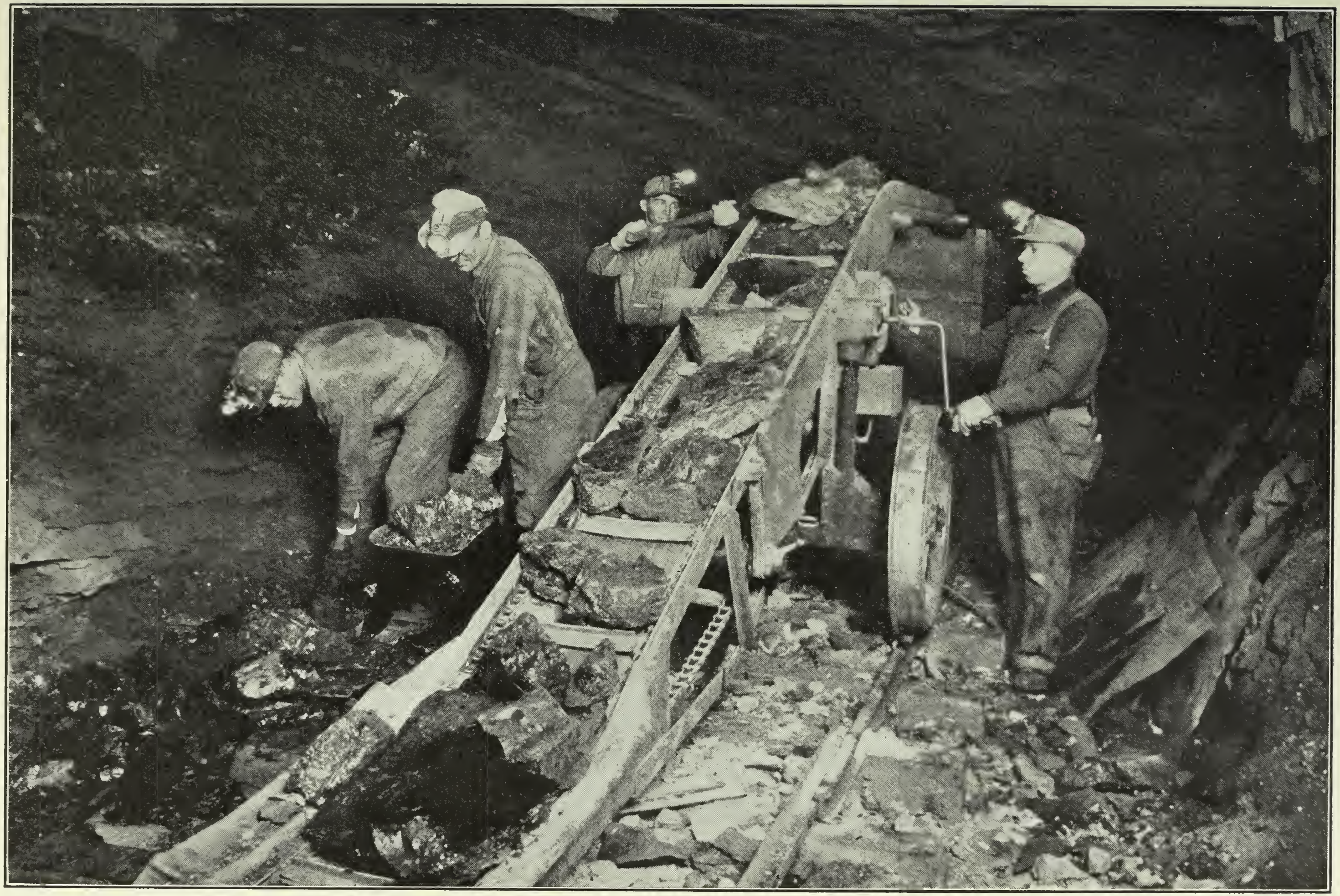
Methods of Working.—Coal mines everywhere provide two passageways because air has to be taken in by one passageway and returned by the other. These passageways are usually known as 'headings,' one is termed the 'intake' and the other the 'return.' Where more air is needed than one airway will carry, two or three, or even six, intake headings are provided and an equal number of return headings. A group of such headings is known as an 'entry.' However, 'entry' and 'heading' sometimes are used synonymously.

Cross passages are made between the headings, known as 'crosscuts.' These are at 60- to 100-ft. centers usually. The last crosscut in any entry is open and the others closed, so that the air current cannot do otherwise than travel to the last crosscut by the intake and leave the mine by the return. In the anthracite region, the intake is known as the 'gangway' and the return as the 'airway.'

The main entry may be paralleled by other entries at some distance away, but other entries are constructed frequently also at right angles to the main entries, thus dividing the coal area into large rectangles or squares, blocking it out and providing access.

In steeply pitching coal, gangways and airways may have to be driven on the level, the crosscuts are chutes and the cross entries become slopes. Roads driven in the rock to other beds are designated 'rock-tunnels.' The gangways and airways often wind considerably with the contours of the coal seam and cannot be kept parallel with each other, except where the beds are fairly level. Sometimes when at a great depth they may have to be made in the rock, because the coal is not strong enough to support them if made in the coal, especially as the coal nearby has to be mined. Rock tunnels may have to be constructed also from the shaft to the coal bed or from one bed to another, and rock chutes may connect the rock tunnels with short roadways in the coal, but rock tunneling is occasional, even in the anthracite region and in the State of Washington, to which fields it is confined.

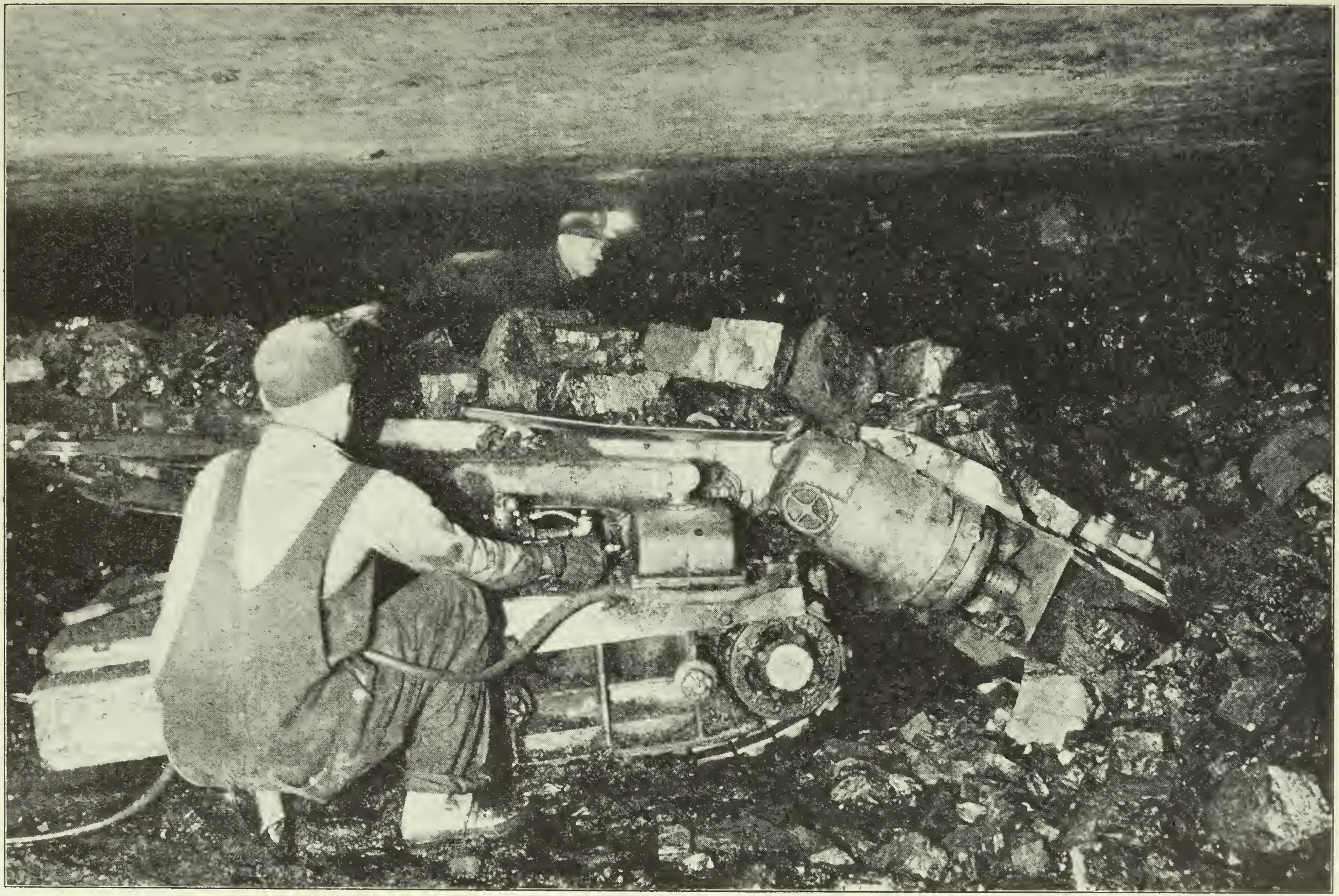
Rooms are driven off some of the headings. These are made to obtain coal and not, like the headings, solely for communication and transportation purposes.



Publishers' Photo Service, N. Y.

LOADING COAL ON AN AUTOMATIC BELT CONVEYER
Philadelphia & Reading Coal & Iron Co.

Vol. III.—At Page 199A



Courtesy of Joy Manufacturing Co.

FIG. 1.—LOADING MACHINE LIFTING COAL FROM THE FLOOR ONTO AN INCLINED CONVEYOR WHICH CARRIES IT TO THE TOP OF A MINE CAR.

They also have to be ventilated and are, therefore, connected by crosscuts (called 'headings' in the anthracite region). They usually start with a narrow 'neck' to provide a good pillar against the heading and then widen to widths, usually from 12 to 24 ft., depending on the strength of the roof, depth of working, thickness of bed, etc. The pillars between these rooms are usually removed after the rooms are driven the required distance (usually 200 to 300 ft.).

The pillar is removed from the far end, and as it is extracted the roof falls or caves in. This is known as 'drawing' or 'robbing' pillars, but as those who do not 'rob' pillars are regarded as wasting our mineral resources, and as pillar drawing usually makes a mine safer if properly done, not stigma but credit is due those thus robbing them. This then is the 'room-and-pillar method' which is the general system of mining in the United States. It is best suited to shallow workings. Timber is nearly always used in rooms and in the removal of pillars.

In the 'longwall' method, the coal seam was removed formerly by miners working along a circular face which continuously receded from the shaft bottom, though usually a heavy pillar of coal was left to support the shaft. Packwalls of rock were built in the extracted area to protect the miners and keep the roads open. These were made from the loose rock over the coal. Sometimes wood cogs are used, built by crossing timber much as in the piling of railroad ties. Today, 'modified longwall' has replaced true longwall. The working face is straight, not circular, and the roads form a rectangular network and are no longer radial to a circle. With modified longwall, or 'longface,' conveyors can readily be introduced. Circular longwall is quite general in northern Illinois and in parts of Iowa and Oklahoma. Longface is used a little in many fields of the United States and in some sections where the coal is thin it is used exclusively as, with conveyors, bottom need be lifted and top rock shot only in roadways.

In 'longwall retreating,' roads first are driven to the property line of the operation and then worked back in a longface toward the shaft, the outer space being filled with waste rock. In the United States, longwall is rarely applied to thick seams, to mines near the surface or under towns, reservoirs, etc. Under towns, rooms are driven and pillars usually left in place so that the roof will not fall. In Great Britain and other countries, longwall has been used under towns, railroads and reservoirs with fairly satisfactory results. Longwall retreating is especially favored in Europe where coal is likely to fire spontaneously.

Timbering.—The proper support of underground workings is of the utmost importance, a large percentage of mining accidents being due to falls of roofs and sides in roadways and at the coal faces (see MINING). Any long-grained, well-seasoned wood is suitable for mine timber. Pine, fir, and oak, treated with creosote or some other preservative, are among the best.

In longwall mining the roof at the face is supported with rows of props with a short cross piece, or 'cap,' at the top of each, while timber cribs, known as 'chocks' or 'cogs,' are placed at the junctions of roads and at other places requiring extra support. *Systematic timbering* consists in setting the props at regular specified intervals, whether or not there is any apparent weakness in the roof or walls. In the room-and-pillar method the pillars of coal form the main support, but lines of props are also used to prevent slabs and pieces of roof from falling. For the roadways adjacent to the faces, cross bars supported by hitches in the side wall or by props are usually sufficient. Main haulage ways may have supports of steel and iron, brick arching, or brick walls and girders.

Methods of Getting the Coal.—All coal seams, except some of those in the anthracite region, have cleavage planes along which they may be readily split. The rooms which are driven in the direction of these planes are said to be 'driven on the butt or end' while those across them are said to be 'driven on the face,' the coal being more easily broken loose in rooms driven in the latter direction. The actual excavation is performed either by manual labor or by machine aided in almost all cases by explosives.

In the United States, where the room-and-pillar method is generally used, there are two principal ways of bringing down the coal in the first working—simple blasting without any preliminary operation, known as 'shooting off the solid;' and blasting preceded by undercutting or shearing, so as to expose more than one face of the coal to the action of the explosive. The latter is much the more common method; 'shooting off the solid' is gradually becoming obsolete. Undercutting or holing consists in cutting under a block of coal to a depth of from three to six feet in the face, the coal sometimes being supported meanwhile by timber supports called 'sprags.' Shearing is similar to undercutting, but is done vertically. When undercutting is done by hand, the method of winning the coal is called 'pick-mining.' When it is done by mechanical cutters, the method is known as 'machine mining,' even though the coal may be loaded in the mine cars by hand.

Mechanical cutting, because of its superior speed and the consequent increase in output, is used with advantage in both thick and thin seams. It is today almost impossible to get men to undercut coal properly by hand and, if it is shot without complete undermining, too much fine coal is produced and an explosion of coal dust is to be feared. The compressed air pick machine which delivered a rapid succession of heavy blows with a long chisel-shaped pick has perhaps entirely disappeared. The chain cutter, in which cutting teeth are mounted on an endless chain driven by a motor is generally used in the United States. This machine may be drawn along the face by its own power, cutting as it goes, or it may be mounted on a wheeled truck and cut a semicircular 'kerf' in the face with the road as center. In the United States compressed air is rarely used for this purpose, electricity being preferred (see COMPRESSED-AIR MOTORS; ELECTRICAL MACHINERY; PNEUMATIC TOOLS). Since 1910 loading coal by machine methods had made remarkable progress in the United States.

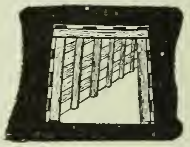


FIG. 2.—*Systematic Timbering*

Until recent years coal, after undercutting and blasting, was loaded into the mine cars by hand shovel. Lately, however, loading machines and conveyors have come into use in many mines. These are operated by electricity, and load the blasted coal directly into the cars. In some instances coal is carried across the working face by a conveyor, down the chamber by a room conveyor and in a few instances along the room heading an entry conveyor, and even along the main entry by a series of conveyors to the mine tipple or breaker. V-shaped scrapers hauled by main and tail ropes by a hoist are sometimes used to transport the coal, but only for distances shorter usually than 300 ft. Strictly speaking, conveyor-loaded coal is not mechanically loaded, for hand shovels are used to put the coal on the conveyor in the first instance, which also is true of the 'pit-car loader' on the foot of which men shovel their coal to have it carried a few feet along the face and deposited in the mine car. However, by adding an enlarged end or mouthpiece, known as the 'duck bill' to the end of a shaking conveyor, loose coal can be lifted from the floor onto the conveyor and transported by a series of jerks along that conveyor to the mine car, 50 to 500 ft. away. Shaking conveyors are usually reserved for short runs and the inclination is slight or favors the load. Belt and flight conveyors work well with any reasonable gradient, but belt conveyors are most favored for long-distance transportation, one installation of belt conveyors being over 4 miles long.

In wet mines, where no gas is present, black powder is often used for blasting; but in dusty or gassy mines one of the so-called flameless high explosives must be employed, their explosion being immediate and not attended with a long flame such as would be likely to ignite dust or gas.

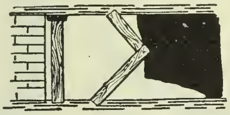


FIG. 3.—*Coal Face undercut by hand*

After the rooms are driven their required length the pillars are removed by slices or lifts until a small square pillar remains, which is mined away by a single operation, no explosives being used at this stage. Where the pillars are large, this is an elaborate procedure, carefully timed so to keep an even 'break line' at all times from pillar to pillar and to provide for the protection of the men when the roof falls as it does shortly after the pillar is withdrawn and haply sometimes before withdrawal.

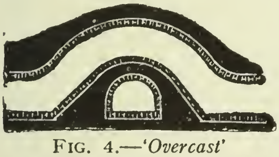


FIG. 4.—*'Overcast'*

Haulage of Coal to Tipple or Breaker.—This may be accomplished by manual labor, mules or horses, or mechanical means. Rope haulage is conducted on four main systems. (1) The self-acting incline, which is possible where the shaft bottom is at the lowest point of the seam, the loaded cars running downhill and pulling up the empty ones by a wire rope running round drums or pulleys at the top of the incline. This system is often used also in lowering cars down the sides of valleys to the tipple. Where it is not possible to lay a double line of rails throughout, the cars may pass each other on a by-pass, or short piece of double track at the center of the incline, or a single line alone may be used with a balance weight running between the rails, alternately being drawn up by a full car and drawing up an empty one. (2) Single-rope haulage is adopted where the shaft bottom is at the top of an incline—the full cars being in this case hauled up by a hoisting engine, and the empty train running back by the action of gravity. (3) Endless-rope haulage is more extensively used than any other system. Though most commonly employed for fairly level seams, it presents marked advantages even for steep roads. An endless wire rope, to which the cars may be attached either singly or in trains, traverses a double roadway, passing from the driving pulley at the beginning of the system, along the haulage roadway, around a return wheel, and back to the driving pulley. The rope is constantly in motion, the empty cars being taken into the workings on one track, while the full cars are brought out on the other. In this way a regular and continuous supply of coal to the shaft is maintained. An endless chain may be employed in place of the endless rope, in which case the cars are attached singly. (4) Main and tail rope haulage is utilized where, owing to insufficient or irregular inclination, it is necessary to use a second rope to draw in the empty cars. Only one road is used, as in single rope haulage; but in addition to the main rope, which runs direct from the engine drum to the front of the full train, there is a tail rope that passes from a drum on the same shaft as the main rope drum, along the side or roof of the roadway, around a return pulley at the far end of the road, to the end of the full train of cars. This rope draws back an empty train as the main rope pulls in a full one.

Rope haulage has never been used in the United States as extensively as in Europe, electric haulage arriving before rope haulage was entrenched. Probably in no country is the use of electric haulage so general. Horses and mules also are almost entirely superseded. Compressed-air locomotives are now used in only a few mines; internal combustion engines after a brief activity underground were relegated to the surface, though in Germany Diesel locomotives are used extensively underground. Storage-battery locomotives are favored for gathering, that is for 'flitting' from room to room to make up a 'trip' or train of cars. For this also a locomotive with an electric cable reel is used that reels out its own power line as it enters a room and reels it up again as it leaves. The crab-reel locomotive, now little used, has a hoisting reel that is used to drag cars out of the room, the locomotive remaining in the heading. Combination locomotives will run on storage-battery power, where, as in rooms, no trolley wire is provided, or on wired power when such trolley wire is strung along the heading. In rooms a small room hoist sometimes is provided to pull mine cars into or out of the room over adverse gradients. Such hoists are used to pull a trip of mine cars under mechanical loading equipment such as a conveyor or mechanical scraper.

Raising Coal to the Surface.—On arrival at the shaft bottom the loaded cars are run into a 'cage' with from one to five 'decks' or stages, each of which holds one or more cars. In America, decked cages, however, are quite unusual and never have had more than four decks; single-deck cages are standard practice. The cage runs in guides of various forms fixed to the sides of the shaft, and is drawn up by a steel-wire rope. The rope passes over a pulley mounted upon a head-gear or pulley frame at the top of the shaft, and from that to the drum (of the same diameter), driven by the hoisting engine. An automatic brake or other device is installed, to check excessive speed of the cage; and a detaching hook releases the rope from the cage in the event of overwinding. Where the mine is not deeper than 200 or 300 feet, it has become customary to drive a slope instead of a shaft and dump the coal at the foot of the slope onto a belt or flight conveyor, usually the former. Most cages are arranged so that the cars are dumped automatically on reaching a suitable level above the surface. This is done so that the car need not be removed from the cage. In other instances, the cars are dumped at the foot of the shaft, and the coal is hoisted in a skip instead of in a cage. This also is dumped automatically on reaching the surface. Where the entrance to the mine is through a drift, it is unnecessary to hoist the coal. As 'trips' of loaded mine-cars are made up, they are hauled out of the mine by the usual means of haulage. Trips arriving at the tipple, either on a nearly level gradient or on a slope, or arriving at the foot of a shaft or hoisting slope, or even at a point well inside the mine are dumped, sometimes automatically, one at a time or all of them together by a revolving dump. To permit one car or a few at a time to be dumped, swivel couplings are provided, so that the cars actually in the dump can be turned over, leaving the other cars in position on the track, ready to take their place in the dump as soon as the others have been discharged and repositioned by the return of the dump to normal. In this way, trips do not have to be uncoupled for dumping. One mine with a 4-mile belt conveyor line dumps an entire trip of 42 mine cars at one time. Bottom-dump cars are used at other mines. These have latches which when released allow the bottom of each car to drop as it passes the dump. The bottoms are relatched as they leave the point of discharge.

Screening and Cleaning Coal.—Coal used to be sold as mined, but as soon as screening was introduced, the unscreened coal was known as 'run of mine.' But today, almost all coal is screened and all the larger sizes are visually inspected and cleaned by hand, and the smaller sizes frequently are cleaned by some mechanical process—dry or wet. Anthracite in all sizes down from and including egg is mechanically cleaned, except in most cases the coal that approaches dust.

Bituminous coal is first screened, so as to expose the larger coal, enabling it to be cleaned on a 'picking table' under a good light. Here, inferior coal and slate are removed by 'slate pickers' who throw the refuse into pockets, whence it goes to a bin and is taken to refuse piles. Except in heavily pitching coal, or with coal loaded mechanically, the loader in the mines is supposed to have already removed most of this impurity, but his light is inadequate and sometimes he is loath to do so.

Finer sizes, today, pass through shaking screens and are delivered separately, if desired, to railroad cars. Cleaned run of mine is often obtained by mixing the various sizes after treatment. Sometimes, it is a replica of the original coal, but often it is freed of a number of smaller sizes that would result in an inferior domestic product. Sometimes the larger lumps are broken on the picking table to remove excessively large material, though where the coal is likely to weather and where the consumer therefore prefers large coal, this is not done. Much is broken also to remove adherent dirty coal. Sizes are also often mixed in definite combinations.

As the lighter coal in any locality is purer than the heavier coal of that locality, the specific gravity of the coal frequently is determined by floating it in upward, or in rapid almost horizontal currents of water in a jig or sluice ('launder'), whereupon the heavier coal falls and is trapped out. Sometimes, the upwardly rising water is made heavier by adding fine sand, so as to make its density almost that of pure coal, thus obtaining an excellent separation of the coal from the refuse. This sand is removed and used again in the washing of other coal. Again, the coal may be put over one of several types of perforated table through which high-pressure air passes, lifting the coal but not the refuse, and thus separating the two. This type of dry method frequently employs a shaking table sloping toward a line of discharge, with riffles which tend to keep the coal and the refuse from sliding down the inclination. The coal, thrown up by the escaping air, leaps over the riffles and lands at the near end of the discharge, and the refuse unable to surmount the riffles is carried by the shaking movement to the far end of the table.

A similar arrangement uses water instead of air, but the water is not delivered through perforations—for the table is water-tight—but at the upper edge of the table. The water washes the coal over the riffles and drives the refuse along them. Other arrangements, now no longer in frequent use, differentiate between the coal and the refuse by the fact that coal is usually cubical, and dirty coal or slate is flat, and also that the coal slides readily being smooth, whereas the refuse declines to slide fast. Running both down a chute, the refuse slides into gaps placed in its way, but the coal bounds or shoots freely over these openings. Again, passing both down a spiral, the coal takes the outer path and the refuse the inner, separating the two. This, in brief, summarizes most of the many methods.

Mechanical cleaning is progressing rapidly for all but the larger domestic sizes. It gives better results than visual cleaning, that is hand picking, but the latter affords a product often more satisfying to consumers, who judge their coal by outward appearance only. A piece of coal of low specific gravity and good all-over purity may have a thin scale of exterior refuse, which would condemn it in the eyes of the consumer. Sometimes such mechanically cleaned coal if too small to be hand-picked economically is passed through a mechanical picker, which, as already described, depends not on specific weight but on exterior characteristics, so that the coal may be judged favorably in this manner also. The refuse from all processes may be broken to a small size and re-prepared, or the refuse from a mechanical picker may be sent through the washer a second time to have objectionable skins of refuse scrubbed off in passage.

Ventilation.—Impure air in mines is due to exhalations of men and animals employed; to the burning of miners' lamps; to gases from coal and other coal bearing strata (fire damp and carbon dioxide) or produced by explosives (carbon dioxide and monoxide with nitrous fumes); to underground fires; to decaying timber; to chemical absorption of oxygen; and to hydric sulphide derived from the pyrite in the coal.

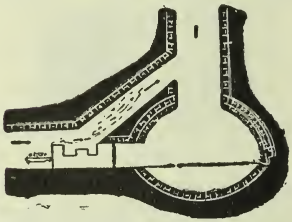


FIG. 5.—*Ventilating Furnace at Bottom of Upcast Shaft*

The ventilation of a mine is effected by passing a current of fresh air from the down-cast shaft along a system of 'intake' roads, and thence back along a second system of 'return' roads to the up-cast shaft, through which the vitiated air rises to the surface. In mines communicating with the surface by two distinct shafts there is usually some natural ventilation. As a rule, however, this is inadequate to carry off the deleterious gases, and some form of artificial ventilation becomes necessary.

In the furnace method, formerly much used, the current of air is heated by a furnace placed at the bottom of the up-cast shaft.

The density of the air at that point being thereby lightened, it is no longer able to resist the weight of air in the down-cast shaft, and is driven forward and upward through the shaft. This method has been largely replaced by centrifugal fans, which are usually placed at the top of the up-cast shaft, where they are used to draw out the bad air. Fans forcing fresh air down, are sometimes installed at the top of the down-cast shaft.

Great care is required to so guide and conduct the ventilation that the maximum amount of pure air will reach the working faces. If an intake current crosses a return current, air crossings must be constructed so that one current is passed by an overcast over the other, and they do not intermix. Where intake and return airways have to travel along the same passage, sheets of 'brattice,' constructed of wood or wood and cloth combined, are employed to separate the two currents. Large mines are usually divided into several districts, known as 'air-split sections' or briefly as 'splits' and each section has its own system of ventilation.

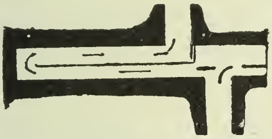


FIG. 6.—*Brattice Partition, Dividing Air Currents*

Fire-damp, choke-damp, carbon monoxide, and *coal dust* are especially dangerous factors in coal mining, and numerous devices are employed for detecting their presence and guarding against their disastrous effects. Some of these are treated in the articles on SAFETY APPLIANCES and SAFETY LAMPS.

Pumping.—The quantity of water in mines varies with the depth of the workings—deep mines, with a well-lined shaft, being less liable to an inflow of water than are shallow workings, except where parts of the coal seam outcrop to the surface. Pumping is particularly vital in the anthracite mines of the United States. Water used to be hoisted to the surface in tanks, but in recent years such means have been discarded in the United States except in extreme emergencies. Occasionally where the water is less than 20 ft. below an outlet to the surface it is siphoned; but the best and most common method of ridding mines of water is by pumping.

Pumps for raising water from mines in early days were operated by engines placed at the surface. Rods, passing down the shaft transmitted power to the plungers. Today electric pumps placed at the bottom of the shaft or at insets in the shaft force the water to the surface, though steam and compressed air have been used. These electrically driven pumps are usually of centrifugal type and are made often with several stages. Mines usually have places which will not drain to the pumping shaft or main drainage sumps and, to clear these places of water, so-called 'gathering pumps' are used, which almost invariably are of reciprocating type. Where the water does not have to be lifted more than 200 feet deep well pumps with the motor at the surface are sometimes used.

Power usually is transmitted to mine workings by electricity along metal conductors. Other means of power transmission have rods of wood or iron and wire ropes, water under pressure and compressed air. All but the last have passed with the years, but compressed air is still an important means of transmission in the anthracite region and in a few gassy bituminous mines. Compressed air is used for conveyors, coal-cutting machines, rock and coal drills and, but rarely of late, for locomotives and pumps. One drawback is the readiness with which it can be used to clear places of powder smoke and fire-damp. As a result, miners too often waste large quantities of the expensive power in ventilation which should be provided by the mine fan.

Conditions of Bituminous Industry.—The economic situation in the years immediately following the World War and in the crisis years, 1929–1933, was critical, with many producers operating at a loss and bankruptcies and reorganizations frequent. Numerous causes were responsible. Easy accessibility, low costs of production and distribution attracted an excessive number of investors to the industry, with the result that it became over-developed, overmanned and extremely competitive. Output always exceeded demand. The World War, the political disturbances and strikes in Europe following the Armistice, and the French occupation of the Ruhr increased the demand for American coal, made mining profitable, and accelerated the expansion of the industry. Between 1919–1923, many old mines were reëquipped and new ones opened and some 85,000 miners were added to the rolls. After 1923, with Europe becoming stabilized, demand for coal had been declining. Other factors, too, had intervened to curtail the consumption of coal. Between 1923 and 1930, the number of operating mines declined by 3,340. In 1930, 1,355 mines, with a nominal capacity of 160 million tons, were idle. Many mines were entirely abandoned. Over 200,000 miners lost employment.

Labor Relations in American Coal Industry.—The heaviest burden in the bituminous industry was borne by the miner. Unemployment and under-employment were always his lot. At the peak of the industry in 1918, the miner averaged 249 days of work, and at the bottom of the crisis in 1932, 145 days. According to the U. S. Coal Commission, there were 200,000 more miners than necessary. In the majority of cases, the miner is compelled to live in company villages, company homes and trade in company stores. Since the 'nineties of last century, he turned increasingly to the United Mine Workers of America, organized in 1890, for the redress of his grievances. In 1897, the U.M.W., after a spectacular strike, obtained from the operators in the central competitive fields—Ohio, Illinois, Indiana, and Western Pennsylvania—an agreement calling for the organization of an Interstate Joint Conference, the first collective bargaining instrument in American labor history. In 1903, 1912, 1913, 1914 and 1917, the U.M.W. ordered the miners out on strike determined to unionize the bituminous coal area completely. In 1919 the industry was composed of 60 per cent 'union fields,' and of 40 per cent 'non-union fields.'

At its convention in 1919, the U.M.W. decided to call a strike on October 31 for a 60 per cent wage increase and the 6-hour day, to meet the rising cost of living and the overgrown condition of the industry. President Wilson held the strike illegal and through Attorney General A. Mitchell Palmer obtained an injunction against the union. The coal commission, appointed by President Wilson, subsequently granted the miners a wage increase of 14 per cent. In April, 1922, 631,000 out of 776,569 miners, bituminous and anthracite, joined in a general strike against a wage cut. They won, and the old wage scale remained in force. In 1924 the wage scale, known as the Jacksonville agreement, was extended for three years, embracing all the Central Competitive Fields. It was hailed as the best agreement the miners obtained in a quarter of the century. In 1927, owing to trade reverses, some operators were inclined to return to state agreements and the Jacksonville agreement was not renewed. The U.M.W. ordered a strike but lost. Toward the end of the year, the U.M.W. was almost wiped out in the bituminous coal fields, the bulk of the industry going open shop. In 1932, its membership dropped from over 400,000 in 1920 to 156,000. Conditions for miners had become worse than they had been in 1890. Hostility toward the leadership of John L. Lewis, president of the U.M.W., had developed in the ranks of the miners. He was held responsible for the reverses of the union and charged with deserting the miners when his aid was urgently needed. An insurgent movement to unseat him was started in many locals. In 1931, the National Miners Union, a communist group, gained the leadership of some spontaneous strikes of miners in the Pittsburgh area, Ohio, West Virginia, and in Harlan, Ky. The last one was accompanied by much violence and four deaths. The insurgent Progressive Miners' Union of Illinois was formed at Springfield in March 1930 and gained a considerable following. It engaged the miners in many local strikes. In West Virginia another insurgent union was formed to contest the conservative leadership of the U.M.W.

With the advent of the N.R.A., the U.M.W. launched the most intensive unionization drive in its career, submerged and silenced the radical and insurgent elements, and not only regained its lost ground but succeeded in organizing the bituminous industry almost 100 per cent. Taking advantage of the favorable atmosphere created for labor by the Roosevelt Recovery Program, the U.M.W. led the miners out in several spectacular and victorious strikes in 1933, notably against the powerful steel corporations which operate the so-called 'captive' mines, and succeeded in having incorporated its gains, namely, the 7-hour day, the 40-hour week, elimination of compulsory patronage of company stores, recognition of the union, and the check-off in the Code of Fair Competition for the Bituminous Coal Industry, which became law on September 18, 1933. The year 1934 was comparatively peaceful. Early in 1935 the miners became restive under the slow pace of recovery. Some operators, again, especially in the former 'non-union fields,' anticipating the expiration of the N.R.A. on June 16 had made deals for delivery of coal after June 16 at prices below the code rates; had been violating the labor provisions in the codes and union contracts and discriminating against union men. With the invalidation of the N.R.A. as unconstitutional by the U. S. Supreme Court on May 27, these practices had increased. The U.M.W., in negotiating for a new agreement in March, demanded of the operators the 6-hour day to absorb the unemployed, a 10 per cent wage increase, and threatened a general strike for their enforcement. The strike order was postponed, reissued and postponed again on June 16 and June 30, at the behest of the President. On Aug. 23 the Guffey Coal Stabilization Bill was passed, creating a national bituminous coal commission of five to administer a wage, hour, trade practice and price-fixing code—a permanent N.R.A. for the industry.

It is noteworthy that in the anthracite industry there was more steadiness and less labor trouble in recent years, for this reason: with all competitive practices reduced to a minimum, the relationship between capital and labor had been comparatively peaceful. After several unsuccessful attempts, the U.M.W. gained a foothold in the anthracite area by the spectacular strike in 1902. The Anthracite Coal Commission, appointed by President Theodore Roosevelt, in its award granted the miners nearly all their demands. The principle of arbitration was permanently installed by the creation of boards of conciliation. The agreement between the union and the operators was renewed in 1906, 1912, 1916, and after a strike in 1920, with the union being specifically recognized. In 1922, 1925, after strikes, and in 1930 the agreement was again renewed, the last time for a period of five years. In 1934 several strikes were instigated by the militant United Anthracite Miners of Pennsylvania, designed primarily to usurp control from the U.M.W. No code for the industry was formulated, the union and operators apparently finding their own agreement to their mutual satisfaction.

Proposed Solutions of the Coal Problem.—The N.R.A. —Early in the century the U.M.W. demanded government ownership of the mines. In 1919, its Nationalization Research Committee proposed a scheme, patterned after the Plumb Plan, for joint operation of the industry by management, labor and government. In 1923 the U. S. government set up the Federal Coal Commission, but save for the publication of a voluminous report in 1925, it offered no constructive measures. In April, 1933 the U.M.W. introduced in Congress the coal-control bill. The operators, on their part, sought solutions by various devices against competitors and schemes of consolidation and price fixing. The Appalachian Coals, Inc. was set up in 1931 by a group of Eastern operators and was to serve as a price-stabilizing agency. It was bitterly contested in the courts but it was found valid by the U. S. Supreme Court. In 1933, the Roosevelt Administration sought to stabilize the coal industry by inducing 90 per cent of the operators to accept the Code of Fair Competition. Despite disappointments and disillusionments, the bulk of the operators in January, 1935 voted for the extension of the N.R.A. for a period of two years. The U. S. Supreme Court in its Schechter decision dealt a mortal blow to President Roosevelt's recovery program and the Guffey Coal Control Bill remained the only instrument that held promise for the stabilization of the industry. In July, 1935 a substantial sector of the operators, the U.M.W., and President Roosevelt were feverishly engaged in agitating for its passage.

Coal Reserves.—The coal reserves of the world are estimated at a total of 8,154,322,500,000 tons distributed as follows: North and South America, 5,627,823,500,000 tons; Asia, 1,410,487,600,000 tons; Europe, 864,412,600,000 tons; Oceania, 187,842,900,000 tons; Africa, 63,755,900 tons

The United States, Great Britain, Germany, France, Belgium, Russia, Austria and Hungary all have large supplies of coal, easily worked and suitable for manufacturing and engineering purposes, and these have been conducive to the rapid advance of their industries and commerce. America's coal fields are so enormous that the question of reserves is seldom raised. China also has vast coal resources (estimated at 1,097,436,100,000 short tons) that have been practically untouched. In many European countries, however, the large production is rapidly depleting the reserves, and the possibility of ultimate exhaustion has become a matter for serious consideration.

But while coal consumption is rapidly increasing, developments are taking place in the coal industry which tend to economy of consumption, which will undoubtedly make the present coal supply last longer than it otherwise would. Waste in mining operations is being minimized by improved methods; waste coal that could not at one time be used, is now consumed in pulverized form in Briquettes (see Briquetting). Coal can be worked at depths of over 4,000 feet, but owing to the high temperature and the great pressure of the overlying strata, mining can be done only at great cost for ventilation and timbering. Improved methods of sinking and working, and the increased use of coal-cutting machinery and electricity, may to some extent facilitate the extraction of the deeper-lying coal. On the other hand, many thin seams may be worked at a profit as the price of coal increases.

The coal reserves of the United States (including Alaska) are estimated at 4,231,352,000,000 short tons, or more than one-half the total reserves of the world. Small fields, and those of especially desirable quality, such as the semi-bituminous coals of Maryland, have been extensively worked; but many of the great reserves of bituminous coals are yet untouched—particularly in the West (especially in the Rocky Mountain regions) and Alaska. Canada's reserve is placed at 1,360,535,000,000 short tons, and South America's at 32,097,000,000 tons.

See Coal; Mining; Mining Law.—Consult Minerals Yearbook issued by Bureau of Mines U. S. Dept. of the Interior; *Saward's Annual;* E. N. Zern, *Coal Miners' Pocketbook;* H. F. Bulman, *Working of Coal and other Stratified Minerals* (1928); R. W. Dron, *Economics of Coal Mining* (1928); Maryland Bureau of Mines, *Electricity Applied to Coal Mining* (1931); D. M. Burns and G. L. Kerr, *Modern Practice of Coal Mining;* H. C. Harris, *Colliery Managers' Guide* (1929); R. A. Redmayne, *Colliery Machinery* (1932); O. Cartlidge, *Fifty Years of Coal Mining* (1933).

R. Dawson Hall,
Engineering Editor, *Coal Age,*
New York.

Coal Oil, a term applied in a general sense to petroleum (q. v.) and more specifically to kerosene (q. v.).

Coal Tar, Gas Tar, or Tar. The liquid that condenses when the volatile products of the distillation of soft coal are cooled separates into two layers; an upper aqueous portion, containing ammonia in solution, and from which the ammonium salts of commerce are obtained; and a lower heavy black oil, which is Coal Tar. Coal Tar contains varying quantities of the following substances: (1) *hydrocarbons* (q. v.), the most important of which are Benzene, Toluene, the Xylenes, Naphthalene, and Anthracene; (2) *phenols* (q. v.), the chief of which are the phenol which is popularly termed Carbolic Acid, and cresols; (3) *basic substances,* including small quantities of aniline, pyridine, quinoline, and other bodies.

The several constituents of coal tar are first partially separated by *fractional distillation.* This process depends on the fact that in a mixture of substances of different boiling points, those of lower boiling point distil over before those of higher boiling point, each substance being present in greatest quantity in that fraction distilling over at or about the temperature of its particular boiling point. The process is carried out in iron vessels and the vapors are conducted therefrom and condensed in long iron worms cooled by water. (See Distillation.)

The distillate is collected in separate fractions, according to the temperature, specific gravity, and various other indications. These include: (1) *light oil* (10%), collected up to 170° c.; (2) *carbolic oil* (5%), from 170° to 225° c.; (3) *creosote oil* (5%), from 225° to 270° c.; (4) *heavy oil* (25%), from 270° to 320° c.; (5) *pitch* (50%), which is the liquid residue in the still. These fractions which are ordinarily produced by plants run in connection with coke ovens or gas plants are refined by further distillation and treatment to yield commercial products. The ultimate products of refining coal tar from the starting points in the synthesis of dyes, medicines, explosives, perfumes, resins and many other valuable products.

In ordinary practice the carbonization of coal to produce gas, tar and coke is carried out with the temperature of the wall of the oven at about 2350° f. (1288° c.) to yield the products described above. The tar produced when the temperature of carbonization is substantially lower—about 1300° f. (704° c.) —more nearly resembles petroleum, and this process called

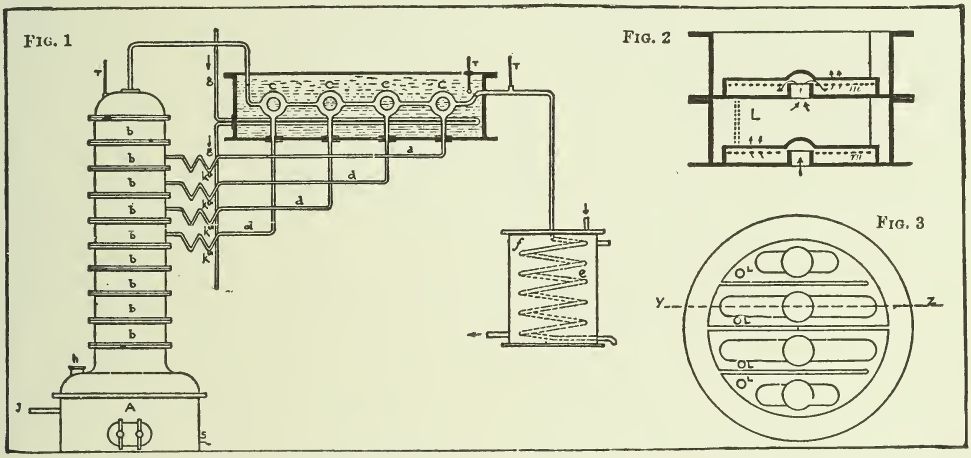


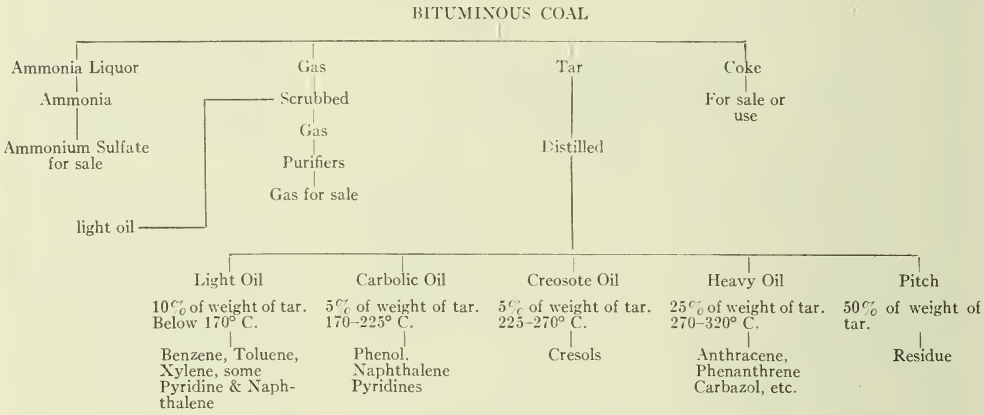
Fig. 1.—*General View Coupier's Still for Benzol, Toluene, etc.*
Fig. 2.—*Section* (on yz) *of Two Rings or Dephlegmators of Rectification Column*
Fig. 3.—*Plan of Dephlegmator*

a. Steam-heated still. *b, b.* Rectification column. *c, c.* Condensing analyzers. *d, d.* Reflex pipes. t, t. Thermometers. *e.* Condensing worm. *f.* Cooling tank. *g, g.* Heating pipes for condensed liquid of analyzer. *h.* Inlet for crude benzol. *j.* Steam pipe for heating still. *k, k.* Test cocks. l, l. Drain pipes for condensed liquid. *m, m.* Outlets for vapor.

low temperature carbonization is widely practiced in countries where coal is plentiful and petroleum scarce. Because of the slowness of the operation on account of its low temperature, it has not been economically successful in the United States. See TAR; GAS MANUFACTURE; BENZENE; ANILINE; ANTHRACENE; COAL-TAR DYES; DYEING; PERFUMERY.

Consult H. M. Bunbury and A. Davidson, *Industrial Applications of Coal-tar Products* (1925); Gluud, *et al, By-Product Coke Industry* (Amer. ed. by D. L. Jacobson 1932); P. E. Spielmann, *Constituents of Coal Tar* (1924); S. N. Wellington and W. R. Cooper, *Low Temperature Carbonization* (1924); R. Wiggington, *Coal Carbonization* (1930).

THE DISTILLATION OF COAL


BITUMINOUS COAL
Ammonia Liquor
Ammonia
Ammonium Sulfate for sale
light oil
Gas
Scrubbed
Gas
Purifiers
Gas for sale
Tar
Distilled
Coke
For sale or use
Light Oil
10% of weight of tar. Below 170° C.
Benzene, Toluene, Xylene, some Pyridine & Naphthalene
Carbolic Oil
5% of weight of tar. 170–225° C.
Phenol, Naphthalene Pyridines
Creosote Oil
5% of weight of tar. 225–270° C.
Cresols
Heavy Oil
25% of weight of tar. 270–320° C.
Anthracene, Phenanthrene Carbazol, etc.
Pitch
50% of weight of tar.
Residue

Coal Tar Dyes, a term applied to synthetic dyes made from coal tar as a raw material to distinguish them from the natural dyes prepared by the extraction of coloring matter from various natural products—plants, barks, etc. They are also called 'aniline dyes.' At the present time several thousand dyes of every color are made from coal tar raw materials. The principal coal tar bases are benzene, toluene, xylene, phenol, naphthalene and anthracene (qq. v.). From these a great diversity of intermediates (products which are not dyes themselves) are synthesized: aniline, naphthols, naphthyl-amines, and their derivatives. From these intermediates, of which some five hundred are commercially important, the more complex molecules of the dyes themselves are made by combining two or more intermediates in various molecular arrangements. In this way the thousands of shades are produced in dye molecules of desired characteristics.

The first synthetic dye was made by W. H. Perkin (1838–1907), a young English chemist, in 1856. Perkin was attempting to synthesize quinine by oxidizing aniline with chromic acid. He did not succeed, but the fact that his aniline was impure led to the formation of a purple dyestuff later called 'Mauveine.' Further investigations led to the knowledge of how this dye was formed and this later became the basis of the synthetic dye industry.

Synthetic dyes, chemically speaking, are formed from molecules known as 'chromogens' to which 'chromophores' groups producing color characteristics, are added. By varying the composition of the chromogen groupings differences in shade and in dyeing characteristics can be produced in the final dye by the addition of an appropriate chromophore group.

Numerous classifications of dyes are made according to different schemes. The Color Index of the Society of Dyers and Colorists (British) lists the principal dye types under twenty-six classifications based on their chemical characteristics. These are:

1. Nitroso (Quinone Oximes). Typical dye: Naphthol Green Y.
2. Nitro. Typical dye: Naphthol Yellow.
3. Mono-azo. Typical dye: Orange II.
4. Dis-azo (Primary, Secondary, Tertiary, and from Amines). Typical dye: Naphthol Blue Black.
5. Tris-azo. Typical dye: Direct Black.
6. Tetrakis-azo. Typical dye: Direct Brown RB.
7. Stilbene. Typical dye: Stilbene Yellow (Direct Yellow R).
8. Pyrazolone (Hydroxy-pyrazol). Typical dye: Tartrazine.
9. Ketonimine. Typical dye: Auramine.
10. Triphenylmethane and Diphenylnaphthylmethane. Typical dye: Malachite Green.
11. Xanthene. Typical dye: Eosine.
12. Acridine. Typical dye: Phosphine.
13. Quinoline. Typical dye: Quinoline Yellow.
14. Thiazole. Typical dye: Primuline.
15. Indamine. Typical dye: Phenylene Blue.
16. Indolphenol. Typical dye: Indolphenol.
17. Azine. Typical dye: Nigrosine (Spirit Soluble).
18. Aniline Blacks. Typical dye: Aniline Black.
19. Oxazine. Typical dye: Gallocyanine.
20. Thiazine. Typical dye: Methylene Blue.
21. Sulfide (or Sulfur). Typical dye: Sulfur Black.
22. Hydroxyketone, Hydroxyquinone, and Hydroxylactone. Typical dye: Alizarine Blacks.
23. Anthraquinone (Mordant and Acid). Typical dye: Alizarine (Mordant).
24. Anthraquinone Vat. Typical dye: Alizanthrene Blue.
25. Arylidoquinone. Typical dye: Helidone Brown CR.
26. Indigoid. Typical dye: Indigo and Ciba Scarlet.

From the dyer's point of view, the behavior of dyes with respect to fibers is important and thus a second classification is made by Matthews on this basis: *Acid Dyes.* Salts of color acids. Dye animal fibers directly. Do not dye vegetable fibers. Mostly applied to wool and silk.

Basic Dyes. Salts of color bases. Dye animal fibers directly. Dye vegetable fibers on a tannin mordant. Mainly used with cotton and silk.

Substantive Dyes. Of neutral chemical nature. Dye both animal and vegetable fibers directly. Mostly applied to cotton, and to some extent to wool and silk.

Mordant Dyes. Of neutral chemical nature. Dye neither animal nor vegetable fibers directly, but require a metallic mordant. Mostly applied to wool.

Sulfur Dyes. Soluble in sodium sulfide solutions. Used exclusively for vegetable fibers, which they dye directly. These dyes themselves contain sulfur.

Vat Dyes. Soluble in sodium hydrosulfite. Dye both animal and vegetable fibers directly. Used mostly on cotton, and to some extent on wool. Characterized by great fastness.

The ability of dyes to attach themselves permanently to fibers is their most important property, yet no universally applicable explanation of this ability has yet been made. Neither a strictly chemical explanation based on the formation of a compound between the dye molecule and that of the fiber dyed, nor a physical theory of colloidal adsorption of dye on fiber is wholly satisfactory. Both seem obviously important in the attachment between the two. The differences in behavior of the same dye with respect to fibers of different types is used to advantage in making fancy dyeings of mixed fibers, the operation being so conducted that one part of the mixture is colored while another is not, or each part may be given a different hue by the same dyeing. This is particularly important in treating mixtures of the different types of rayon, whose affinities for dyes depend upon the methods of their manufacture.

An important use of dyes is in the preparation of the so-called 'color lakes,' which are insoluble pigments colored by dyes. These are made by forming insoluble compounds of dye molecules with heavy metals (barium, calcium, iron, etc.) and are used as pigments in inks, paints, lacquers and plastics.

The special importance of the dye industry lies in the facts that its products increase the value and variety of the output of the textile and other industries and that the intermediates it uses are the same as those needed in synthesizing drugs, resins, explosives and other products.

Consult T. Beacall, F. Challenger, G. Martin and H. J. S. Sands, *Dyestuffs and Coal-Tar Products—Their Chemisty, Manufacture and Application* (1928); J. C. Cain, *Manufacture of Dyes* (1922); J. C. Cain and J. F. Thorp, *Synthetic Dyestuffs and the Intermediate Products from Which They are Derived* (1933); A. M. Doyle *Digest of Patents Relating to Coal-Tar Dyes and Allied Compounds* (1926); J. M. Matthews, *Application of Dyestuffs to Textiles, Paper, Leather, and Other Materials* (1920); Society of Dyers and Colorists, *Colour Index and Supplement* (edited by F. M. Rowe) (1924); J. F. Thorpe and C. K. Ingold, *Synthetic Coloring Matters* (1923).

Coal Tit (*Parus ater*), a common European titmouse, with a glossy blue-black head with white spots. See Tit.

Coal'ville, town, Leicestershire, England; 16 miles N.W. of Leicester. It has extensive coal fields in the vicinity. There are also iron foundries and brick works. Pop. (1931) 21,886.

Coamo, kō-ä'mō, town, Porto Rico, on the Coamo River; 18 miles N.E. of Ponce, on the road from San Juan. The mineral waters of the Baños de Coamo, near the town, are much visited. Sugar refining is carried on. Pop. about 4,000.

Coan, kō'an, Titus (1801–82), American missionary, was born in Killingsworth, Conn., and entered the ministry of the Congregational Church in 1833. In the same year he went as a missionary to Patagonia; and in 1835 inaugurated missionary work in Hilo, Hawaii, where he spent the remainder of his life. He also organized missions in the Marquesas and Gilbert Islands. He was the author of *Adventures in Patagonia* (1880); *Life in Hawaii* (1881); and of numerous papers on the Hawaiian volcanoes. Consult *Memorial,* by his wife.

Coan, Titus Munson (1836–1921), American author, son of Titus Coan, was born in Hilo, Hawaii. He studied at the Royal School, Honolulu, and was graduated from Williams College (1859), and the New York College of Physicians and Surgeons (1861). He served in the hospitals of the Federal Army from 1861 to 1863; from 1863 to 1865 was assistant surgeon with Admiral Farragut's squadron, and was in the Battle of Mobile Bay. In 1871–3 he was literary editor of the New York *Independent;* and in 1880 he founded the New York Bureau of Revision, of which he was long a director. His publications include: *Hawaiian Ethnography* (1899); *Natives of Hawaii* (1901); *Climate of Hawaii* (1901); and essays in literary criticism and poems.

Coanza, or Kwanza, river, Portuguese West Africa, rises south of the Bihé plateau, flows northwest and west, and falls into the Atlantic Ocean 30 miles south of St. Paul de Loanda. Its chief tributary is the Lucalla. Its course is much interrupted by cataracts, the lowest fall is that of Kambamba or Livingstone with a drop of 70 ft. It is navigable for small vessels as far as these falls, 120 miles from its mouth. There is regular steam communication between Dondo and Loanda. Length, 700 miles.

Coar, John Firman (1863– d. JUNE 26, 1938), American educator, was born in Berlin, Germany, of American parents, and brought to the United States in 1870. He studied at Cologne, Bonn, Boston and Harvard. He held posts as professor of modern languages in various American universities and wrote books and articles on German literature, history, politics and war debts, besides editing classics.

Coast. The coast may be defined as the belt of land, partly above, partly below the normal level of the ocean (q. v.), which at the present time is subjected to the action of its waters. The margin of the ocean is never constant, but swells and sinks with changes of atmospheric pressure, thus influencing a narrow strip of land, called the *coast line* or *shore line.* The ocean also rises and falls in tides, which determine a second and wider strip of land—the *shore.* A third strip of land, the *coastal region,* or *coastal belt,* arises from more potent and more intermittent causes, which take the form of climatic and natural disturbances, as exemplified in earthquakes and storms, the concerted action of these often profoundly altering the nature of the coast line. Taking into account the far distant past, there is evidence of still greater movements, some of which have raised submarine strata to the crests of lofty mountains, while others have lowered continents beneath the waves.

In classifying the chief forms of coasts, it is necessary to differentiate the coastal regions where the sea is relatively lower than formerly from those where it is higher—whether this be due to local crustal deformations which have directly raised or lowered the land, or to more remote crustal modifications or changes in the state of the water itself which have determined a general fall or rise of the sea. In order to distinguish these two forms of natural phenomena, Suess has made use of the terms Positive and Negative sea-level movements, as these are recorded on any fixed-level indicator. The *positive* movement shows a loss, and the *negative* movement a gain, of the surface. The terms *sunken, submerged,* or *drowned* coast are also used for the region where a positive sea-level movement has taken place, and *raised* or *emerged* coast where a negative movement has occurred.

In *sunken* or *drowned coasts* the characteristics are determined by the original sub-aerial configuration, and the phase of degradation due to the nature and duration of subsequent marine action. The outline of the coast depends on the nature of the valleys and heights of the drowned land. In sunken table lands the coast is regular, and is often due to faulting. The steep sides are broken by square-headed inlets formed of the submerged lower ends of gorges or canyons, as in Arabia. In young folded mountain regions, if the coast is parallel to the axis of folding, it is regular, and rarely broken by inlets—*e.g.,* in South America. The inlets in such a coast are T or L shaped, and have, as a rule, narrow, steep-sided entrances, representing the drowned transverse gorge, and widen out at right angles to this in one or two bays representing the drowned longitudinal valley —*e.g.,* San Francisco. A double T gulf may be found where a second range has been penetrated —*e.g.,* Cattaro. If much of the land is submerged, the coast may consist of a number of elongated islands, separated from adjacent islands either by long, narrow channels where they lie parallel, or by short, narrow passages where they lie in line—*e.g.,* the Dalmatian coast.

All these coasts are longitudinal or concordant. Where all the parallel ridges and valleys sink beneath the sea, forming a transverse coast, the ridges gradually narrow, and become lower toward the ocean; the valleys gradually narrow, and become shallower toward the land. This is the *ria* coast characteristic of the Peloponnesus. In drowned denudation highlands, where the structure lines can be determined, we may speak of longitudinal or concordant, and transverse or *ria* coasts—*e.g.,* in Southwest Ireland and Northwest France and Spain. In regions which have been glaciated, and have U-shaped valleys and rounded ridges, a new type of coast line is found—the fjord coast, where the inlets are steep sided, do not narrow much, and have irregular floors. The coast may be fringed with glaciated islands or skerries—*e.g.,* Norway, Scotland, British Columbia and Alaska, Southern Chile and New Zealand. On a dune-bordered coast the sea may break through and get behind the marginal ridges, and form T-shaped gulfs, as in the Landes in France. In all these irregular coasts the prolonged action of marine denudation results in a lessening of the irregularities, and in time in a reduction of them to gentle outcurves and incurves.

The *raised* or *emerged coasts* are regular, with gently waving lines. They are usually sandy, and tend to be fringed with dunes. A dune coast may also be formed by the extension of desert dunes blown seaward by the prevailing winds, as on the west coast of the Sahara. A dune coast may also occur on the deltas of great rivers, which are extended seaward by the waste carried down by the rivers. One of the most common characteristics of this emergent coast is the presence of lagoons, which are usually parallel to the shore, and separated from it by sand spits (*e.g.,* the Gulf of Mexico, the south of France, the Haffs of the Baltic), formed by currents, due to wind, tides, or rivers. In the case of the north coast of the Black Sea, the currents have distributed the silt in spits across submerged river valleys, and made lagoons known as *limans,* with axes at right angles to the shore line.

Some coasts are due to the past and present activity of plants such as the mangrove, which forms great swamps on many coasts of the hot belt (*e.g.,* Niger delta), and animals, such as the coral polyp, whose skeletons, under the influence of wind and wave, form the coasts of many islands and of reefs, such as the Great Barrier Reef of Australia. (See CORALS.)

The minor forms of the shore line are most varied in the case of drowned coasts, where the waves act directly on the rocks. Here composition and structure play their part in determining the details of the configuration. A homogeneous rock tends to form a regular coast. Where the rocks vary in composition, the more easily eroded are worn into inlets, between which the harder rocks project as headlands. Where the rocks are stratified, or jointed, or both, the main lines of stratification and fracture determine the minor forms of the coast. With horizontal strata and vertical jointing, perpendicular cliffs are formed, very often with stacks or isolated pillars rising out of the sea beyond. If the main joints dip toward the ocean, the section of coast shows a line more or less parallel to this dip. If the main line of cleavage dips away from the ocean, rugged and even overhanging cliffs may be formed. The submerged part of the coast tends to assume a profile of equilibrium. The limit of erosive wave action is about 60 feet, and of currents parallel to the coast about 300 feet. If no change of the sea level occurs, the sub-

Lengths of tidal shore lines of the United States, in statute miles

State	Mainland	Islands	Total
Atlantic coast:			
Maine	558	761	1,319
New Hampshire	15	5	20
Massachusetts	421	250	671
Rhode Island	118	100	218
Connecticut	126	18	144
New York	31	798	829
New Jersey	392	368	760
Pennsylvania	13	.....	13
Delaware	140	14	154
Maryland	770	275	1,045
Virginia	780	500	1,280
North Carolina	1,040	831	1,871
South Carolina	281	960	1,241
Georgia	166	727	893
Florida	714	507	1,221
Gulf coast:			
Alabama	174	117	291
Florida	1,273	1,257	2,530
Mississippi	99	103	202
Louisiana	1,122	591	1,713
Texas	973	709	1,682
Pacific coast:			
California	1,264	291	1,555
Oregon	429	60	489
Washington	1,037	684	1,721
Total:			
Atlantic coast	5,565	6,114	11,679
Gulf coast	3,641	2,777	6,418
Pacific coast	2,730	1,035	3,765
Grand total	11,936	9,926	21,862

Lot 1
~~SUPERSEDED~~

merged coast grows shallower, owing to deposition of rock waste, and at the same time the force of the waves diminishes as the shallower belt widens.

The currents which carry waste parallel to the shore deposit it in the quieter waters in the lee of any projection, and tend to form a spit of sand or gravel. Such sand spits are the *nehrungen* of the Baltic Haffs. Sometimes the termination of a spit takes on a strongly hooked form, and shows successive stages of growth, as at Sandy Hook, N. J. Where an island lies close inshore washed by such currents, the current sweeps outside it, but forms two eddies. Between the island and the mainland two spits are formed on the margins of these eddies, and ultimately the island becomes a peninsula (*e.g.,* Glens in the south of France, Argentario in Tuscany).

The coast, as the meeting place of two fundamentally different worlds—of solid land and liquid sea—at once imposes a limit on the inhabitants of each, and adds to the resources of both. The littoral floras and faunæs of land and sea are peculiar and rich, but only a small number of organisms find it possible to exist both on land and in water. From the littoral regions many forms of marine and terrestrial organisms have spread, differentiating further according as they lived longer in the one or the other environment.

From the human standpoint, the coasts may be divided into harbored and harborless; permitting easy or difficult access from the sea and from land; shallow and deep; rich or poor in fishing grounds. Territorial waters (usually three nautical miles) are measured from the low-water mark of the adjacent coast. See GEOGRAPHICAL DISTRIBUTION; SEASHORE; TIDES.

Coast and Geodetic Survey, U. S., a bureau of the Department of Commerce whose functions are the production of charts for the guidance of mariners through the navigable waters of the United States and its possessions; triangulation and levelling to furnish control throughout the interior of the United States for mapping and other engineering work; observation and analysis of tides and currents, in order that they may be predicted for mariners; magnetic surveys to give mariners and land surveyors information essential for the use of the magnetic compass and to furnish information to engineers for the development of radio; studies in seismology to reduce the hazard of earthquakes by furnishing data on which structures that will withstand earthquakes can be erected; and the preparation of a series of maps of the United States, with special attention to those used by aircraft pilots. The beginnings of the Coast Survey may be found in the Act of Congress of Feb. 10, 1807, authorizing a survey of the coast of the United States, and appropriating $50,000 for that purpose. Four years later the initial preparations were made; and on Aug. 6, 1816, field work was begun in the vicinity of New York City. During the period prior to the Civil War, hydrographic surveys were extended over large portions of the Atlantic and Pacific Coasts; systematic observations were made of the tides along the Atlantic Coast and Gulf Stream; triangulation of the area extending from Point Judith, R. I., to the Florida Keys was accomplished; and magnetic observations were made, and the latitudes and longitudes of a large number of points were determined.

In 1871 the scope of the Survey was considerably enlarged, and the extension of the triangulation into the interior of the country was authorized. In 1878 its title was changed from Coast Survey to Coast and Geodetic Survey. In 1903, on the creation of the Department of Commerce, the Survey was transferred thereto from the Treasury Department.

The head of the Survey is the Superintendent, who has his headquarters in Washington, and is aided in his duties by an assistant superintendent and by the heads of the divisions of geodesy, hydrography and topography, charts, tides and currents, terrestrial magnetism and seismology, accounts, and instruments. The office force, which is mainly employed in Washington, consists of a disbursing agent, clerks, computers, draughtsmen, engravers, instrument makers, printers, etc., numbering 160 persons. There are Field Stations at Boston, New York, New Orleans, San Francisco, Seattle, Honolulu and Manila; observatories at Gaithersburg and Cheltenham, Md., San Juan, P. R., Tucson, Ariz., Ukiah, Calif., Sitka, Alaska, and Honolulu, besides a number of primary tide stations along the coasts. The Survey has a small fleet of steamers and launches. A survey of the Philippines has been made. Formerly Army and Navy officers were detailed to the Survey, but since 1900 it is a purely civil concern.

The work of the Survey includes, besides the hydrographic and topographic surveys for charting purposes, primary triangulation and the determination of geographic positions by astronomic methods, and secondary and tertiary triangulation, in order to bring the geodetic work of the Survey into connection with State surveys, and with the topographic and hydrographic surveys.

The Survey publishes nautical charts and *Coast Pilots,* the latter containing detailed sailing directions for navigable waters along the coast of the United States, descriptions of dangers to navigation, and other information of special value to mariners; annual tables of predicted tides and currents; charts showing magnetic declinations; *Notices to Mariners* (issued jointly with the Bureau of Lighthouses); airway maps of the United States; lists showing geographical positions and elevations; and numerous other technical publications covering its activities and prescribing methods to be followed by its personnel. The first superintendent was F. R. Hassler.

Coast Artillery, or seacoast artillery, embraces that artillery fixed, tractor drawn, anti-aircraft and railway, employed either within or without a coast defense, and organized primarily for defense against hostile naval vessels. In the United States Army it is classified, according to caliber, as primary and secondary armament. The former includes all armament of 12-inch or greater caliber; the latter, all other seacoast armament.

Seacoast artillery is characterized by its ability to concentrate quickly great fire power against naval targets and to shift its fire rapidly; by the long range of its weapons; and by the strategical mobility of its mobile elements. It is limited by its inability to act other than by fire action; by its vulnerability, when unsupported, to air attack, and to attack by landing parties and land forces; and by the immobility of its fixed armament and the lack of rapid mobility of some of its mobile armament.

For purposes of administration and technical instruction the coast artillery of the continental United States is organized into five coast artillery districts, each commanded by a brigadier general. The First Coast Artillery District includes all the seacoast defenses from Maine to the eastern end of Long Island, inclusive; the Second District, the Harbor Defenses of New York City and Delaware Bay; the Third District, the defenses of Chesapeake Bay; the Fourth District, the South Carolina and Florida seaboard; and the Ninth District, the Pacific coast line. The Hawaiian Separate Coast Artillery Brigade is charged with the coast defense of the vicinity of Honolulu; and the Harbor Defenses of Manila and Subig Bays with the protection of Manila from naval attack. Coast artillery defenses protect both ends of the Panama canal.

The forts of each defended harbor are grouped into commands called Harbor Defenses. These are designated by the name of the harbor on which located—e.g., the Harbor Defenses of southern New York; and are commanded by officers of the Coast Artillery Corps of appropriate rank, under the supervision of the commander of the Coast Artillery district.

The Coast Artillery Corps is that part of the U. S. Army which maintains the seacoast defenses. It consists (1937) of the Hawaiian Separate Brigade and 28 regiments, a majority of which are only partially organized. It operates also 8 mine planters and cable ships. Of the 28 regiments, 15 are assigned to harbor defenses, 8 are anti-aircraft organizations, 3 tractor drawn regiments, and 2 railway artillery. These regiments are distributed as follows: 17 in the continental United States; 5 in the Hawaiian Islands; 4, including 2 regiments of Philippine Scouts, in the Philippine Islands; and 2 in the Panama Canal Zone. The enlisted strength totals 13,027 men. The officer personnel of the corps consists of one major general, who is Chief of Coast Artillery, 57 colonels, 142 lieutenant colonels, 203 majors, 308 captains, 211 first lieutenants, and 88 second lieutenants. Most of these officers are graduates of the Coast Artillery School. See COAST DEFENSE; MILITARY EDUCATION.

Coast Defense. Every nation having a maritime frontier has commercial relations of more or less importance, depending upon its industrial development. To protect its commerce and guard its territory against invasion from oversea, it must make provision for defending the coasts. Coast defense consists of the fortifications, tactical dispositions, and operations designed to meet hostile attacks against any portion of the national seacoast.

Modern systems of coast defense are founded upon well-recognized principles of strategy, and should be consistent with national policies. A system, to be developed logically, should take account not only of the foreign policies of possible enemies, but should consider their total sea power, and especially that part of it which, in the event of war, may be available for the attack of the coasts. In a way, the coast fortifications of a nation may be said to be the complement of its naval strength, the two together forming a unit.

The defense of the coast line involves, therefore, the use of both naval and land forces. The *naval forces* include: (1) The active fleet, whose primary objective is the destruction of enemy fleets. (2) The portion of the reserve fleet assigned to local defense of important points along the coast. (3) The naval coast patrol, which operates in conjunction with the shore signal stations.

For coördination of command of the *land forces* strategical or tactical areas are normally divided into sectors, each sector usually including harbor defense areas protected by coast artillery troops and armament, and adjacent areas only partially or provisionally organized for defense. Each harbor defense constitutes a strong point in the general defensive system, and not an isolated fortification. The completed defensive organization comprises a combination of harbor defense and mobile defense; the former including the fixed armament of the defensive area, and the latter such mobile armament as truck drawn, tractor drawn, anti-aircraft and railway artillery, and such motorized and mechanized infantry and auxiliary troops as have been allotted to the area. It is the mission of the harbor defense agencies to deny the enemy access to the harbor, to prevent destruction of harbor utilities by hostile bombardment, and to secure the harbor and its approaches for friendly naval and merchant vessels. The mobile defense elements have the task of preventing the enemy from landing and securing a beach head within the undefended portion of the defensive sector.

The first line of defense consists of the active fleet of the navy, which must be free to seek out and destroy its proper objective, the hostile fleet, and must not be tied down to or be divided for the local defense of particular points. It must be free to take the offensive as a unit against the enemy's fleet, since only by this course can victory be won. In order to be free to carry out offensive operations against the enemy's fleet, the navy must have securely defended ports or naval bases, to which the fleet can return to make repairs, to replenish its supplies, or to refit after an action. For use as naval bases certain harbors affording ample sheltered anchorages are provided with storehouses, docking facilities, recruiting and other depots. The selection of the sites of these bases is influenced to a large degree by the water area, and the possibility of easy defense against attack from both land and sea.

The second line of defense may be regarded as the coast fortifications and the accessory or allied defenses. In this line may be included the shore or permanent land batteries; portions of the reserve fleet; harbor-defense submarines and destroyers; and submarine mines and torpedoes. This line is purely defensive in its nature, and unless the shore defenses are supplemented by a part of the reserve fleet, their rôle in action is restricted to that of passive defense.

With reference to the land forces, the military preparations connected with the defense of the coast line may be divided into three groups: (1) Constructing, arming, and equipping permanent fortifications, and making provisions for submarine defense in time of peace. (2) Constructing, arming, and equipping semi-permanent fortifications and field works for the protection of the permanent fortifications against attack by small raiding parties on the landward side, or, in the case of an island, from boats from the adjacent shore. These may be constructed in time of peace or when war becomes imminent. (3) The organization and concentration of troops from the mobile or field army to resist the landing of large bodies of troops near cities and fortified harbors, and for the defense of strong, semi-permanent works on interior lines. These troops constitute the reserve and are concentrated at strategic points only when war is imminent.

In addition to securing the bases for the active fleet, the coast defenses must hold other points of commercial and strategic importance along the coast, points having value not alone to the defending nation, but also to a possible enemy. In the case of the United States, it may be expected that, in addition to attempting to destroy naval bases or arsenals, an enterprising enemy would strike at the large commercial and railroad centers on the coast, the merchant marine sheltered in the harbors, and important harbors at the mouths of great rivers; or he might attempt to capture a suitable harbor in which he could establish a base for future operations by land or sea.

United States.—In this country, coast defense dates back to the period shortly following the

War of 1812. In 1816 boards of engineer officers were convened for the purpose of considering and reporting upon a system of defenses for the seacoast of the United States. These boards spent several years in an exhaustive study of the subject; and their conclusions as to the value of coast fortifications and the ports which should be fortified were not materially modified for nearly a century by the recommendations of later boards convened for similar purposes. Under the projects submitted at that time, a number of stone and brick forts were constructed at various points along the coast. Many of these forts have been abandoned since the First World War.

The history of modern coast defense in the United States begins with the creation of the Gun Foundry Board in 1884, which was succeeded by the so-called Endicott Board in 1886. In its final report the Endicott Board fully and clearly set forth the general principles governing coast defense and elaborated a system suitable to our requirements and the state of advancement of the science at that time. Until 1880 the custom had been to assemble large numbers of guns in massive stone or brick forts; but the bombardment of the forts at Alexandria, Egypt, in 1882 by the British fleet drew attention to the value of concealment and dispersion of the guns ashore in reducing the effect of the fire of a fleet. The Endicott Board recommended the installation of 2,362 guns and mortars of all calibers within the continental limits of the United States. About ninety per cent were eventually mounted.

The development of heavy artillery and of smokeless powder following the Spanish-American War, and the demand of certain localities along the Atlantic seaboard for stronger coast defense as a result of that war, led, in 1906, to a reconsideration of the national coast defense problem and to a revision of the Endicott system. This task was completed by the National Coast Defense Board under the Presidency of W. H. Taft, then Secretary of War. In submitting its report this board recommended the fortification of 29 ports in the United States (7 more than had been proposed by the Endicott Board), 6 in the insular possessions, and 2 in the Panama Canal Zone. Most of the work recommended by the Taft Board had been completed by the time the United States entered the First World War.

During the years that have elapsed since the First World War the principal advancement in war *matériel,* so far as coast defense is concerned, may be summed up as follows: increased power for guns of any given caliber, due to improvements in powder; greater rapidity of fire, and greater accuracy of range and position finding, all of which has increased the range at which the action begins to something more than 30,000 yards. Battleships are vastly more expensive than formerly, and therefore are more reluctantly brought within range of coast-defense guns; they are also heavier, and have a greater draught and turning radius, which requires deeper water and more room for manoeuvring. On the other hand, they carry heavier armor and require greater gun power to sink them. The vast improvements in submarine mines, as well as in submarine boats, torpedoes, and bombs discharged from aircraft have also increased the advantage of the defense. However, the impossibility of concealing permanent fortifications from aerial observation, and the consequent danger of attack from the air and of naval bombardment directed from aircraft, has lessened the effectiveness of the permanent type of coast defense. To combat the threat from the air the attention of students of coast defense has been fixed upon a combination of harbor defense, supplemented by heavy mobile artillery, fast-moving infantry, and quick-firing anti-aircraft weapons.

See FORTIFICATION; ARTILLERY; COAST ARTILLERY; GUNS; SEA POWER. Consult *Coast Artillery Field Manual* (Vols. I and II, 1933); *History of the U. S. Army* (ed. by W. A. Ganoe, 1924); Report of the National Coast Defense Board (1906); Training Regulations, Coast Artillery Corps (1936); Reports of the Chief of Coast Artillery, U. S. Army; *Coast Artillery Journal.*

Coast Guard Service, U. S., a government service under the jurisdiction of the Treasury Department, created by the Act approved Jan. 28, 1915, whereby the Revenue Cutter and Life Saving Services of the United States were merged into one organization, to be known thereafter as the Coast Guard.

The Revenue Cutter Service was originally established in 1790, at the second session of the First Congress, as the result of the need for the services of a coast patrol for the enforcement of the customs laws and an organized armed force for the protection of the seacoast. Provision was made for the equipping of ten revenue cutters, and as the Navy Department had not yet been organized, the Service was attached to the Treasury Department. During 1798–9 it was temporarily placed at the disposal of the Secretary of the Navy, and in the latter year cooperation with the Navy was authorized whenever the President should so direct, and a distinctive ensign and pennant were provided. Previous to the establishment of the Lighthouse Board in 1852, the inspection and supply of lighthouses and buoys were also in the hands of the Revenue Cutter Service. In 1871 the Service was reorganized and a definite life-saving system was inaugurated and placed under its administration. This was constituted a separate organization, known as the Life Saving Service in 1878, and was so maintained until the two were again combined in 1915. The Coast Guard was transferred from the Treasury Department to the Navy Department Nov. 1, 1941 but was returned to the Treasury Department Jan. 1, 1946.

The Coast Guard is essentially an emergency service and may be called upon for any special work of a maritime nature for which no other vessels are provided. In general, however, its duties are as follows:

1. Rendering assistance to vessels in distress and saving life and property.
2. Destruction or removal of wrecks, derelicts, and other floating dangers to navigation.
3. Extending medical aid to American vessels engaged in deep-sea fisheries.
4. Protection of the customs revenue.
5. Operating as a part of the Navy in time of war or when the President shall so direct.
6. Enforcement of law and regulations governing anchorage of vessels in navigable waters.
7. Enforcement of law relating to quarantine and neutrality.
8. Suppression of mutinies on merchant vessels.
9. Enforcement of navigation and other laws governing merchant vessels and motorboats.
10. Enforcement of law to provide for safety of life on navigable waters during regattas and marine parades.
11. Protection of game and the seal and other fisheries in Alaska, etc.
12. Enforcement of sponge-fishing law.

The work of the Coast Guard Service now includes activities for the prevention of the smuggling of liquor into the United States, and the conduct of the ice patrol in the North Atlantic. The ice patrol dates from the sinking of the *Titanic* in 1912.

It is conducted under international convention, the expenses being borne by the parties to the convention. The duties of the Coast Guard consist in patrolling the vicinity of the Grand Banks of Newfoundland along the transatlantic steamship lanes, where in the spring and early summer icebergs form a menace to navigation, finding and keeping in touch day by day with icebergs and field ice, determining their set and drift, reporting their presence and location to the Hydrographic Office of the Navy, and broadcasting the information by radio for the protection of shipping.

The Coast Guard Service is a military arm of the Government, its officers being commissioned by the President, and holding rank with officers of the U. S. Army and Navy. Line and engineer officers are commissioned from cadet graduates of the Coast Guard Academy at New London, Conn. Cadets are appointed after competitive examination, and the course covers four years. Aviation stations are maintained along the coasts and on the Great Lakes for search and rescue work, air reconnaissance, law enforcement, and mapping. Training stations are maintained for indoctrination and training of recruits and enlisted personnel and special instruction for officers. The Coast Guard Reserve and Coast Guard Auxiliary were established in 1941, the first to supply additional service in emergency conditions and the second, non-military, to provide means for the safety of motorboats and yachts.

Coast Pilot is a pilot licensed to conduct vessels along a coast. Upon reaching a bay or harbor, a vessel is often put under the conduct of a local pilot, who is expected to know his part of the coast thoroughly and to be familiar with all the soundings, currents, beacons, buoys, etc., so that he may lead a vessel safely into harbor even in bad weather, or under cover of darkness. *Coast Pilots* are published by the Coast and Geodetic Survey (q. v.) to assist mariners in navigating the coast waters of the United States. See Pilot.

Coast Ranges, a series of mountain ranges near the Pacific Coast, stretching through British Columbia, Washington, Oregon, and California. The British Columbia Coast Range reaches an average height of about 6,000 feet, though many of the peaks exceed 9,000 feet. In northwest Washington the system is represented by the Olympic group, which is extremely rugged, its highest peak being Mount Olympus (8,150 feet). To the south the ranges diminish greatly in altitude, and throughout Oregon exceed 4,000 or 5,000 feet in only a few places. In northern California they rise again to considerable altitudes, and between there and San Francisco there is a great complexity of ranges, with many summits exceeding 8,000 feet. South of San Francisco Bay they are low, in no place reaching 5,000 feet in height. Near Los Angeles these ranges are continued by others which stretch into the interior, where they reach great altitudes —San Bernardino Mountain being 10,630 feet, San Jacinto, 10,805 feet, Tehachapi Peak, 9,214 feet, and Pinos Mountain, 9,214 feet. See North America.

Coastwise Trade, or Coasting Trade, the maritime commerce between ports of the same country, limited by most nations to ships of domestic ownership. Since 1854 Great Britain has allowed vessels of any nationality to carry passengers and goods from one port in Britain to another; but the part taken by foreign vessels in British coastwise trade is inconsiderable.

In *Canada* the coastwise trade is restricted to British ships. Vessels built in any foreign country, if British registered since Sept. 1, 1902, on application for a license to engage in the Canadian coasting trade, are admitted upon the payment of a duty of 25 per cent of their fair market value.

United States.—The coasting trade of the United States, because of the length of seacoast, exceeds that of any other nation. Traffic between the Atlantic and the Pacific Coasts is carried on largely by way of the Panama Canal.

Section 27 of the Merchant Marine Act of 1920, as amended by Title 46, Sec. 883, in part provides: 'That no merchandise shall be transported by water, or by land and water, on penalty of forfeiture thereof, between points in the United States, including Districts, Territories, and possessions thereof embraced within the coastwise laws, either directly or via a foreign port, or for any part of the transportation, in any other vessel than a vessel built in and documented under the laws of the United States and owned by persons who are citizens of the United States, or vessels to which the privilege of engaging in the coastwise trade is extended by sections 18 and 22 of this act.' It is provided, however, that a foreign vessel may carry from one port of the United States to another, goods which it may have brought from a foreign port, and which have not been unladen. 'No foreign vessel shall transport passengers between ports or places in the United States, either directly or by way of a foreign port, under a penalty of $200 for each passenger so transported and landed.' A joint resolution of Congress, approved April 28, 1904, provides that only vessels of the United States shall be employed in the transportation by sea of coal, provisions, or supplies for the use of the Army or Navy, unless the President shall find that the rates of freight charges by said vessels are excessive, in which case contracts shall be made under the law as it now exists. To enjoy the privileges of the coasting trade, such vessels must be owned wholly by citizens of the United States, or by corporations formed under United States laws; they must be commanded by citizens of the United States; and all officers who shall have charge of a watch, including pilots, must be American citizens. The coastwise regulations were extended to Alaska in 1867, to Hawaii in 1898, to Puerto Rico in 1899, and to the Philippines in 1906 (but removed in 1908). The Panama Canal Act originally provided that no canal tolls should be levied on 'vessels engaged exclusively in the coastwise trade of the United States'; but this exemption was protested by Great Britain, and was later repealed by Congress (see Panama Canal).

See Shipping, Merchant; Subsidies. Consult *Annual Reports* of the U. S. Commissioner of Navigation.

Coatbridge, town, Scotland, Lanarkshire; 8 miles east of Glasgow. It is the center of the most important coal and iron district in Scotland, and has numerous blast furnaces, tube works, boiler and iron and steel sheet works. The Gartsherrie iron works date from 1830. Educational institutions include a technical school and the West of Scotland Mining College. Janet Hamilton, the poetess (1795–1873), was a native of Coatbridge. Pop. (1940) 45,400.

Coatesville, city, Pennsylvania, Chester county, on historic Brandywine Creek, and on the Pennsylvania and Reading railroads. It is an industrial and agricultural center, with manufactures of iron and steel, boiler works, brass and iron foundries, machine shops, and silk mills. Pop. (1930) 14,582; (1940) 14,006.

Coati, kō-ä'ti, or Coati Mundi (*Nasua*), a small brown mammal allied to the raccoon, of which two species are found in Mexico, Central and South America, and southern United States. The body is elongated, the nose prolonged into a mobile snout, and the tail large, long, and ringed. The coatis live in wooded regions, nesting in hollow trees or the crevices of rocky cliffs, and going abroad at night in search of mice, birds, frogs, etc., as well as insects and worms. They are often tamed.

Coaticook, kō-at'i-ko͝ok, town and port of entry, Canada, Stanstead co., Quebec, on the Coaticook River and the Canadian National Railway; 20 miles from Sherbrooke. Manufactures include woolens, fabrics, butter and cheese, chemicals and brick. Pop. (1941) 4,386.

Coatzacoalcos, kō-ät'sä-kō-äl'kōs, or Snake, river, Mexico, rises in the Sierra Madre, Tehuantepec Isthmus, and after a northerly course falls into Campeachy Bay, 130 miles southeast of Vera Cruz. It is about 220 miles long, and is navigable for large vessels for about 25 miles from its mouth.

Coatzacoalcos, or Puerto Mexico, seaport, Mexico, Vera Cruz state, on the Gulf of Campeachy. It has an extensive breakwater, docks, and jetties, and is the starting point of the Tehuantepec Railway across the isthmus. Pop. 5,000.

Cobalt, Co, 58.97, atomic no. 27, is a bright silvery metal and an element belonging to the iron-cobalt-nickel triad. It was first prepared by Brandt in 1735, and its compounds first studied by Thénard in 1802. Its ores are sparingly distributed and the most important ones are *smaltite,* $CoAs_3$; *cobaltite,* $CoSAs$; *evythrite,* $Co_3(AsO_4)_2 . 8H_2O$; and *wad,* Co_3S_4. The most important deposit of cobalt ores is located at Cobalt, Ontario, where the cobalt arsenide is mixed with nickel and silver. Other important deposits are in Belgian Congo, the Scandinavian Peninsula, Chile, New Caledonia and the United States. The metal itself has a reddish tinge, is brittle, hard and very magnetic. Unlike iron, cobalt is not attacked by air and water at ordinary temperatures, but it is superficially oxidized at a red heat. Its specific gravity is 8.9 and its melting point is 1480° c.

Many of the compounds of cobalt are valued on account of the brilliance and permanence of their colors. The protoxide of cobalt, CoO, is employed in the form of *smalt* in the production of the blue colors in porcelain, pottery, glass, encaustic tiles, fresco painting, etc.; and it is the principal ingredient in *Old Sèvres Blue, Thénard's Blue,* etc. The chloride of cobalt, dissolved in water, may be employed as a sympathetic ink. In dilute solutions it is of a faint pink color, which is not observable upon paper; but when heated before the fire it loses water, and becomes blue, and the writing can then be read. Several organic solvents of cobalt, particularly the oleate, the acetate and the linoleate, are used as driers in the paint and varnish industry because of their effectiveness in accelerating the drying of paint and varnish and because their blue color neutralizes the yellow of the oil to yield a product nearer water white.

Many cobalt alloys are known and highly valued. It is a constituent of many of the alloys used in high speed cutting tools and when alloyed with steel containing nickel and aluminum, with or without chromium, forms a highly magnetic metal. This metal is largely used in making permanent magnets of great strength. Steel alloys containing cobalt with chromium and tungsten belong to the class of high speed steels which are at the same time stainless.

Cobalt, town, Canada, Timiskaming district, Ontario, on Cobalt Lake, and on the Ontario North Land Railway; 330 miles north of Toronto. Cobalt is the center of one of the richest silver-producing districts in the world, dating from 1903, when the first notable discovery of ore was made. These ores also contain cobalt, nickel and arsenic in large quantities. It has machine shops, foundries, sampling plants, saw and planing mills, smelter and refinery. Pop. (1941) 2,332.

Coban, kō-vän', Guatemala, capital of department of Vera Paz, in the finest coffee district of the republic; 100 miles north of the city of Guatemala. Alt. 4,050 feet. Pop. (1940) 26,774.

Cobb, Henry Ives (1859–1931), American architect, was born in Brookline, Mass., and was educated at the Massachusetts Institute of Technology and Harvard University. In 1881 he removed to Chicago, where he designed the Newberry Library, the Opera House, and the University of Chicago. He was also the architect of the American University in Washington, the Yerkes Observatory, the U. S. Marine Buildings at Annapolis, Md., the King Edward Hotel in Toronto, and many other public and private buildings. He served the U. S. Government as special architect from 1893 to 1903, and was a member of the National Board of Architects for the Columbian Exposition (1893).

Cobb, Howell (1815–68), American public official, was born in Jefferson county, Ga. and admitted to the bar in 1836. From 1837 to 1840 he was solicitor-general of the state; and from 1843 to 1851 a member of Congress, serving as Speaker of the Thirty-first Congress (1849–51). He was then governor of Georgia (1851–3); again a member of Congress (1855–7); and Secretary of the Treasury in the Cabinet of President Buchanan (1857–60). An ardent advocate of slavery, he resigned from the Cabinet to become president of the congress that adopted the Confederate Constitution.

Cobb, Irvin Shrewsbury (1876–1944), American author and humorist, was born in Paducah, Ky., and was educated in the public schools. He entered the newspaper field, and was staff correspondent of the Louisville *Evening Post* (1898–1901) and managing editor of the Paducah *News-Democrat* (1901–4). He then came to New York, where he served as a special writer on the staff of *The Evening Sun* (1904–5) and of *The Evening World* and *Sunday World* (1905–11). From 1911–22 he was staff contributor to *The Saturday Evening Post,* for which he was also war correspondent in Europe at intervals between 1914–18; and from 1922 staff contributor to the *Cosmopolitan Magazine.* His published works include *Funabashi* (musical comedy, 1907); *Mr. Busybody* (musical skit, 1908); *Cobb's Anatomy* (1912); *Old Judge Priest* (1915); *Here Comes the Bride* (1925); *Irvin Cobb at His Best* (1929); *Incredible Truth* (1931); *Murder Day by Day* (1933); *Judge Priest Turns Detective* (1935); *Exit Laughing* (1941).

Cobb, Sylvanus (1823–87), American author, was born in Waterville, Me. He edited *The Rechabites* and *The New England Washingtonian,* and was a prolific writer of tales of adventure, and edited *Autobiography of Rev. Sylvanus Cobb* (1867) by his father, with *Memoir.*

Cobbett, William (1762–1835), English political writer and reformer. In 1783 he went to London, where he became a solicitor's clerk, then joined the army as a private, and acquired a great amount of general knowledge. He served as sergeant-major in New Brunswick, Canada (1785–91), meanwhile studying rhetoric, geometry, logic, French, and fortification. On his return he obtained his discharge; but in 1792 went to France to get out of a court martial on three of his late officers, whom he had taxed with peculation. Six months later he sailed for America. At Philadelphia he taught English to French refugees; translated from the French; and, as 'Peter Porcupine,' wrote fierce onslaughts on Dr. Priestley, Tom Paine, and the native Democrats.

Twice he was prosecuted for libel, and America got too hot for him, so in 1800 he returned to England. In 1802 he started his famous *Weekly Political Register*. But Tory first, it altered its politics in 1804, till it became the determined opponent of the government and the uncompromising champion of Radicalism. He wrote a somewhat untrustworthy *History of the Reformation* (1810), and was prosecuted for certain remarks on military flogging, and sentenced to two years' imprisonment, with a fine of $5,000. In 1817 Cobbett again came to the United States, to escape prosecution, and lived on Long Island, N. Y., but returned to England two years afterward, taking with him the body of Tom Paine, which he had caused to be exhumed. He ultimately settled down upon a farm near Farnham. He was returned to the reformed Parliament for Oldham (1832), and took a prominent part in debate.

A vigorous and original writer, Cobbett 'might be said to have the cleverness of Swift, the naturalness of Defoe, and the picturesque satirical description of Mandeville' (Hazlitt). He was a very Ishmael of politics. He loathed Whigs and 'mock gentlefolks,' but he honestly loved the poor—loved Nature, too, and could paint English scenery with a freshness and insight wholly his own. His books include: *A Year's Residence in the United States of America* (1818); *The American Gardener* (1821); *The Poor Man's Friend* (1826); *The Emigrant's Guide* (1828); *Rural Rides* (1830), his best book; *Advice to Young Men and Women* (1830); *A Parliamentary History of England* (1806–20); *The Curse of Paper Money* (1833); *A Legacy to Parsons* (1835); and a great number of political pamphlets and other writings. He originated Hansard's *Debates* (1806) and Howell's *State Trials* (1809). Consult *Life* by himself; *Lives* by his son, and by R. Huish, E. Smith, G. H. D. Cole; L. Melville, *Life and Letters* (1913); A. D. M. Hughes (1924).

Cobden, RICHARD (1804–65), English statesman, 'the Apostle of Free Trade,' was born in Heyshott, Sussex. In 1819 he entered his uncle's office in London as a junior clerk, and when twenty-one was promoted to the position of commercial traveler. In 1829, with two of his friends, he entered into a partnership for selling calicoes by commission. They set up an establishment for calico printing in Lancashire in 1831, and in 1832 Cobden settled in Manchester. In 1835 he visited the United States, and in 1836–7 traveled in Turkey, Greece, and Egypt. The result of his travels appeared in two pamphlets, *England, Ireland, and America* (1835), and *Russia* (1836). The dominating thought of Cobden's political writings was the necessity of free economic intercourse between nations, and, as a consequence, the futility of the old ideas of the balance of power, and the folly of war. His first public appearances were identified with the crusade against the Corn Laws. In 1837 he stood as a candidate for Stockport, but was defeated. The Anti-Corn Law League was then formed (1839), and by it Cobden and his friends carried on an energetic propaganda throughout the country. He again stood as a candidate for Stockport, and was elected (1841). After seven years of hard work by the league the Corn Laws were repealed (see CORN LAWS).

Cobden's public labors were at the expense of his private affairs, and at the close of the agitation he found himself a ruined man; a subscription of $400,000 was then raised in recognition of his great services. Instead of the retirement which he contemplated, however, he started a propaganda on the Continent, where, among the leading statesmen, historians, and economists, he endeavored to spread true views on social progress, economic reform, and international relations. During his absence he was elected both for Stockport and the West Riding of Yorkshire; he chose the latter constituency, which he continued to represent till 1857.

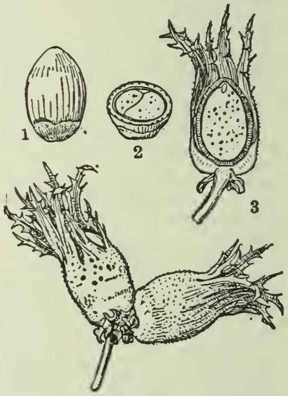
Cobden began to agitate in and out of Parliament in favor of a peace policy, the reduction of armaments, and the acceptance of arbitration to settle international disputes. He shared John Bright's unpopularity for opposing the policy that led to the Crimean War; and opposed Palmerston in his Chinese policy, when he was defeated for Huddersfield. He made his second visit to the United States in 1859, and on his return to England in the same year again entered Parliament. In reconstructing his Cabinet, Lord Palmerston offered him a seat, but Cobden declined. As Her Majesty's plenipotentiary (1859–60) he arranged and concluded a treaty of commerce with France. He spoke out strongly in favor of the North during the American Civil War, and in 1864 strenuously opposed intervention in favor of Denmark. He was the first political thinker who grasped in its entirety, and endeavored to translate into legislation, the comprehensive theory of civilization that not only the economic but the universal interests of nations are not antagonistic. Consult *Speeches* (1870); Morley, *Life of Richard Cobden* (new ed. 1908); Hobson, *Richard Cobden* (1918).

Cobequid Bay, an inlet at the northeastern end of the Bay of Fundy, Nova Scotia. It has important fisheries.

Coblenz. See KOBLENZ.

Cobleskill, village, New York, Schoharie county, on Cobleskill Creek, and on the Delaware and Hudson Railroad; 40 miles west of Albany. Farm implements are manufactured. Pop. (1930) 2,594; (1940) 2,617.

Cobnut, a name given to some of the largest and finest cultivated varieties of the Hazelnut. The species most commonly referred to is *Corylus tubulosa,* or great cob. It bears a large, thick-shelled nut, the oblong kernel of which is covered by a reddish coat; when grown on suitable soil, and under favorable conditions, it is a prolific bearer. In the West Indies the name is given to the fruit of *Omphalea triandra,* a tree of the natural order Euphorbiaceae. Its white juice turns black on drying, and in Guiana is used as ink.

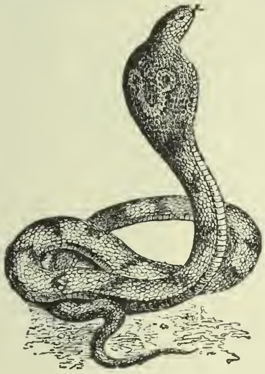


Cobnuts (*Corylus tubulosa*).
1, Nut; 2, 3, sections of nut.

Cobourg, kō'bûrg, town, Canada, capital of Northumberland county, Ontario, on Lake Ontario, and on the Canadian National and the Canadian Pacific railroads; 70 miles east of Toronto. It has a good harbor, with regular steamship connections with American and Canadian ports. It has a tannery, foundry machine and arms factory, dye works, pectin plant, carpet factory and chemical plant.

Town was first settled by United Empire Loyalists (1796) and British Army personnel. It was known as 'Amgerst,' but the name was later changed to Coburg. Pop. (1941) 5,907.

Cobra, or COBRA DE (DA, DI) CAPELLO, kō′brä dē kä-pel′lō ('hooded snake'), a widely distributed poisonous snake (*Naja tripudians*), occurring over the whole of Southern Asia, especially in India, and extending to the Malay Archipelago. It belongs to the sub-order of venomous Colubrine snakes (Proteroglypha), in which the fangs borne on the upper jaw are not perforated by a complete canal, but possess simply an anterior groove down which the poison trickles. The cobra is a large snake, 5 feet or more in length; the color varies considerably from pale yellow to dark olive; one variety has spectacle-like black markings on its neck. By the dilatation of the anterior ribs during excitement the neck can be distended so as to produce a hood-like appearance. It is by preference nocturnal, and feeds on amphibians, reptiles, birds, eggs, small mammals, etc. It does not appear to be naturally aggressive, but instinctively assumes a threatening attitude when disturbed. It then dilates its neck, hisses loudly, and prepares to strike by raising its fangs in the usual snake fashion.



Cobra.

The habits of the cobra vary greatly in different situations. It may haunt human dwellings for the sake of poultry and other food, and is said to occur 8,000 feet up the Himalayas. Though essentially land animals, and fond of concealing themselves among old masonry, stone heaps, and the like, the cobras can swim and climb with ease. In gracefulness of movement they excel. The head and neck are often raised above the level of the rest of the body, which remains horizontal. It is preyed upon by the mungoos (q.v.), and also, it is said, in the young state at least, by pigs, pea fowl, and jungle fowl.

The bite of the cobra is as usual accompanied by the compression of one of the salivary glands modified as a poison bag. The secretion trickles down the grooves of the fangs, and entering the wound produces rapid nervous paralysis, from which recovery is extremely rare. No certain remedy is known, but excision, cauterizing, ligaturing, doses of ammonia, drugging with rum, etc., are often resorted to.

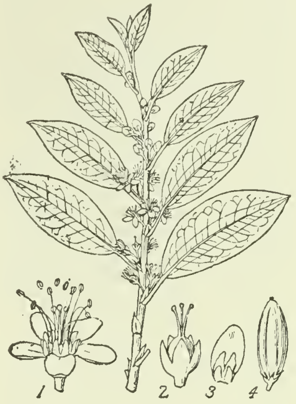
To the same genus belong the hooded cobra or asp of Africa (*Naja haje*), and the large and very dangerous Hamadryad (q. v.), King Cobra (*Naja bungarus*) or Krait of India, Southern China, etc.

Coburg, kō′bo͝or*ch*, town, Germany, in the republic of Bavaria, formerly one of the alternate capitals of the duchy of Saxe-Coburg-Gotha, situated on the left bank of the Itz, and at the southern foot of the Thuringian Forest; about 33 miles N.N.E. of Bamberg. The chief manufactures are woolen and fabrics, machinery, basket ware, glass, colors and porcelain, and has beer brewing. Life centers in the Marktplatz, with its statue of Albert, Prince Consort of England, by Theed; and in the Schlossplatz, around which stand the Ducal Palace of Ehrenburg, the palace of the late Duke of Saxe-Coburg (Duke of Edinburgh), the Theatre, the Church of St. Augustin, and the statue of Duke Ernest I, by Schwanthaler. Immediately opposite to the Ducal Castle is the Court Garden, on the slope of a hill, at the summit of which is the fortress, 525 feet above the town. It is now converted into a museum of art and antiquities. For some little time in 1530 it was Luther's refuge, and successfully defied Wallenstein's attacks in 1632. It was supplanted as the ducal residence by the Lower Palace in 1547. Pop. (1933) 29,038.

Coburg Peninsula (50 miles east to west, 20 miles north to south), the most northerly part of Australia, to the west of the Gulf of Carpentaria, runs out in a northwesterly direction toward Melville Island, from which it is divided by Dundas Strait.

Cobweb. See SPIDER.

Coca, kō′k*a*, the dried leaves of a South American shrub, *Erythroxylin Coca* Lamarck, which grows from three to six feet high, and is cultivated not only in South America, but also in Ceylon, Java, and India. The lanceolate leaves have a very pronounced midrib, a faintly aromatic and bitter taste, and furnish an important narcotic and stimulant. Coca has been in use from a very remote period among the Indians of South America, and was extensively cultivated before the Spanish Conquest. The dried leaves are chewed with a little finely powdered, unslaked lime, or with the alkaline ashes of the quinoa, or certain other plants. An infusion is also occasionally used. An habitual coca chewer takes a dose about four times daily. In soothing effect it resembles tobacco, but its influence is much more marked. It greatly lessens the desire for ordinary food, and at the same time permits of much more sustained exertion, even without sleep. It affects the nervous mechanism of respiration, so that the difficulty of breathing, so common in the ascent of long and steep slopes at high elevations, is little felt. Habitually chewed, the leaves ruin body and mind. An infusion or a tincture in wine is often prescribed by physicians as a tonic. The chief value of coca consists in the alkaloid *Cocaine* (q. v.).



Coca.

1, Flower; 2, calyx and pistil; 3, petal; 4, fruit.

Cocaine, kō′k*a*-in (popularly kō-kān′), is an alkaloid extract from the leaves of *Erythroxylin Coca* Lamarck and other plants of the species *Erythroxylon* (see Coca). This shrub is cultivated in the tropics of both hemispheres but comes principally from South America. At the time of the Spanish Conquest of Peru in the first half of the 16th century, Europeans first learned of the habit of the natives of chewing the leaves of this plant to avoid fatigue and apease hunger. Later the plants were cultivated in Europe where it was found that continued use leads to mental and physical degeneration. In 1855 Gädeke succeeded in isolating the alkaloid cocaine from the leaves of the coca plant, and in 1860 Niemann, in Germany, obtained it in crystalline form and studied its properties. Although the anesthetic action when coca leaves are chewed, or when cocaine is placed upon the tongue, was recognized by Europeans as early as 1855 and some sporadic suggestions were made, the real application of the product did not develop until Koller of Vienna, and later of New York, used it in surgery of the eye in 1884. Effective anesthesia dates from this event.

The alkaloid cocaine (cocaina, or cocain) has the chemical formula $C_{17}H_{21}O_4N$ (molecular weight 303.17) and has been synthesized. As a result of its synthesis a number of other compounds having like anesthetic properties but lacking the habit-forming effect of cocaine have been prepared synthetically and now largely replace its use in local anesthesia. The preparations of cocaine found in the U. S. Pharmacopoeia are Cocaina, the alkaloid, and Cocainae Hydrochloridum, which is the hydrochloride of the alkaloid. Both the alkaloid and more commonly the hydrochloride are used hypodermically in solution or applied to mucous membranes to produce local anesthesia. The average dose of each is one-fourth grain, or fifteen milligrams.

Externally applied to the skin, cocaine has little effect. Applied to mucous membranes in the form of a solution of the hydrochloride, it produces first a slight tingling, and afterward numbness and complete local anesthesia, lasting for about ten minutes, the duration depending on personal idiosyncrasy and on the strength and quantity of the solution. It causes blanching, due to constriction of the superficial vessels: and when applied to the eye there is dilatation of the pupil, attributed by some to constriction of the local blood vessels, by others to irritation of the sympathetic nerve.

Cocaine was formerly much used in operations on the eyes, nose, and lips, for application to the tonsils and throat, to reduce their sensibility temporarily, to control hemorrhage, and for diagnostic purposes. When administered hypodermically, it produces local anesthesia, and is thus very useful for such minor operations as the amputation of a toe, finger, etc., its effect being much increased by first applying a proximal ligature—i.e., a ligature between the point of operation and the heart. This hastens anesthesia, and retards the general diffusion of the cocaine, hence avoiding disagreeable after effects, such as faintness, vomiting, etc., which occasionally occur.

The tendency of cocaine to cause these and other more serious symptoms in certain individuals, as well as its habit-forming properties, have led to the preparation of numerous synthetic cocaine-like compounds, among which may be mentioned *Eucaine* (q. v.), *Holocaine* (q. v.), *Procaine* (Novocaine), *Stovaine,* and *Tropacocaine.* The danger inherent in the use of cocaine and the effectiveness of Procaine (Novocaine) in producing local anesthesia have led to the almost complete replacement of the natural derivative by the synthetic product in ordinary surgical and dental practice. While the synthetic Procaine and other local anesthetics introduced within the past two decades have practically equal value when injected, most of them fail to produce the so-called surface anesthesia when applied to the mucous membrane. Recently, however, even this important type of anesthesia can be produced by new synthetics, notably Butyn, which do not possess habit-forming or degenerative properties, and hence cocaine is seldom used today.

Administered by the mouth, cocaine is a nerve stimulant, exciting respiration and circulation, removing the sense of fatigue, stimulating to muscular and mental effort, and deadening the sense of hunger, although not affording any nutriment.

The dangers of cocaine differ according to the different methods of administration. The stimulating effect which it produces on the brain tends to the formation of the cocaine habit—as serious an addiction as morphinism or alcoholism. (See DRUG HABITS).

Cocanada, kō-k*a*-nä′d*a*, seaport in Godavari district, Madras, India; 86 miles southwest of Vizagapatam (16° 57′ N., 82° 14′ E.). It exports cotton, rice, sugar, and cigars. Pop. (1931) 53,348.

Coca Wine (*Vinum cocæ*), a wine used for stimulating purposes, consisting of about one part of coca (q. v.) to eight parts of sherry.

Coc′cidæ, COCCUS INSECTS, or SCALE INSECTS, a genus of insects of the order Hemiptera, including many forms very injurious to plants, and a few others which have come to be of use to man. As general characteristics may be noted the beaded feelers, the general absence of wings in the female, the degeneration of suctorial proboscis and posterior wings in the male, and the peculiar history of both sexes. The adult females attach themselves by their proboscis to a juicy part of the plant, and surrender themselves to feeding and maternity. The body always degenerates more or less, and after fertilization becomes simply a case, or eventually a dead covering for the eggs and larvæ. From the resting larva an elegant male insect results, with developed anterior, but degenerate or aborted posterior wings. The males fertilize the females, but are short lived. The young shelter for a while under the dead female, and then start for themselves.

In any greenhouse some one or other of the plants will show green or brown 'scales' on the leaves or branches. These are female coccids, the scale being a protective shield, formed of the cast skin together with excreted matter. In other cases there may not be a distinct scale, but the body may be covered with a white powder: such coccids are called *Mealy Bugs.* In still other cases the insects secrete a hard shiny substance, surrounding the whole body; these form the '*Ground Pearls*' of many countries, and are members of the genus Margarodes. In the island of St. Vincent, West Indies, they are collected and used as beads.

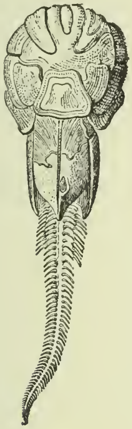
In addition to their economic importance as destructive insects, coccids yield various useful products. The honeydew formed by *Gossyparia mannifera* is eaten by the Arabs, and is believed to be the manna of Exodus (see MANNA). *Lac* (q.v.) is produced by an Indian coccid, *Cochineal* (q.v.) by an American one, *Wax* (q.v.) by various forms. See INSECTS.

Coccidia, kok-sid′i-*a*, organisms related to those which cause malaria, found as cell parasites in most animals. They are Protozoa, and belong to the order known as Sporozoa, but the life history has in most cases been inadequately worked out. In the liver of man *Coccidium oviforme* may occur.

Coccinella, kok-si-nel′ȧ. See LADY-BIRD.

Coc′co, COCO ROOT, or EDDOES, plants of the genus *Xanthosoma* or *Colocasia,* and of the nearly allied genus Caladium, of the order Aracæ, widely cultivated in tropical countries for their edible, starchy root stocks. These are deprived, by roasting or boiling, of the characteristic acridity of the order. They are sometimes included under the name Yam, but are different from the true yam. See TARO.

Coccosteus, kok-os'ti-us, a remarkable fossil fish characteristic of the Old Red Sandstone and Devonian rocks of North America and Europe. It is supposed to belong to the group Dipnoi (q.v.), and was covered with a shield consisting of hard, bony plates with a tuberculated outer surface. This carapace was divided into a head shield and a body shield which covered the anterior part of the body. The tail was naked, and devoid of plates or scales.



Coccosteus.

Cocculus, kok'ū-lus, a genus of berry-bearing shrubs belonging to the order Menispermaceæ. *Anamirta paniculata* is a native of the East Indies, and is the source of the very poisonous *Cocculus Indicus,* cocculus berries, or 'fish berries' of commerce. These, in a dried state, are brownish in color, more or less reniform, and of the size of a small bean. The active ingredient is a bitter, very potent substance known as *Picrotoxin,* which constitutes about one-half per cent. of the weight of the seeds. It is a drug and an intoxicant, and in large doses produces spasmodic muscular contractions, followed by narcosis and coma. It is sometimes used as an external ointment (though it must be applied with very great care), to destroy lice and ringworm. The cocculus berries are used by Orientals to catch fish, which are stupefied by the acrid poison when the berries are flung into a stream, and rise to the surface.

Coccus Insects. See COCCIDÆ.

Coccyx, kok'siks, the small rudimentary bone at the lower end of the spinal column. See SPINAL COLUMN.

Coccyzus, kok-si'zus. See CUCKOO.

Cocentaina, kō-then-tī'nä, town, province Alicante, Spain; 5 miles northeast of Alcoy. It manufactures linen, silk, and paper. Pop. 7,000.

Cochabamba, kō-chä-bäm'bä, department of Bolivia, between lat. 17° and 19° s. and long. 65° and 68° w. The climate is equable and healthy. Agriculture and cattle raising are the chief occupations. Its products are dyewoods, timber, cotton, sugar, and the precious metals. Its chief towns are Cochabamba, Sacaba, Tapacari, and Misques. Area, 25,228 square miles. Pop. (1932 est.) 571,730.

Cochabamba, capital of Cochabamba department, Bolivia; 130 miles southeast of La Paz. It contains a cathedral, university, theatre, and other buildings. Owing to its elevation (8,430 feet) and to the proximity of the Andes, the air is dry and the heat moderate—mean, 66° F. Cotton and woollen goods, leather, soap, and earthenware are manufactured. The town was founded in 1573, and was then called *Oropeza.* Pop. (1932) 49,000.

Cochem, k*o*'kem, town; Germany, in the Prussian Rhine province, at the junction of the Moselle and the Endert; 25 miles s. w. of Coblenz. The ancient castle of the archbishops of Treves is situated on a hill to the south. Industries include milling, forestry, and wine making. Pop. 3,662.

Cochin, a fowl. See POULTRY.

Cochin, kō-chēn' *or* kō'chin, feudatory state in India, lying between Travancore and British Malabar, on the west shore of the Madras Presidency, with an area of 1,417 square miles. The forests yield teak and redwood, and are inhabited by elephants, bisons, tigers, and deer. The state exports cocoanut oil, coir, tea, and spices. Until about the middle of the ninth century Cochin formed part of the ancient kingdom of Chera or Kerala. In 1662 it was seized by the Dutch; and in 1799, on the fall of Seringapatam, it passed to the British. Pop. (1931) 1,205,016. The capital is Ernakulam. The chief commercial center is Mattancheri, adjoining the British town of Cochin.

Cochin, (*Kochchi,* or *Kochchibandar,* 'small port'), a seaport town in British India, in the district of Malabar, Madras; 87 miles s. w. of Coimbatore. It is almost surrounded by inlets of the sea and estuaries of streams from the West Ghats. It has an arsenal, and carries on shipbuilding. Exports include cocoanut oil, coir and tea. Tradition says that St. Thomas the apostle visited it in 52 A.D., and made several converts. In 1502 Vasco da Gama established a factory. In 1530 Cochin was visited by St. Francis Xavier. In 1663 it passed into the hands of the Dutch; in 1795 the English besieged and captured it, to whom it was formally ceded in 1814. Pop. 20,637.

Cochin-China, kō'chin chī'n*a* (French, *Basse Cochin-China*), the southernmost colony of French Indo-China, extends from 11° 44' to 8° 35' N. lat., and from 104° 24' to 107° 36' E. long. On the north it is bounded by the kingdoms of Annam and Cambodia; on the east and south, the China Sea; on the west, the Gulf of Siam and Cambodia. The total area is about 26,476 square miles. The coast has no port. Saigon, on the River Saigon, and Mytho, on a branch of the Mekong delta, accommodate vessels of largest tonnage.

Cochin-China is mostly a vast, rapidly extending alluvial plain formed by the deltas of the Mekong and Donnai, the Saigon, and the Great and the Little Vaico, all connected by an intricate network of canals. To the east of the Saigon the land rises into an undulating wooded region 1,800 to 2,600 feet high, which is said to contain gold and tin deposits. West of Saigon the mountains of Tay-ninh attain 2,900 feet. Minerals consist of phosphate of lime in Ha-tien; lignite, used as fuel, in the island of Phu-quoc (Fu-kwok), in the Gulf of Siam; granite at Bien-hoa; and the salt on the coast, especially from the pits of Baria and Baclieu.

The climate depends on the monsoon, the northeast or dry monsoon prevails from November to April, and the southwest or wet monsoon from May to October. The temperature averages 79° in January, 84.4° in April and 81.5° for the year. September is the rainiest, January the coldest, month. Storms prevail in May and August.

The forests cover nearly 20,000,000 acres and contain large quantities of fine timber and abound with game of many kinds, among which are elephant, rhinoceros, tiger, deer, wild boar and eland, and the feathered game include snipe, jungle fowl and pheasant.

The principal product is rice. It is planted in almost every province except some of the northern districts. Other crops are maize, beans, sweet potatoes, earth nuts, cotton, rubber, sugar-cane, tobacco, coffee, coco-nuts, pepper, orange and bananas. China grass, sesamum, palma-christi, indigo, saffron, gum-lac, sapan wood and cinchona exist in large quantities. Buffaloes are employed as beasts of burden; zebus (oxen) are also used in harness. Swine, poultry and ducks are largely reared.

Native industry produces jewelry, mats, and pottery, basket work, and also spirits distilled from rice. River and coast fishing is an active industry. Imported industries include spinning mills, tanneries, dye works, breweries, glass works, sugar refineries and sawmills. Of exports, rice is the chief, followed by maize, dried and salted fish, pepper, cotton, copra, rubber, hides and timber. Cochin-China forms with Cambodia one customs division (see INDO-CHINA, FRENCH). A railway connects Saigon, Cholon and Mytho. Another line connects Saigon with Khat-Hoa Langbian. There is a regular weekly air service between Marseilles and Saigon.

The Government of Cochin-China is administered by a Governor, who is assisted by a Privy Council composed of all the heads of departments as official members and several unofficials. The Colonial Council, some of the members of which are elected by the residents, consists of 16 members, six of whom are natives. It is represented in France by one deputy.

A considerable portion of Cochin-China was formerly included in the Khmer kingdom. In the 17th and 18th centuries the country came under the rule of Annam; was taken by the French in 1867 and united with Cambodia, Annam and Tongking as Indo-China.

Population (1933) was 4,441,418, of whom 17,000 were French and 597 European foreigners, excluding military forces. Saigon, the capital had a population of 109,468, including 11,760 French and 460 other Europeans.

For ethnology, history, and archæology, see INDO-CHINA and INDO-CHINA, FRENCH; for bibliography and map, see ANNAM.

Cochineal, koch'i-nēl (*Coccus cacti*), a Mexican scale insect living on the cactus called *Opuntia coccinellifera*. It will also grow on other species, and has been introduced into the Canary Islands and round the borders of the Mediterranean.

The cochineal insect is exceedingly small, a pound of cochineal dye being calculated to contain 70,000 in a dried state. The male is of a deep-red color, and has white wings. The female, which is wingless, is of a deep-brown color, covered with a white waxy powder; flat beneath, convex above.

From the dried bodies of the insects, which feed in swarms on the cacti infected, and are collected by shaking or brushing them off on sheets, the dyes known as *Cochineal* and *Carmine* (q. v.) are obtained by maceration. Similar dyes were obtained by Greeks and Romans from various species of kermes (q. v.). Cochineal has been largely superseded by aniline colors.

Cochituate, Lake, cō-chit'ū-āt, in Middlesex county, Mass.; 17 miles west of Boston. Area, about one square mile. The water supply of Boston is mainly obtained from this lake.

Cochlea, kok'li-*a*. See EAR.

Cochlearia, kok-li-ā'ri-*a*. See SCURVY GRASS.

Cochran, THOMAS EVERETTE (1884–), American educator, was born at Shepherdsville, Ky. At several universities and other institutions he received degrees of B.Sc., A.B., A.M., Ph.D., B.D. and Master of Theology. He taught in public schools (1900–4); dean and professor of education and philosophy, East Lynn College, Buffalo, Ky. (1907–9); professor of mathematics and sociology (1911–13), psychology (1916–17) at Columbia College, Lake City, Fla. Subsequently he taught educational psychology, tests and measurements, lectured on religious education and church history in North Carolina, Alabama and Pennsylvania. In 1930 he became professor at Centre College, Danville, Kentucky. Among his published works are *Elements of General Psychology—An Outline; Guide to the Study of Educational Psychology; Manual for the Study of Adolescent Psychology*.

Cochrane, a point at the confluence of Cochrane Bay, Passage Canal and Port Wells, northwestern part of Prince William Sound, Alaska.

Cochrane, kok'ran, town, Cochrane district, Ontario, Canada, on the Timiskaming and Northern Ontario Railways; 480 miles north of Toronto. It is the commercial center of the district, and several large pulp and lumber mills. Pop. (1931) 3,963.

Cochrane, SIR ALEXANDER FORRESTER INGLIS (1758–1832), English admiral, took part in the actions off Martinique (1780) in the *Montagu*. In 1795 he captured two large French store-ships out of a squadron of five. In 1801 he commanded the *Ajax* in Lord Keith's expedition to Egypt, and became second in command under Duckworth, taking part in the Battle off San Domingo (1806). He then co-operated in the reduction of St. Thomas, Martinique, and Guadeloupe. He was made a vice-admiral in 1809, attaining the rank of full admiral in 1819.

Cochrane, ADMIRAL THOMAS (LORD). See DUNDONALD.

Cock, name applied, erroneously, to South Fowl, a lake in Thunder Bay District, Ontario, Canada, and Cook co., Minn., international boundary.

Cockaday, LAURENCE MARSHAM (1894–), American radio engineer, was born in Greenville, N. J. He was radio instructor, U. S. Navy, 1917–19 after serving as electrical engineer on the I. R. T. in New York City. In 1928 he was appointed lecturer on the general science faculty, N. Y. University and editor of *Radio News*, 1931.

Cockade' (French *cocarde*, or *coquarde*), an ornament or knot worn either as a military or naval decoration, or as the badge of a political party. Cockades made of ribbons of the national colors were worn by soldiers during the wars of the eighteenth century. In 1767 an authoritative regulation was issued that every French soldier should wear a cockade of white stuff; and in 1782 cockades were prohibited to all but soldiers. From this time till the French Revolution the cockade was an exclusively military badge. After the Revolution, the tricolor ribbon took the place of the white cockade.

In England, after the expulsion of the Stuart family, the white cockade became the distinctive mark of the adherents of the exiled house, in opposition to the orange of Nassau and the black of Hanover.

The national cockades were: Austria, black and yellow; Belgium, black, yellow, and red; Denmark, red and white; France, red, white, and blue; Germany, black, white, and red; Great Britain, black; Holland, orange; Italy, green, white, and red; Norway, red, white, and blue; Portugal, blue and white; Russia, black, yellow, and white; Spain, yellow and red; Sweden, blue and yellow.

Cockaigne, Land of, kok-ān' (French *Cocagne*), an imaginary country of idleness and luxury, the idea of which originated in the mediæval romances. It is described as a land of milk and honey whose streets are of gold, along which waddle geese roasted ready for the table, while the houses are walled with pastry and roofed with cakes. In a secondary sense the name is applied to London, the El Dorado of the rustic imagination.

Cock′ateel, a cockatoo of Australia of the genus *Calopsittacus*, commonly known as the 'Ground Parrakeet,' or 'Cockatoo Parrakeet.' It is about the size of a pigeon, is gregarious in habits, and in its free state nests in hollow trees. It readily adapts itself to captivity, and is a favorite cage bird. The female is a pale gray; the male is darker, with a bright yellow crest, face, and cheeks, and ear coverts of brick red.

Cockatoo, kok-*a*-tōō′, a popular name for several genera and species of parrots (*Psittaci*), that are native to Australia, Tasmania, New Guinea, and the Indian Archipelago. Cockatoos are characterized in general by a high curved beak, large head, long wings, and long rounded tail feathers. They inhabit open, wooded country in flocks, feeding on fruits, seeds, nuts, and the larvæ of insects. Though loquacious in habit, they learn to speak but few words. True cockatoos are commonly white, tinged with color, and bearing brilliant, erectile crests of long pointed feathers. The name is applied, however, to the black cockatoos of Australia and the Indian Archipelago, and to the crestless nasiterna of New Guinea.

Among the important varieties are the Great Palm Cockatoo (*Microglossus aterrimus*), the strongest of the parrot tribe; the Sulphur-Crested Cockatoo (*Cacatua galerita*), often found domesticated in Europe; and the Leadbeater Cockatoo (*Cacatua Leadbeater*), the most beautiful of the species.

Cockatrice, kok′*a*-trīs *or* -tris, sometimes identified with the basilisk, was a monster fabled to come from eggs laid by the cock (a Basel cock in 1474 was sentenced to death for laying such an egg). Its appearance, in tradition and heraldry, is part fowl, part serpent; deadly by poison and look. The Biblical reference means a poisonous reptile. In mediæval art the cockatrice is an emblem of sin generally, and the special attribute of St. Vitus.

Cockburn, kō′burn, SIR ALEXANDER JAMES EDMUND (1802–80), English judge, was called to the bar, and became Q.C. (1841), M.P. for Southampton (1847), and attorney-general (1851). He was created a baronet (1858), and lord chief justice (1859), represented Great Britain at Geneva in the court of arbitration between that country and the United States with regard to the *Alabama* Claims (q.v.), and published his report (1872). He presided over the Tichborne and Wainwright trials.

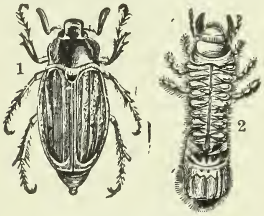
Cockburn, ALICIA, or ALISON (?1712–94), Scottish poetess, was born in Fairnalee, Selkirkshire. Having married, in 1731, Patrick Cockburn, advocate, she became noted for her wit and sprightliness as an Edinburgh hostess, her circle of intimate acquaintances including the most distinguished Scotsmen of her time. She was one of the first to discern the 'extraordinary genius' of Scott, a distant relative; and their admiration was mutual. In addition to her exquisite version of *The Flowers of the Forest*, which first appeared in *The Lark* (1765), she was the author of other songs. She wrote *Letters and Memoirs*.

Cockburn, CATHERINE (1679–1749), English dramatic writer and essayist, was born in London. She was converted to Roman Catholicism in youth, but returned to the Church of England in 1707. In 1708 she married Rev. Mr. Cockburn, afterward of Long-Horsley, Northumberland. Her principal dramatic works are: *Agnes de Castro* (1696); *Fatal Friendship* (1698); *Love at a Loss* (1701); *The Unhappy Penitent* (1701); *Revolution of Sweden* (1706).

Cockburn, SIR GEORGE (1772–1853), British admiral, was born in London. After distinguishing himself in several important engagements, he participated in the reduction of Martinique (1809). Attaining the rank of rear-admiral (1812), he was in command of the North American station during the War of 1812–15, especially during the various operations in the *Chesapeake*, on the coasts of North Carolina, Maryland, and Virginia, and took a large share in the capture of Washington (August, 1814). After his return home, he took Napoleon to St. Helena on the *Northumberland* (1815). He was senior naval lord (1841–6) and admiral of the fleet (1851–3).

Cockburn, HENRY THOMAS, LORD (1779–1854), Scottish judge, was born in Edinburgh, and was educated at Edinburgh University. He became the companion of Jeffrey, Horner, and Brougham, from whom he imbibed Whig opinions. He was admitted an advocate (1800), and appointed an advocate-depute (1806), but owing to his Whig principles was dismissed (1810). He rose, however, to share with Jeffrey the leadership of the bar, and with Jeffrey was counsel for three prisoners accused of sedition (1817–19). He became solicitor-general for Scotland under the Grey ministry in 1830; had the chief hand in drafting the Scottish Reform Bill; in 1834 was made, as Lord Cockburn, a judge of the court of Session; and three years later a lord of justiciary. He was founder of the Edinburgh Academy. His works include a *Life of Lord Jeffrey* (1852), *Memorials* (1856), and *Journal, 1831–44* (1874).

Cockchafer, kok′chāf-*er* (*Melolontha vulgaris*), a beetle very common in some parts of the continent of Europe, and conspicuous on account of its large size (1 to 1¼ inches long) and destructive habits. In the United States it is represented by a large group of dark-colored beetles, popularly known as *June Bugs* and *Dung Beetles*. The perfect insect emerges from the soil in spring, and begins its brief (a few weeks) aerial life, during which it is very destructive to the foliage of fruit and forest trees. During this period the female excavates holes in loose soil, and lays a number of white eggs, which hatch into grubs after a few weeks. The grubs are entirely subterranean in habit, and feed on roots, hence their great destructive powers. The grub approaches the surface during the warmer parts of the year, and buries itself deeply in cold weather. Its rate of development varies from three to five years, according to the climate. In warm seasons and regions the period of larval life may be shortened. The chief natural enemies of the grub are moles and large birds; of the perfect beetle, bats, hedgehogs, badgers, and birds; but the destruction of many of these natural checks has necessitated the expenditure of public money —*e.g.*, in France—in artificial methods of keeping down the numbers. In America the cockchafer has not become a pest.



Cockchafer.
1, Adult beetle; 2, larva.

Cock′er. See SPANIEL.

Cocker, EDWARD (1631–75), English arithmetician and author. Of his *Arithmetick* over 112 editions have appeared. 'According to Cocker' has passed into a proverb. He also wrote *A Guide to Penmanship* (1664).

Cockerell, kok'*e*r-el, Charles Robert (1788 – 1863), English architect, was born in London. He assisted in the completion of Covent Garden Theatre (1809); travelled in the Levant and Italy (1810–17), and made important archæological discoveries; and designed Hanover Chapel in London and the Taylor buildings at Oxford. He was professor of architecture in the Royal Academy (1840–57). He wrote: *The Temple of Jupiter Olympus at Agrigentum* (1830); *Ancient Sculptures in Lincoln Cathedral* (1848); *Travels in Southern Europe and the Levant* (ed. by his son, 1903).

Cockerell, Theodore Dru Alison (1866), American zoologist, was born in Norwood, England, and studied at Middlesex Hospital Medical School. He became curator of the public museum, Kingston, Jamaica (1891–3); professor of entomology, New Mexico Agricultural College (1893–1900); instructor in biology, New Mexico Normal University (1900–03); curator of the Colorado College Museum, Colorado Springs (1903–04); and lecturer on entomology (1904–06), and professor of zoology (since 1906), at the University of Colorado. He has written more than 2,000 articles for scientific and other publications. His works relate principally to entomology, molluscs, palæontology, flowering plants, and general biological questions.

Cockermouth, kok'*e*r-muth, town, Cumberland, England; 25 miles southwest of Carlisle. Its eleventh-century castle, on the Cocker River, became Mary Stuart's prison in 1568, and in 1648 was dismantled by the Parliamentarians. Near Cockermouth is a tumulus, Toot's Hill; and at Pap Castle are remains of a Roman camp. Linen and thread are manufactured, and there are coal mines in the vicinity. Wordsworth was born here in an old-fashioned house, still standing. Pop. (1911) 5,203.

Cockett, village, Glamorganshire, Wales; 2 miles west of Swansea. It has brick works and coal mines. Pop. 6,100.

Cock Fighting was common among the ancient Greeks and Romans. We hear of it in England as far back as the twelfth century, when it was looked upon more as a game for children than as worthy of the attention of sportsmen. The amusement first became fashionable in the reign of Edward III.; but owing to the amount of gambling which it occasioned, the sport was prohibited in 1366. Henry VIII. had a cockpit built at Whitehall, and James I. is said to have attended cock fights at least twice a week. In the latter reign the amusement was loudly denounced from the pulpit, and several preachers were reprimanded for a sport patronized by the king. By an Act of the British Parliament (1849), a penalty of $25 may be levied on any person keeping fighting cocks, letting a cockpit, or otherwise connecting himself with cock fighting, for every day that he shall so act.

Partridges were sometimes pitted against each other in lieu of cocks, especially in Scotland, but the sport was in that case also called cock fighting. The 'Welsh main,' popular in the reign of James II., consisted in pitting ten or more cocks (a favorite number was sixteen) against each other; the survivors were again made to fight, until only one bird survived. In the reign of George IV. artificial spurs, made of steel or silver, came into use; these were long, curved blades or spikes, bound to the shank. They shortened the battle considerably.

Cock fighting was popular in France, Belgium, and Russia during the same period. In Russia a kind of quail was often used, and the gambling was on a more extensive scale than in any other country.

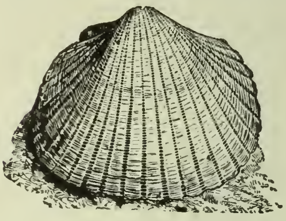
In Asia cock fighting is still widely pursued, especially among the Chinese, Siamese, and Malays; but the breeding of fighting cocks has not been attended to as it was in Europe. It is illegal in the United States, but is still carried on secretly, although the breeding of fighting cocks, which was at one time a profitable industry, has died out. It is also a favorite pastime in the South American states and the Philippines, where the law does not forbid the practice.

Cockie-leekie, kok'i-lēk'i, is in Scotland a kind of soup made of a fowl boiled with leeks.

Cock Lane Ghost, an imposture that in 1762–3 agitated all London, even Dr. Johnson sharing in the commotion. In a house in Cock Lane, Smithfield, unaccountable noises were heard, and in conjunction therewith a ghost was by a number of persons declared to have been seen. The noises were at last traced to a little daughter of Parsons, the occupier of the house, who produced the sounds on a small board she had in bed concealed under her stays. In spite at Kemt, a late lodger, Parsons contrived this method of raising a ghost, who purported to be a lady poisoned by Kemt. For this malicious imposture Parsons was sentenced to stand thrice in the pillory, and to suffer two years' imprisonment.

Cockle, a weed. See Corn Cockle.

Cockle (*Cardium*), a large genus of bivalve molluscs (Lamellibranchs) related to the American quohog, many of which are edible, and in Europe have considerable commercial value. The thick, ribbed, heart-shaped, equal-valved shell, and the large knee-bent 'foot' are characteristic. The shell is closed by two muscles; the hinge has large teeth; there are two minute respiratory siphons.



Shell of Cockle.

The foot is long and bent, and by its means cockles are enabled to execute considerable leaps in the sand. The common cockle is *Cardium edule*, which is widely distributed over Europe, and inhabits sandy bays near low-tide mark. It is much used as food and bait. Other British species are also eaten.

Cock'lebur, or Clotbur, is a coarse annual weed, a species of *Xanthium*, belonging to the Compositæ family. The plant is low and branching, and is distributed widely in almost every part of the temperate zone. *X. canadense*, *X. commune*, *X. speciosum*, and *X. echinatum* are the distinct American species; while *X. spinosum* and *X. strumarium*, though found in the United States, are indigenous to the Old World. The weed is regarded as a pest, especially to the sheep-growing industry, as the hooked, spiny burrs cling to the wool, and injure its value. For this reason, laws have been enacted in South Africa to limit the spread of cocklebur. If prevented from going to seed, it will die out in a few seasons.

Cockney, kok'ni, a contemptuous name for a person born within the sound of Bow Bells, London, hence a 'Londoner.' Minsheu explains 'cockney' as *incock* (*incoctus*), 'unripe in country affairs.' In Shakespeare a cockney means one versed only in town manners. Dr. Murray traces the word to *cocken-ey*, *cock's egg*, 'nestle-cock,' 'an effeminate fellow,' 'a milksop.'

Cock of the Rock (*Rupicola*), a genus of South American Passerine birds in the family of Cotingidæ or Chatterers. The bill is high and strong, the tail short and straight, the sole naked, the feet strong and stout. The male is remarkable for a lofty, laterally compressed crest. In the best known species (*R. crocea*), from Guiana and the northeast of Brazil, the male is predominantly orange red in color, with a dark purple-red crest, and decidedly larger than the sober brown female. The feathers are highly valued by the natives of South America. The males go successively through an elaborate dance before an assembly of other males and females in special clearings in the forest.

Cock of the Woods, another name for the woodgrouse, capercailzie, or capercaillie (*q.v.*).

Cockpit, in former sailing men-of-war a place situated near the after hatchway, under the lower gun deck. It was contiguous to the berths of the surgeon and his mates, and was the place where the wounded in action were placed. Similarly, the fore cockpit was a place leading to the magazine passage, and to the boatswain's, gunner's, and carpenter's storerooms. In larger ships, and especially in war time, the boatswain and carpenter generally had their berths in the fore cockpit.

The word is also used for the ring in which cock fighting takes place.

Cockran, kok'ran, (William) Bourke (1854–1923), American political leader and lawyer, was born in Ireland, and was educated there and in France. He went to the United States in 1871, became a teacher and the head of a public school, and was admitted to the New York bar in 1876. Devoting himself to politics, he became prominent as a Tammany Democrat, attracting especial attention as a campaign orator. At the National Democratic Conventions of 1884 and 1892 he took a conspicuous part in opposing the nomination of Grover Cleveland. In 1891–5 he was a Member of Congress; in 1896 he became an advocate of the gold standard, and supported McKinley; but in 1900 he returned to the Democratic Party, and campaigned for W. J. Bryan. He was a Member of Congress for seven different terms, practicing law in New York during the intervals when he was not in Washington.

Cock'rell, Francis Marion (1834–1915), American soldier and legislator, was born in Johnson County, Mo. He was graduated from Chapel Hill College (1853); was admitted to the bar in 1855; and practised law in Warrensburg, Mo. During the Civil War he rose from captain to brigadier general in the Confederate Army. He resumed law practice after the war, and was U.S. Senator from Missouri from 1875 to 1905. He then served on the U. S. Interstate Commission (1905–10); and in 1911 acted as U. S. Commissioner in the boundary dispute between Texas and New Mexico. In November, 1913, he was appointed civilian member of the Board of Ordnance and Fortification of the U. S. War Department.

Cock'roach, any one of several species of insects of the orthopterous family Blattidæ. Cockroaches are among the most ancient and widespread of insects, and in every civilized country certain species have become a pest, especially in ill-kept houses, where moisture is plentiful, as about sinks. The principal species are: 1. *Blatta germanica*, or *Ecotobia germanica*, the common brown cockroach of the United States, where it is known as the *Croton bug*, because it first appeared about the time when Croton Lake water was first taken into New York City (1842). It is of medium size, with long wings extending beyond the abdomen. 2. *Periplanta orientalis*, the small Oriental cockroach, which has become widely distributed, and is known in England as the 'Black Beetle.' 3. *P. americana*, the largest of all roaches, which had its origin in South America, but which has also become widely distributed. 4. *P. australasiæ*, the Australian cockroach, similar to the preceding, but smaller in size.

Among the more striking external features of the cockroach are the antennæ longer than the body, the bent-down head, the long spiny legs compressed terminally, the flat, broad, segmented abdomen, and the cigar-shaped anal appendages. The two adult sexes in the common cockroach are readily distinguished, since the female has a somewhat broader abdomen, and only slight traces of wings. In the male, the anterior wings form stiff opaque wing covers (*tegmina*), while the posterior pair are membranous, really wing-like, and folded longitudinally; in the female, the tegmina are very small, and the posterior wings only suggested by marks. Certain cockroaches, however, are wingless in both sexes. The eggs are surrounded by a peculiar hard capsule, which the female carries about for a long time, but eventually attaches by a glutinous secretion to some suitable sheltering object.

Cockroaches are voracious insects, devouring both animal and vegetable substances, which they seem to seek out by aid of their antennæ. Their mouth organs (three pairs of jaws) are typical, and well adapted for biting. The juices of the mouth leave an offensive smell on the objects over which the insects pass. They are nocturnal in habit, most abundant in warm countries, found of sheltering in houses, and notoriously a pest to bakers and millers.

Cleanly housekeeping usually suffices to prevent their becoming a pest, not only by their disagreeable presence, but because of their destructiveness. For methods of preventing and suppressing them, consult Howard and Marlatt's 'Principal Household Insects of the United States' (U. S. Division of Entomology's *Bulletin No. 4*).

Cockscomb. See Celosia.

Cock's-foot Grass. See Grasses.

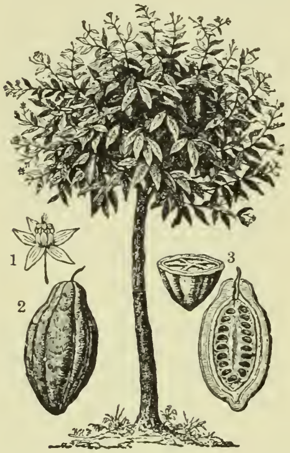
Cockspur Thorn. See Cratægus.

Cock'tail, a stimulating drink composed of spirits, bitters, and sugar, with various aromatic additions. *Champagne cocktail* has an addition of Angostura bitters; *Manhattan cocktail* has a basis of whiskey with the addition of vermouth; *Martini cocktail* is gin and vermouth; *soda cocktail* is soda water plus a little bitters.

Cock'ton, Henry (1807–53), English novelist, was born in London. He is the author of *Valentine Vox, the Ventriloquist* (1840), his best known work; *George St. George Julian, the Prince* (1841); *Sylvester Sound, the Somnambulist* (1844).

Cocles, kō'klēz, Horatius. See Horatius Cocles.

Cocoa, kō'kō, Cacao, or Coco, a food product prepared from the plant *Theobroma cacao*, an evergreen belonging to the order Byttneriaceæ. It is indigenous to tropical America, but is also grown in the West Indies, in Ceylon, in Portugese West Africa and other tropical regions. It requires a mean temperature of 80° F. and a rich porous soil and must be sheltered from the wind. The fruit is in the form of a pod, and shows considerable variation in different countries. In general it resembles a gherkin in size and shape; the color varies from purple to yellow; the rind is thick and warty, the pulp sweetish, and not unpleasant; the seeds numerous, compressed, and not unlike almonds, with a thin, pale, reddish-brown, fragile skin or shell, covering a dark brown, oily, aromatic, bitter kernel. These seeds are the *cocoa beans* of commerce. They are separated from the surrounding pulp, and are allowed to undergo fermentation either in covered boxes or lightly buried in the soil. This process causes (1) the development of an essential oil which gives the cocoa its peculiar flavor, (2) the conversion of the bitter principle of the bean, and (3) the liberation of theobromine, which gives the cocoa its stimulating properties. The seeds are next air dried in covered sheds, and are ready for market.



Cocoa or Cacao
1, Flower; 2. pod; 3, sections of pod.

In commerce cocoa appears as either 'nibs,' 'flake,' or 'soluble' cocoa. In preparing the nib cocoa the seeds are simply roasted, and the skin and husk are removed; a peculiar flavor is developed during the roasting process, and the color is deepened. To prepare a beverage from the nibs they are boiled with water for some hours. Flake cocoa is prepared from the nibs by grinding and pressing; a considerable quantity of the natural fat is removed, and the residue then mixes more easily with water.

There are a number of so-called soluble cocoas on the market; but the term is a misnomer, as only a very small proportion of the constituents of cocoa is soluble in water. The ordinary beverage consists of the finely powdered and prepared seeds suspended in water. The original seed contains about fifty per cent. of solid fat, and as this retards or prevents the mixture with water, it is usually removed by pressure to the extent of one-half or more. A large number of the soluble cocoas, especially the cheaper varieties, contain only fifty per cent. of cocoa, the remainder being made up of added starch and sugar; the starch becomes thick with the boiling water, and suspends the cocoa in the liquid.

The Dutch soluble cocoas are treated with some form of alkali to soften the fibre and render the albuminoids more soluble. The practice has been condemned on the ground that the added alkali has an injurious effect on the system; this objection is, however, somewhat doubtful, while the advantage of the increased solubility of the albuminoids must be admitted.

Cocoa essence and cocoatine consist of pure cocoa deprived of about half of its natural fat. The chemical composition of cocoa is shown by the following analysis: Cocoa fat, 50; theobromine, 1.5; starch, 10; nitrogenous matters, 18; gum, 8; coloring matter, 2.6; water, 6.0; ash, 2.6; loss and undetermined, 0.3. *Theobromine*, the alkaloid of cocoa, is closely allied to the caffeine and theine of coffee and tea, and has the same stimulating effect. The fat, starch, and nitrogenous matters represent the actual food constituents; and assuming that all the nitrogenous matters are available as food, the dietetic value of cocoa is undoubtedly high.

Chocolate consists of ground cocoa deprived of a portion of its fat, and sweetened with sugar; in addition, it often contains some flavoring matter. The last ten years has seen a tremendous increase in the consumption of cocoa preparations, particularly in the United States, Germany, Great Britain and Holland.

Statistics.—West Africa furnishes about two-thirds of the cocoa of the world, the bulk of which comes from Gold Coast and Nigeria. In 1927 the imports of raw cocoa into the United States were as follows: British West Africa, 63,668 tons; Brazil, 46,248 tons; Dominican Republic, 24,371 tons; British West Indies, 14,723 tons; Germany, 8,226 tons; Ecuador, 7,703 tons; Venezuela, 5,690 tons; and Netherlands, 5,699 tons. In 1927 the total exports of raw cocoa from Gold Coast were 205,068 tons; from Nigeria and Cameroon 39,152 tons.

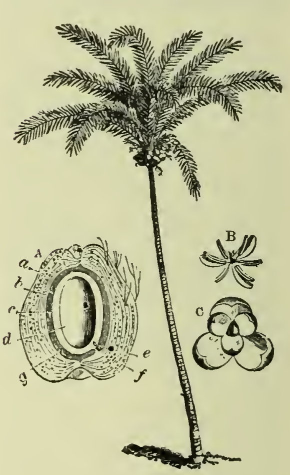
The manufacture of cocoa and chocolate is carried on in the United States, Germany, France, England, Holland, and Switzerland; and to a lesser extent in Spain, Belgium, Austria, Russia, Italy, and Canada. According to the U. S. Census of Manufactures for 1927 there were 69 establishments devoted to cocoa and chocolate products, having 6,427 employees, and products valued at $122,623,000. In 1928 the United States imported 388,635,000 pounds of cocoa and chocolate valued at $49,216,000. Consult Van Hall's COCOA (1914).

Cocoa, Brazilian. See GUARANA.

Cocoa Butter, a pure fat obtained from the seeds of the cocoa plant (*Theobroma cacao*) by pressing. It is used in the manufacture of cosmetics and confectionery and is said to be valuable in the treatment of skin irritations.

Co'coanut', or COCONUT, the fruit of a tropical palm *Cocos nucifera* which reaches a height of fifty feet or more and has long pinnate leaves which sometimes attain a length of twenty feet. Its original home was the islands of the Indian and Pacific Oceans, but it is now found in nearly all tropical regions, thriving best between 15° N. and 12° S. lat. The palm grows naturally on a sandy shore, being able to endure storms better than any other cultivated tree. It is little affected either by excessive rain or prolonged drought. In about its seventh year it begins to produce nuts.

Almost every part of the tree can be put to economic use. On an average, each tree yields about eighty nuts each year. The kernel of the cocoanut contains about seventy per cent. of fat, which is largely used in the manufacture of candles and soap. (See COPRA.) The bark of the growing tree, when pierced, yields a juice which, after being kept for a couple of hours, makes a tart and refreshing drink ('toddy' q.v.). An alcoholic beverage (*palm wine*) of the nature of arrack is also obtained from this juice by fermentation and distillation; and by continued fermentation a vinegar is manufactured. The juice can also be made to yield a sugar known as *jaggery*. After the shell or husk of the cocoanut has been soaked, its fibrous part may be separated from the re-



Cocoanut Palm
A, Section of fruit; *a*, husk; *b*, shell; *c*, albumin; *d*, cavity; *e*, embryo; *f*, aperture of shell; *g*, rudimentary aperture; B, male flower; C, female flower.

mainder by beating. The coarse bristle fibre is used in the manufacture of brushes. The finer mattress fibre is spun into what is known as coir yarn, from which mats, ropes, nets, and coarse cloth are made (see Coir). The nut itself is used as food by the natives of those countries where it is produced; and the whole nuts and various desiccated products are exported. The shell is made to serve as a utensil for holding liquids, and is sometimes polished and carved for ornamental purposes. The leaves of the tree are woven into baskets, mats, and roofing material; and the wood, known as *porcupine wood*, is used for building, furniture, and firewood. The root has narcotic properties, and is sometimes chewed by the natives. The terminal bud (*palm cabbage*) is esteemed a delicacy, and the central part of the young stem is also succulent and eatable.

Cocoanut Oil, or Cocoanut Butter, is expressed from the dried kernel of the cocoanut, known as copra (q.v.). The oil is a liquid in tropical temperatures, and a white, buttery solid in temperate climates. It is of highly complicated composition, containing laurin (glyceryl laurate) as its principal constituent. It can be separated by pressure into a liquid and a solid portion, and is used in the preparation of artificial butter, marine soap, lard, and candles. It is also employed as a lubricant and illuminant, and by perfumers as an embrocation in the preparation of cosmetics.

Experience has shown that 500 cocoanuts will give about 112 pounds of cocoanut oil. From 170 to 200 nuts are required to make 112 pounds of copra; and 336 nuts are reckoned to every 112 pounds of desiccated cocoanut.

See Palm. Consult E. B. Copeland's *The Cocoanut;* R. Belfort and A. J. Hyer's *All About Cocoanuts.*

Cocoanut Crab, or Robber Crab (*Birgus latro*), a large species of crab nearly allied to the hermit crab (q.v.), found on the coral islands of the Indo-Pacific region. It is a land form, and lives upon cocoanuts, which it is capable of opening with its powerful claws.

Cocomas, kō'kō-mäs, Cocamas, or Cucamas, South American Indians, who formerly occupied an extensive tract about the Maranõn and Lower Huallaga, known as La Gran Cocoma. When first visited by the missionaries (about 1680) the Cocomas were addicted to cannibalism. They are a shrewd, provident, and hard-working people, and make good boatmen and fighters. Their language is related to the Tupi-Guarani (q.v.) stock.

Cocoon', the silken sheath spun by the larvæ of many insects in passing into the pupa or resting stage. The cocoon proper is due to the secretion of special spinning glands, situated anteriorly or posteriorly, but larval hairs and foreign objects of many kinds may also be utilized. The amount of secretion, the arrangement of the threads, and the completeness of the covering vary widely; nor is the presence of any cocoon whatever essential to the pupa stage. See Silk.

Coco River. See Segovia.

Coco Root. See Cocco.

Cocos. See Keeling Islands.

Cocytus, kō-sī'tus (modern *Vuvos*), a river of Epirus, a tributary of the Acheron, supposed to be connected with the lower world. Homer makes it a branch of the Styx.

Cod (*Gadus callarias*), a fish of the family Gadidæ, which includes the haddock, whiting, pollack, ling, hake, and torsk. The name cod is also applied to the entire family.

The cod has a moderately elongated body, compressed and tapering behind, with small, smooth scales, and three dorsal and two anal fins. The head is narrowed anteriorly, the mouth is large, with the upper jaw longer than the lower, and there is a long barbel on the chin. The color varies, but is usually greenish or brownish, with numerous dark spots on the back and sides; the lateral line is pale, and the fins are dark. The average weight of a full-grown fish is from 20 to 35 pounds, although many larger specimens have been recorded.

Cod are essentially deep-water fish, and are omnivorous and voracious feeders, living principally on crustaceans, molluscs, and small fish. They travel in schools, their movements being governed mainly by temperature changes, the abundance or scarcity of food, and the search for suitable spawning grounds. They are exceedingly prolific, a single fish producing from two to nine million eggs. These may be deposited near the coast or in mid-ocean, where they float on the water as minute crystalline spheres, from which the young cod emerge in twelve to fourteen days. Only a small percentage of the eggs hatch and reach maturity.

The members of the cod family are confined to the Arctic and North Temperate zones. The common codfish ranges in American waters from Cape Hatteras to Greenland, being especially abundant off the coast of the Middle States, New England, and Canada. On the coast of Europe the cod fisheries are an important industry from the Bay of Biscay north to Spitzbergen.

The *Alaska cod* (*G. macrocephalus*) frequents the Bering Sea and the Northern Pacific from Cape Flattery to Hakodate, Japan. It occurs in abundance about the Aleutian Islands, and in the Okhotsk Sea.

The cod is one of the most valuable of food fishes. The flesh is white and flaky, absorbs salt readily, and is especially suitable for drying. It is of further economic importance as the source of cod liver oil (q.v.). The preserved 'sound' or swim-bladder is esteemed a delicacy, and is used in a dried state as isinglass (q.v.).

The principal cod fisheries are those along the coast of Norway, especially at the Lofoten Islands—where, according to the Norse sagas, cod fishing was established in Viking times; at Iceland; off the Shetlands and Orkneys; on the Dogger Bank; and off the coast of Newfoundland and New England. European vessels have frequented Iceland and the Norwegian coast for cod since an early period; and in 1577, according to Hakluyt, the cod vessels fishing off Newfoundland numbered 315, of which 100 were Spanish, 50 Portuguese, 150 French, and 15 English.

At the present day, the chief fisheries are controlled by Norway, France, Great Britain, Canada, Newfoundland, and the United States, and their combined annual product is valued at about $40,000,000. American fishing is done mainly on the Grand Banks and other shoal places near Newfoundland, or on George's Banks off Cape Cod, where inshore fisheries were long ago exhausted. The headquarters of the industry are at Gloucester and Boston, Mass.

During 1928 there were landed at Gloucester, by American fishing vessels, 16,090,000 pounds of fresh cod, valued at $567,400. At Boston, 39,956,000 pounds of fresh cod were received, valued at $1,506,000. The Alaska fisheries reported a catch of 578,000 pounds, valued at $29,000. The annual value of the total catch for the United States averages between $2,000,000 and $3,000,000.

Canadian fishing interests are kept apart from those of the United States by strict international regulations, though both nations fish in the same waters. The Canadian product is valued between $8,000,000 and $9,000,000. Most of the American catch is salted and dried.

See Cod Liver Oil; Fisheries. Consult D. S. Jordan and B. W. Evermann's *Food and Game Fishes of North America.*

C. O. D., the usual form employed for the phrase 'cash on delivery,' meaning an article must be paid for when delivered at the purchaser's home or place of business.

Co'da (Italian 'a tail'), that section which forms the conclusion of a musical composition. Originally it frequently consisted of a few simple chords, but modern composers — notably Beethoven—have developed the coda into a feature of great importance.

Cod, Cape. See CAPE COD; CAPE COD CANAL.

Cod'dington, WILLIAM (1601–1678), American colonist, was born in Boston, Lincolnshire, England. He went to Plymouth, Mass., in 1630, and for a time carried on business as a merchant in Boston. Becoming a follower of Anne Hutchinson (q.v.), he defended her, and subsequently Wheelwright, against Winthrop and his party, and was included in the nineteen who were obliged to remove from Massachusetts, and who purchased the island of Aquidneck, now Rhode Island. Of this settlement he was governor from 1651 to 1655, when he was ousted by Roger Williams and John Clarke, and again from 1674 until his death.

Code (Latin *codex*) in modern times signifies an authoritative statement either of the whole body of law prevailing in a particular jurisdiction, or of a definite branch of the same. Though the term is sometimes popularly applied to a compilation of law of a comprehensive character made without legislative authority, and sometimes to a statutory revision of a part of the law—as *Penal Code, Military Code*—it is strictly applicable only to a statutory restatement of the entire body of the law of a state.

The codes published under the Roman Empire were simply compilations of enactments by the emperors, arranged systematically under various headings. These were: (1) the *Codex Gregorianus et Hermogenianus*, consisting of two private collections of imperial constitutions published about the end of the third and the beginning of the fourth century A.D., and rendered authoritative by later emperors; (2) the *Codex Theodosianus*, issued in 439 by the Emperor Theodosius II., a considerable part of the last portions of which are known to us through the *Lex Romana Visigothorum* or *Breviarium Alaricianum;* (3) the *Codex Justinianeus*, which was by far the most important of Roman codes, embodying as it did the earlier ones with the addition of subsequent constitutions. The first edition of this work was published in 528; the second, which alone has come down to us, in 534.

When the Roman Empire had succumbed to the inroads of northern tribes, the barbarian rulers of different parts of the former imperial dominion published codes based on Roman law for the use of their subjects. These are generally called the *Romano-barbarian* codes, and consist of (1) the *Edictum Theodorici* or code of the Ostrogoths, (2) the *Lex Romana Visigothorum* or *Breviarium Alaricianum*, and (3) the *Lex Romana Burgundiorum* or Papian Code, all published in the early years of the sixth century. There are also a number of early codes found in different parts of Western Europe which show little or no traces of Roman influence; for example, the Ripuarian, Alamannic, Salian, Welsh, Frisian, Saxon, and Anglo-Saxon codes.

The codification of modern law may be said to have originated with Frederick the Great of Prussia. His idea was to secure uniformity and certainty in the law prevailing throughout his dominions; and the result was the publication of the *Landrecht* or *Code Fréderic* of 1751. The famous code promulgated between 1804 and 1810 under the auspices of the Emperor Napoleon finally established French law on a uniform basis (see CODE NAPOLÉON). In Germany two commercial codes, the *Wechsel - Ordnung* (1848), dealing with bills of exchange, and the *Allgemeines Handelsgesetzbuch* (1861), dealing with the remaining branches of mercantile law, were sanctioned by the North German Confederation. After 1871 these codes were put in force throughout the German Empire. In 1900 a gigantic codification of the entire German civil law was published as the result of the labors of a commission which sat for many years. In Great Britain the Bills of Exchange Act (1882), the Partnership Act (1890), and the Sale of Goods Act (1893) are codifications of the law on each of these subjects. The *Rules of the Supreme Court* made by the judges under statutory authority also amount, in practice, to a code.

In the ***United States,*** several codes were issued by the colonies before the Revolution. In 1848 New York adopted its present code of civil procedure, which later became the model for other States. A draft civil code, originally prepared by Dudley Field for New York in 1857–65, but which did not receive the sanction of the legislature, was adopted by California and Dakota, and many of its provisions have passed into the laws of Montana, Utah, Wyoming, and other States. The Revised Statutes (see STATUTES) of the various States are more or less complete codes of criminal procedure, and sometimes of civil procedure also. Several States have codified the main body of their prevailing substantive law, including statutes, but have not succeeded in completely superseding the common law.

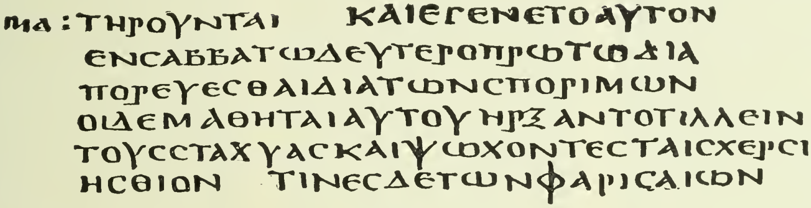
The value of codes has been a matter of much controversy. The main objection may be summarized thus: Law is a thing of natural growth which springs from the mind of the people, and is undergoing a continual process of development; and on that account all attempts to stereotype it by means of codification are doomed to failure. The answer made is that a code does not stereotype law any more than a dictionary stereotypes language, but merely states in clear terms what the actual rules existing at a given moment are. It is, however, conceded that codes must be continually revised in accordance with new developments in jurisprudence. One of the most cogent arguments in favor of codification is derived from the vast and unwieldy and ever-increasing bulk of statute and case law. It must be remembered, however, that judicial interpretation can never be done away with; and it has been found in those of the United States which have codes, that cases constantly arise where it is necessary to refer to the common law. See PENAL CODE. Consult Carter's *Proposed Codification of our Common Law;* Dillon's *Our Legal Chaos.*

Code'ine, $C_{17}H_{18}(CH_3)NO_3 + H_2O$, is one of the alkaloids of opium (q.v.), whence it is obtained by precipitating an infusion with chalk and calcium chloride. The chlorides of morphine and codeine which crystallize out are then dissolved in water and treated with ammonia. The morphine crystallizes, and the filtrate is evaporated for codeine. It may also be obtained from morphine by methylation.

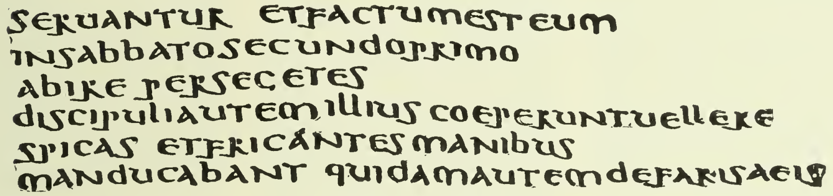
Codeine occurs in white or nearly translucent orthorhombic prisms, octahedral crystals, or as a crystalline powder. It is odorless, slightly bitter to the taste, freely soluble in alcohol and ether, and soluble in 80 parts of cold water and 17 parts of boiling water. It has a slightly hypnotic action but less than that of morphine, and is used to quiet cough and to fulfil other minor narcotic indications. It has also been employed in the treatment of diabetes, to reduce the excretion of sugar. The dose is from ½ to 2 grains. See OPIUM.

Code Napoléon, the popular name of the great codification of French civil law which was first promulgated March 30, 1804. It is the legal embodiment of the Revolutionary principle of equality, applied to the principles of the Roman law, current in France from its beginnings, and to the mass of old customary laws, partly codified already in the *Grandes Ordonnances* of D'Aguesseau. In July, 1799, Napoleon as first consul appointed Tronchet, Bigot-Préameneu, Maleville, and Portalis, to draw up a code, which, after discussion and minor alterations, was passed by the council of state. Napoleon presided over these discussions and offered many suggestions, but cannot be regarded as a serious collaborator.

Known at first as the *Code Civil des Français,* it became the *Code Napoléon* (1807), but at the Restoration (1815) resumed its old title. Its division is practically the same as Justinian's and Blackstone's, and consists of persons, goods and property, and inheritance, contracts, and obligations. It has been criticised for its system of hypothecs, accused of lacking many of the social and economic laws, which arose only during the nineteenth century, and has received some modifications, especially in relation to divorce. Its influence on more recent codes has been great, and may be seen in the laws of Quebec and in those of Belgium, Holland, Italy, and Portugal, and more remotely in those of Spain and the South American republics.


ΜΑ:ΤΗΡΟΥΝΤΑΙ ΚΑΙΕΓΕΝΕΤΟΑΥΤΟΝ
ΕΝCΑΒΒΑΤΩΔΕΥΤΕΡΟΠΡΩΤΩΔΙΑ
ΠΟΡΕΥΕCΘΑΙΔΙΑΤΩΝCΠΟΡΙΜΩΝ
ΟΙΔΕΜΑΘΗΤΑΙΑΥΤΟΥΗΡΞΑΝΤΟΤΙΛΛΕΙΝ
ΤΟΥCCΤΑΧΥΑCΚΑΙΨΩΧΟΝΤΕCΤΑΙCΧΕΡCΙΝ
ΗCΘΙΟΝ ΤΙΝΕCΔΕΤΩΝΦΑΡΙCΑΙΩΝ

Luke vi. 1—Greek.


SERUANTUR ETFACTUMESTEUM
INSABBATOSECUNDOPRIMO
ABIRE PERSEGETES
DISCIPULIAUTEMILLIUS COEPERUNTUELLERE
SPICAS ETFRICANTES MANIBUS
MANDUCABANT QUIDAMAUTEMDEFARISAEIS

Luke vi. 1—Latin.

Codex.—*The Codex Bezæ of the Sixth Century.*

Code, Telegraphic. See Telegraphy.

Co'dex, the name applied to certain ancient mss. of the classics or of the Scriptures. A codex, as contrasted with the papyrus roll, which it superseded, consists of a number of leaves of vellum, paper, or other material, arranged in quires and bound together in book form. The earlier codices are written in capitals or uncials, with no separation of words, punctuation, breathing marks, or accents; and the text is arranged in columns or written directly across the page. The later codices—from the eighth to the fifteenth century—are written in small or minuscule letters.

Among famous uncial codices are the three great codices of the Bible in Greek—Codex Sinaiticus (fourth century), Codex Vaticanus (fourth century), and Codex Alexandrinus (fifth century); the Codex Bezæ (sixth century), containing the four Gospels and the Acts of the Apostles in both Greek and Latin; the Cottonian Genesis; the Paris Pentateuch; the Codex Ephraemi, a palimpsest manuscript of the Bible (see Palimpsest); the Homeric manuscript in the library at Milan; and the two famous Latin codices of Virgil—Codex Romanus and Codex Palatinus. Minuscule or cursive codices number over 3,500, and include copies of earlier uncial manuscripts, commentaries on the Scriptures, writings of the saints, and copies of the classics.

The catalogue of the Vatican Library has listed the Codex Vaticanus since 1475, and it has probably been there at an even earlier date. In 1628 the Codex Alexandrinus, now in the British Museum, was presented to king Charles I of England by the Patriarch of Constantinople. The British government acquired the Codex Sinaiticus from the Soviet Union in 1933 for £100,000, half the cost subsequently being refunded to the Treasury by public subscription. It was found in 1844 in the Convent of St. Catherine on Mount Sinai by Tischendorf, who secured it for emperor Alexander II of Russia in 1859. Of the 200 pages of the Old Testament, the first 43 are in the library of the University of Leipzig. The New Testament is complete in 138 pages. The text of the Codex is in four columns on each of the pages of fine vellum, which measure 15 in. by 13½ in. See Bible; Manuscripts; Palæography.

Cod'icil (Latin *codicillus*), in Roman law, denoted an informal writing of a testamentary nature, which, if confirmed in a will, was read as part thereof; but if not so confirmed, merely operated as a trust imposed on the deceased's heir. It might be made when no will was in existence, in which case a trust was imposed on the heir in intestacy.

In modern law a codicil is an instrument executed for the purpose of adding something to a will already made, or of altering or explaining its terms. There is no restriction on the number of codicils which may be added, but they must be executed with the same formalities as are required in the case of the will itself. A codicil, if inconsistent with, though not expressly revoking, the provisions of the will or a prior codicil, will prevail as being the final expression of the deceased person's intentions. See Will.

Codification. See Code.

Cod'ling Moth (*Carpocapsa pomonella*), a small tortricid moth, an almost universal pest of apple orchards. It is grayish brown in color, with coppery metallic markings, and measures from 14 to 17 millimetres across with spread wings. It deposits its eggs upon the leaves or the fruit of apple and occasionally other fruit trees, where they hatch in about eleven days. The young larva enters the fruit at the calyx or some irregularity on the surface, tunnelling its way to the core, where it eats out an irregular cavity. In about twenty days, when full grown, the larva makes its way out of the fruit, seeks a crack or hole in the branch or trunk of the tree, and there spins its cocoon, from which it emerges as an adult moth in the spring. Spraying with arsenites and banding are the most effective remedial measures.

Cod Liver Oil is the oil extracted from the fresh liver of the cod (q. v.) and allied fishes found in the North Atlantic Ocean. The method devised by Möller in 1853, and now largely used in its production, is as follows: The fresh and healthy livers are selected, freed from gall bladders, and subjected to a gentle heat, which causes the oil to separate. The oil is drawn off and exposed to a low temperature, which solidifies much of the fatty matter; this is then removed by filtration. The greater proportion of cod liver oil is prepared at Lofoten and Romsdal in Norway; there are also manufactories in the United States, Great Britain, Canada, and Newfoundland.

Cod liver oil should be of a pale yellow color, and have a slight fishy but not rancid odor. It is easily distinguished from vegetable oils by yielding a violet color when a few drops of it are mixed with a drop of sulphuric acid on a white slab. It consists chiefly of olein (about 70 per cent) and palmatin (about 25 per cent), together with a little stearin, and traces of iodine and bromine. It has been shown to contain also an active principle called *gaduin* ($C_{35}H_{46}O_9$), and a crystalline substance known as *morrhuol*.

Cod liver oil is the most easily digested of all fats, possesses high nutritive qualities, and is a valuable therapeutic agent in many diseases. Its efficiency as a restorative agent in wasting diseases depends to some extent upon its power of aiding the assimilation of other foods. Digestion is thus facilitated, the blood corpuscles augmented, the weight of the body increased, and a stimulus given to healthy cell formation. It is a valuable expectorant, of advantage especially in bronchitis; and its effects are decidedly helpful in most forms of tuberculosis, in syphilis, and rickets. It is also beneficial in nervous exhaustion and neuritis by supplying fat. It is usually given thrice daily after meals in tea or dessertspoonful doses at first, and then gradually increased to a tablespoonful. Over-doses may cause nausea and vomiting.

As the peculiar flavor of the oil is distasteful to many patients, it may be rendered more palatable by taking it in coffee, or by adding a drop of oil of peppermint to each dose. It may also be administered in capsules, or in the emulsion form (see Emulsion).

Cod'man, Robert (1859–1915), American Protestant Episcopal bishop, was born in Boston. From 1885 to 1891 he practised law in his native city. In 1891 he entered the General Theological Seminary, New York; was ordained priest in 1894. He was bishop of Maine from 1900 until his death.

Codogno, kō-dō'nyō, town, Milan province, Italy; 7 miles by rail north of Piacenza. It is famous for its trade in Parmesan cheese; and has silk and tanning industries.

Cod'rington, Sir Edward (1770–1851), English admiral. He entered the navy in 1783, was lieutenant of Lord Howe's flagship, and took a prominent part in the action off Ushant (1794). At Trafalgar, in 1805, he was captain of the *Orion,* and leader of a squadron. He afterward served in the North Sea, in Spanish waters, and in North America. In the War of 1812 he commanded the fleet at Washington and Baltimore, afterward taking part in the attack on New Orleans. He was in command of the combined fleets of Great Britain, France, and Russia at the Battle of Navarino (1827), but was recalled for exceeding his instructions.

Codrington, Sir William John (1804–84), British general, was the son of Sir Edward Codrington (q. v.). In the Crimean War he commanded a brigade at the Battle of the Alma, and a division at Inkerman, where he especially distinguished himself; and in 1855 he was made commander-in-chief in the Crimea. In 1859–65 he was governor of Gibraltar.

Co'drus, the last king of Athens, was the son of Melanthus, and, according to Greek legend, sacrificed his life for his country about 1070 B.C. A war raging between the Athenians and Dorians, the oracle declared that the victory should belong to those whose king was slain by the enemy; whereupon Codrus entered the Dorian camp, and contrived to have himself slain.

Co'dy, Samuel F. (d. 1913), British aviator, was born in Texas. He spent his early life as a cowboy, but later removed to London, where he became a British subject. He first attracted attention as a designer and builder of man-lifting kites, and was appointed adviser to the British War Office in regard to aerial machines. He constructed a successful biplane in 1909, and as early as November, 1910, accomplished a flight of 110 miles in 2 hours and 45 minutes. In 1911 he won the British Empire Michelin Cup and $2,500 for a flight of 261 miles 800 yards; and in 1912 he took a prize of $20,000 in the British army aviation tests. He was killed in an aeroplane accident at Aldershot.

Cody, William Frederick (1846–1917), American scout and showman, popularly known as Buffalo Bill, born in Scott County, Iowa. In 1860 he became a rider in the Pony Express (q. v.), and in the Civil War served on the Federal side as a cavalry scout (1861–5). During the construction of the Union Pacific Railway he contracted to furnish the laborers with meat; and in eighteen months (1867–8) is said to have killed about 4,300 buffaloes. He was a Government scout and guide (1868–72), serving against the Sioux and Cheyenne Indians, and a member of the Nebraska legislature (1872). He acted as a scout in the Sioux War of 1876, and killed the Cheyenne Chief Yellow Hand in a personal combat during the Battle of Indian Creek. He was brigadier-general of the Nebraska National Guard, and served in that capacity during the Indian Wars of 1890–91. Cody then organized his 'Wild West Show,' which has periodically toured the United States and Europe. In 1901 he became president of the Cody Military College and International Academy of Rough Riders, Wyoming. He was judge-advocate-general of the Wyoming National Guard and president of the Shoshone Irrigation Company. He published *The Life of Hon. William F. Cody* (1879); *Story of the Wild West and Camp Fire Chats* (1888); *The Adventures of Buffalo Bill* (1904); *True Tales of the Plains* (1908); *Turning the Trackless Plains into an Empire* (1916). Consult *Life* by Helen Cody Wetmore.

Coe, Wesley Roswell (1869–), American biologist, was born in Middletown, Conn. He was graduated from the Sheffield Scientific School, Yale

University (1895), and studied at the University of Würzburg and in Naples. He was instructor (1896–1902) and assistant professor (1902–08) of comparative anatomy, and professor of biology (from 1909), at Yale University. He accompanied the Harriman expedition to Alaska in 1899. He published numerous papers dealing with the anatomy and embryology of invertebrate animals.

Coeducation, a term applied to the education of the two sexes in the same institution or in the same classes. As an administrative problem in education, the subject of coeducation acquired importance only toward the middle of the nineteenth century.

So far as the *elementary schools* are concerned—that is, up to the ages of twelve or fourteen—the principle of coeducation is generally accepted in the schools of the United States. While the system is not uncommon in Great Britain, it is only in universal use in Europe in Greece, Holland, Jugoslavia, Russia and Switzerland.

In the field of *secondary education,* which covers the adolescent period, the subject of coeducation appears to be more debatable, as is indicated by the varying practice in different countries. While segregation is customary in France after the 13th year, the schools of the German Republic have been largely reconstituted on coeducational lines. Those secondary schools in England and Wales administered by the Board of Education are for the most part of the segregated type, though the change over is being made by degrees. Of the thousands of private schools that exist, a large number are mixed, but even here coeducation extends only up to the age of twelve or thirteen. In addition to these day schools, coeducation in boarding schools has found a number of advocates. The Society of Friends has long favored coeducation on the ground that it reproduces the natural associations of family life. A few schools, such as the Bedales School, whose principal, J. H. Badley, is a leader in the movement, King Alfred School Society, Hampstead, Keswick School, and the St. George's School at Harpenden, are experimenting in this field.

In the United States, the public high schools are coeducational, with few exceptions. The reasons for their development are simple: the public high schools arose to meet the demands for equality of educational opportunity, and the demand for the higher education of girls was almost contemporaneous; to this was added the administrative need for economy, with the result that both sexes were admitted to the same school; further, the demand for the higher education of girls was a demand for an education identical with that for boys, rather than one suited to the needs of the female sex. One result of the coeducational system has been that 70% of the teaching staff in the public schools are women.

Coeducation in *colleges* and *universities,* unlike the practice in secondary schools, is accepted generally. It is agreed that the students have attained maturity, have a greater sense of responsibility, pursue their studies with a definite career in mind, and that preparation for professions requires the same studies of both men and women. Women enjoy equal opportunities with men in most of the European universities, but these have been won only within the last quarter of a century. In Great Britain, practically all the new universities admit women to all the faculties; while in the University of Durham and the Scottish universities there are but few restrictions. The older universities of Oxford and Cambridge, after long resistance, finally yielded to women the right to secure degrees on the same basis as men. In the United States, coeducation in colleges and universities is almost universal in the Middle Western and Western States, Oberlin College, Ohio, having led the way in 1833. In the East, coeducation has made much slower progress. Although St. Lawrence, Cornell and Swarthmore have admitted the sexes on an equality since the 1860's, Harvard, Yale and Princeton remained virtually closed to women. (See WOMEN, HIGHER EDUCATION OF.)

The discussion of the theory of coeducation centres round the secondary school period, or better, the period of adolescence from about the ages of twelve to eighteen. The objections are based largely on physiological grounds. Up to the age of twelve there are no material differences between the two sexes; after the age of eighteen those women who desire to continue their studies have definite habits and settled objects in view. During the adolescent period, however, the two sexes develop at different rates. It is no longer contended that girls are inferior to boys intellectually; the difference here is not in quantity, but in quality. Girls show greater aptitude in certain subjects, especially literary and linguistic, than boys, but tend to show inferiority in mathematics and sciences. The rate of progress of the two sexes during the period of puberty is different, with the consequent dangers from coeducation that girls who are more sensitive and conscientious in their work may suffer from overstrain in trying to keep up with the boys of their class, or that the boys may fall behind the girls and stagnate permanently. Another objection is pressed on moral grounds, but experience has not proved that there is any danger here, although it may be that in a coeducational school an intenser social life may interfere with studies.

Recently, the objections based on physiological reasons have been supplemented by others based on the changing conception of education. Not only do boys and girls during adolescence live different physical lives, but the best education is that which provides both equal and varied opportunities for development. The vocations of women differ from those of men; girls have a different bent and different tastes from boys; in some subjects their inclinations and abilities are identical. The modern educator, therefore, has shifted his ground, and his objection is no longer to mixed schools, but to mixed classes doing exactly the same work, irrespective of the different needs of the two sexes. Except in the larger cities, indeed, it is economically impossible to provide separate schools for boys and girls.

Coeducation in this sense, therefore, means the education of boys and girls side by side in the same school with due safeguarding of those physical, intellectual and social differences that are due to sex. The acceptance of coeducation to this extent admits much that its supporters have demanded; it provides for economy of expenditure on plant and equipment; it provides for the natural association of boys and girls as in the family; it provides for the intellectual and social stimulus of the two sexes, and is a safeguard against moral dangers; it prevents the development of too much femininity in girls, and too much masculinity in boys, and tends to a refinement of manners. Above all, however, it recognizes that education, to be successful, must appeal to the present inclinations and future needs of the pupil. Since differences have been established between the sexes on physiological and intellectual grounds, and since the future careers, social, civic, and vocational, of the vast majority of boys and girls will be different, that thoroughgoing system of coeducation which was established through a confusion of equal opportunities with identical opportunities of education, and in answer to a demand for democracy in education, is no longer possible.

Consult J. H. Badley's *Co-education and Its Part in a Complete Education* (1920); W. Goodsell's *The Education of Women* (1923); T. Woody's *History of Women's Education in the United States* (2 vols., 1929); U. S. Bureau of Education's *Bibliography of Current Research Studies in Education* (1928); Monroe, Hamilton and Smith's *Locating Educational Information in Published Sources* (1930); F. Engelhardt's *Public School Organization and Administration in the United States* (1931).

Coefficient. In Mathematics, if a number or an expression is the product of two factors, then either factor is called the coefficient of the other. Thus, in 3 times 2, 2 is the coefficient of 3, and 3 is the coefficient of 2. In $3ax$, 3 is the coefficient of ax, $3a$ of x, x of $3a$, and a of $3x$. In such expressions as $3ax$, the factor consisting of Arabic figures is often called the 'coefficient of the expression.' (See EQUATION.)

In Physics, a number used to measure some one of the properties of a given substance is called a coefficient. Thus, the coefficient of expansion of a substance is the amount of expansion of a body of unit magnitude due to a unit increase in temperature; the coefficient of friction is the quotient of the resistance due to the sliding of one substance on another and the pressure. If v_1 and v_2 represent the velocities of light in two substances, then the coefficient of refraction (sometimes called the *index of refraction*) is measured by the quotient $\frac{v_1}{v_2}$. If c represents this coefficient, we may write:

$$c = \frac{v_1}{v_2}, \quad \text{or} \quad c.v_2 = v_1;$$

that is, c is the number which multiplied into v_2 gives v_1. This example shows the reason for the use of the mathematical term coefficient in Physics. (See HEAT; FRICTION; LIGHT.)

Coehoorn, kōō'hōrn (COHORN), MENNO, BARON VAN (1641–1704), Dutch military engineer, was the successful rival of the French Vauban. He distinguished himself in many important engagements, among others at Maastricht and Graave, and especially at the sieges of Namur (1692–5), where Vauban and he were pitted against each other. He was subsequently engaged at the siege or capture of Venlo, Stevensworth, Roermond, Liége, Kaiserswerth, Bonn, Huy, Limburg, during the wars against the French (1701–4). The fortifications of Breda, Namur, and Bergen-op-Zoom were his work. He was the inventor of the small portable mortar called the coehoorn.

Cœlenterata, sē-len'tėr-ā'ta, a division of invertebrate animals, including such common forms as Corals, Sea Anemones, and Jelly-Fish. The Cœlenterata do not possess an alimentary canal as distinct from the general cavity of the body, whence their name ('hollow-bodied'). They have radial or flower-like symmetry, and the mouth is typically surrounded by hollow outgrowths or tentacles, which bear the characteristic stinging cells (q. v.). Two types of structure occur, often in the same life history: the *polypoid* type, represented in the sea anemone, and the *medusoid* type, represented in the jelly-fish. In various groups the polyp type develops a skeleton of lime, and thus forms coral (q. v.), while there is frequent budding, resulting in the formation of a composite colony. When, as in the sea firs, a colony of polyps produces buds which become free swimming and float away as medusoids, whose function is to produce eggs from which a new polyp colony may arise, the life history is said to include *alternation of generations* (q. v.). Almost all the Cœlenterates inhabit the sea, while the few that occur in fresh water exhibit modifications which show that this habitat is a secondary one.

The three main classes of the Cœlenterata are: (1) Hydrozoa, (2) Scyphozoa, and (3) Ctenophora; and the first two of these contain a considerable variety of organisms. In the *Hydrozoa,* the simplest forms, are included the Sea Firs and their liberated swimming bells or medusoids, abundant in surface water in the summer; the little fresh-water Hydra; the tropical Millepores, which form corals, together with other forms; and the beautiful Siphonophores, such as the Portuguese Man-of-War, which are free-swimming colonies found in warm seas, where they are remarkable for their stinging power. In the *Scyphozoa* are included the true Jelly-Fish and the Sea Anemones, with their very numerous allies, including the Stone or Reef Corals, the Sea Pens (*Pennatula*), 'Deadmen's Fingers' (*Alcyonium*), and others. The *Ctenophora* include only free-swimming forms, such as Beroë and Cydippe, and by many zoologists are now no longer included among the Cœlenterata.

For further information, see the articles ALCYONARIA; CORALS; CTENOPHORA; HYDROZOA; JELLY-FISH; PENNATULA; POLYP; PORTUGUESE MAN-OF-WAR; SEA ANEMONE; ZOOPHYTE.

Cœlestines. See CELESTINES.

Coele-Syria, sē'li-sir'i-a ('Hollow Syria'), now called by the natives *El-Bukâ'a*, or *Beka'a,* 'the deep plain,' a valley of Syria, extending between the ranges of the Lebanon and Anti-Lebanon. It is 1,706 feet above the sea, and is watered by the Orontes (now El Asi). Above the valley stand the ruins of Baalbek (q. v.).

Coello, CLAUDIO (?1621–93), last of the great Spanish painters of the seventeenth century, was born in Madrid. He was influenced by Titian, Rubens, and Van Dyck. Becoming (1684) court painter to Charles II, he executed decorative work in the Escorial, his paintings bespeaking anxious care and unsparing labor, and having something of the richness of tone of Murillo with the fascination of Velasquez. His frescoes, hastily executed, do him less justice. Charles' choice of Giordano to paint the grand staircase in the Escorial marks the decline of Spanish art, and brought on Coello's death through disappointment. His masterpiece is an altar piece in the Escorial, of great power and splendor.

Cœlostat. See SIDEROSTAT.

Cœnobites, sē'nō-bīts, monks living as members of a community, as opposed to the *anchorites* or *hermits* (qq. v.), who led solitary lives. See MONASTICISM.

Coercion Acts. See IRELAND, *History.*

Coercive Force. See MAGNETISM.

Cœur d'Alene, kûr dȧ-lān', city, county seat of Kootenai county, Idaho, on Cœur d'Alene Lake, the Cœur d'Alene, St. Joe, and Spokane Rivers, and the Cœur d'Alene and Pend d'Oreille, the Northern Pacific, and the Chicago, Milwaukee, and St. Paul Railroads; 33 miles by rail east of Spokane. It is the seat of Cœur d'Alene College and a Catholic Academy, and manufactures lumber, ties, shingles, and bricks. Pop. (1930) 8,297.

The ***Cœur d'Alene District*** is a resort for sportsmen, and contains important silver deposits. The mines have been the scene of severe labor troubles, and forest fires occurred in the district in 1910. See IDAHO, *History.*

Cœur d'Alene, Lake, Idaho, situated among wild mountains in Kootenai county. It is only

MAY 26 1939

about 2 miles in width, but extends for about 30 miles north and south with one sharp bend toward the east.

Coffee, as known in commerce, consists of the seeds of two species of a small tree or shrub, the *Coffea arabica* and the *Coffea liberica*. Originally introduced from Kaffa, Abyssinia, where it grows wild, an infusion of the seeds or leaves of the coffee tree has been used as a beverage from time immemorial. It was taken into Arabia at the beginning of the fifteenth century, and a hundred years later came into favor in Constantinople. About the middle of the seventeenth century it was introduced into England by a merchant from Smyrna. As a cultivated crop it reached America from the French plantations in Martinique, and thence spread rapidly over the warmer sections of the hemisphere. It is now extensively grown in India, Ceylon, Java, the West Indies, Central America, Mexico, Venezuela, Colombia, and particularly in Brazil, where it forms two-thirds of the export trade.

Coffee

A. Berry, cut to show seeds.

The plant belongs to the botanical order Rubiaceæ, which also includes Peruvian bark and ipecacuanha. Its successful culture requires a moist, tropical atmosphere, a rainfall of from 100 to 150 inches, or its equivalent in irrigation; an equable temperature with a minimum of 60° to 70°; and an altitude of from 1,000 to 3,000 feet, depending upon the latitude. The Liberian species is hardier, and thrives under exposure to the sun at low elevations, where for *C. arabica* shade trees must be supplied. Coffee may be grown in a great variety of soils, but those containing a large amount of humus and those of volcanic origin are preferred. Coffee plants are usually raised from seed, but sometimes from layers, and are cultivated for the first six months in nurseries, after which they are transplanted. They begin bearing in the second or third year, but do not arrive at full bearing age until the fifth season, continuing with profitable crops of about 700 pounds per acre until thirty years old.

The coffee tree is a slender evergreen, reaching naturally 20 feet in height, but usually pruned to a pyramidal form of from 6 to 10 feet high. It flowers for about eight months beginning in September, bearing dense clusters of fragrant white blossoms at the axils of the leaves. The flower is followed by a small red fruit, resembling a cherry or cranberry, beginning to ripen in June. Each fruit contains two seeds or beans, their flat sides together, enclosed in a soft, whitish pulp. They are covered with a semi-transparent membrane known as 'parchment,' and, within this, by a thin tissue known as 'silver skin.'

When ripe, the fruit is gathered (usually three times a year), and subjected to washing and soaking for some hours in tanks of water to soften it, after which the pulp is removed by machinery. The berries are then allowed to undergo a certain fermentation and subsequent washings until quite clean of pulp, and are dried in the sun. The final stage in the preparation consists in removing the parchment skin by running the beans through a mill under very light pressure, breaking the parchment, which is winnowed out. This may be done on the estate or the beans may be sent to dealers and shippers as 'parchment coffee.' A 'dry method' is also in use by some growers, the fruit being spread out to dry immediately upon being gathered, and the dried pulp removed in the mill by crushing and winnowing.

Before being used for the beverage known as coffee, the beans are roasted, the best temperature being 210° F., and ground. Roasting changes some of the sugar into caramel, darkens the color, and develops a characteristic aroma. The beans lose weight, owing to water being driven off, and there is also a slight loss of the active ingredient, known as caffeine (q. v.).

There are several methods of making coffee. The older method is by boiling or steeping; some cooks using cold water and bringing the infusion to the boiling point, others starting with boiling water and allowing the infusion to boil for ten or more minutes. A second method is by the use of a coffee percolator, a special pot with a strainer at the top to hold the coffee, over which the water is forced by means of a central tube. Still a third method is used for what is known as 'drip' or 'filtered' coffee; this is prepared by pouring boiling water slowly through finely ground coffee which has been placed in a square or bag of linen or coarse cotton. Special drip coffee pots, known as tricolators, are on the market. Turkish coffee is a thick, sweet decoction made with pulverized coffee, the finely powdered coffee being allowed to remain in the infusion. *Café au lait* consists of equal parts of hot coffee and scalded milk.

Coffee is a stimulant to the heart and nervous centres. It increases the activity of the skin and kidneys, and in some persons acts as a mild aperient. It often removes the sense of fatigue, and the milk and sugar usually added are of nutritive value. In excess it may act as a poison, producing toxic symptoms, such as tremor of the muscles, nervous dread, and palpitation of the heart. These injurious effects are attributed to its caffeine content. Recently 'decaffeinized' coffee, from which practically all the caffeine has been removed, has been widely advertised. Coffee is an antidote to poisoning by opium and alcohol.

Ground coffee is subject to adulteration—roots of dandelion, carrots, beans of various sorts, rice and other cereals, and seeds of several kinds being used. The mixture with chicory cannot always be called an adulteration, for the flavor and body thus added to the beverage are favored by many consumers. There are many coffee substitutes in the market, most of which are prepared from cereals.

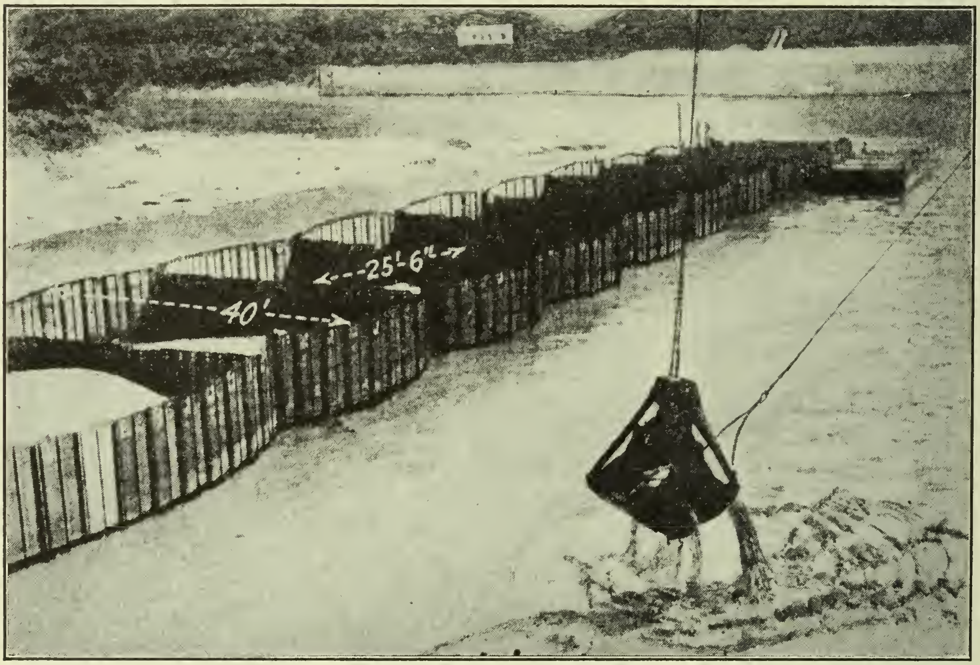
In the markets, coffee is classified under such names as Rio, Santos, Maracaibo, Java, Mocha, etc.; but these names are used indiscriminately, any mild-flavored coffee being called Java. The original Mocha came from Arabia; it now comes from Brazil. Most of the differences in flavor depend upon the skill exercised in the roasting process.

Coffee-houses, places of refreshment partaking somewhat of the character of the modern club. The first city in which coffee-houses are known to have existed is Cairo. In the latter part of the sixteenth century they were established in Constantinople, and from there the knowledge of them was carried to the court of Louis XIV by the ambassador of Mohammed IV. The first coffee-house in England, according to Wood, was opened at Oxford by Jacobs, a Jew, in 1650, although Oldys maintains that 'the use of coffee in England was first known in 1657.' Two years later, as Oldys says, the first coffee-house was opened in

London by 'one Pasqua Rosee, a Ragusan youth,' whom a Turkish merchant had brought from Smyrna to prepare the beverage for him. Coffee-houses shortly afterward came to be places of popular resort—too popular in the time of Charles II, who made vain endeavors to repress them as harboring characters suspected of treason. One of the most noted was Garraway's, in Change Alley, where tea was first sold in England, and which was much frequented during the South Sea Bubble. Other famous houses were Jonathan's, close to Garraway's; the Rainbow, in Fleet Street; Nando's; Dick's; Lloyd's, which Steele patronized, and from which sprang Lloyd's 'Subscription Rooms'; the Jerusalem, with a news-room; Don Saltero's, in Cheyne Walk, celebrated in the *Tatler;* the great Whig house, the St. James', where originated Goldsmith's *Retaliation;* the British, in Cockspur Street, long a house of call for Scotsmen; Wills', which Dryden made the great resort of the wits of his time, and which was the open market for libels and lampoons; Button's, patronized by Addison and Pope; Tom's, frequented by Garrick.

Cofferdam, a construction made use of by engineers for the purpose of temporarily excluding natural waters from the site chosen for the foundation of some permanent structure within their basin. The water enclosed within the cofferdam as it is built, is pumped out, leaving the earthen or rock bottom measurably dry for the building operations. A cofferdam usually consists of two (or more) distinct rows of piles driven close together in the rows, with the rows at least 10 feet apart, if the height from the bottom to the water surface is not greater than 10 feet; and where the depth of water is more than that figure, one foot additional in thickness should be added for every excess foot in height, e.g., a depth of 20 feet of water calls for a cofferdam 15 feet in thickness. As the two rows of piling are driven, they are braced across at the top from one to the other with heavy timbers, called 'wales,' which are secured by substantial bolts. Finally, the space between the two rows of piles is filled with clay, which is puddled down to a solid mass with as little water as will wet up the clay sufficiently. As a rule, a platform or deck is laid on top of the cofferdam, and for the support of this, other cross timbers reach from one row of piling to the other.

The term 'pile,' when applied to cofferdams has the specific meaning attaching to sheet-pile, which is of flat make-up, and when of wood usually of oaken plank one inch thick and of two widths, so spiked together as to form tongue-and-groove timbers three inches thick, which fit upon each other along the edges, with a lap of one-and-one-half inches. They are sharpened flatways, to an angle of 45 degrees, and fitted with a movable block of iron to forestall splitting when hit by the driving hammer. These wooden sheet-piles are rarely used in water exceeding a depth of 15 feet. Where the depth of water to the level of the excavation within the cofferdam is unusually large, and the pressure near the bottom is consequently great, a third row is sometimes driven at the same distance as that between the first two rows to serve as a strengthener. This third row is generally from one-fourth to one-third lower in height, and may be wholly beneath the level of the natural water, being driven to that depth by dropping the hammer of the pile driver on a movable strut held upon the pile. The filling between this row and the clay-puddled pair is usually broken rock or large gravel to



Progressive cofferdamming for long, low dam, on the Allegheny River Navigation project, carried across the river from one shore to the other in five successive steps, transplanting the cofferdam with the completion of each of the five sections.

oppose a higher weight resistance. In pulling the piles out after they have served their purpose, it is customary to pull them one by one sideways so that the tongue is partially released from the next groove, surround them with a loop of chain, and then to hoist them out with a derrick.

When the water is more than 15 feet deep, a sheet-piling made of steel plate five-eighths of an inch thick is generally in use. These steel plates are 18 inches in width, with edges so formed as to interlock, and may be had up to 50 feet in length. They are driven with the expanded edge fixed in the shaped run and kept in an upright position while being hammered down. A deviation from this usual practice will be made when the eventual bottom of the planned excavation proves to be of rock. The cofferdam in that case is built of timber, braced at all angles to preserve its shape, the lower edge fitted to the face of the rock so that the sides of the cofferdam stand vertically. In these cases it is not unusual to fill within the dam to a level floor the lower part of the rock on which the work is to be built with a mass of concrete gently let down through the water, the rock bottom being made rugged with steel spike-bars let into the rock to prevent sliding—these bars reaching up through the deposited concrete. Where the bottom of the deep water is of penetrable soil, it is usual to construct the cofferdam of a single thickness of steel sheet-piling driven against the outward side of a row of large wooden cribs filled with rock, the size of these cribs being calculated so that the weight of the rock is enough (and a little more) to withstand the thrust of water inward at the depth where it must act to stabilize the wall of piling when the enclosed water is pumped out from the occupied area. It is not unusual to have such cribs constructed at capable shipyards at some distance from their intended use, to be sunk and filled with rock—and this with a large saving of expense.

The use of the cofferdam forms a substantial part of the current history of some of the most notable engineering works under construction. The most impressive instance has been the immense structure across the Columbia River at Grand Coulee dam. The space enclosed was 60 acres of river bank and bed. Built of wood and metal from both banks, the units were framed so that two cofferdams were used, with a central connecting part to finish, the latter of timber.

Probably the most intensive examples of cofferdamming were those shown in the Tennessee River developments. At Pickwick Landing, the cofferdam consisted of twenty-four 59-foot cells and two connecting cells each of 41 feet in diameter, driven through ten to fifteen feet of gravel overburden to the flat rock underlying the site. The main cells were 62 feet between centers and were connected with arched segments of ten piles each. Upper and lower cutoff walls, totalling about 800 feet long were driven to rock—to seal the land ends. All piling was of 15-inch flat-web, interlocking steel sheeting, weighing 38.8 pounds to the foot, and averaging 51.3 feet in length. The piling on the river side was about 55 feet high—to the rock bed; that on the land side was 50 feet. All cells and connecting arched web-sections were filled to elevation by hydraulic dredging.

See Caissons; Dams; Dredging; Piles and Pile Driving.

Richard Ferris,
Consulting Engineer.

Coffer Fish, Trunk Fish, or Box Fish, a name applied to certain tropical and subtropical fish, of the genus *Ostracion*, remarkable for the hard shield or carapace with which the body is covered, which is made up of six-sided scutes joined together in a mosaic.

Coffeyville, city, Kansas, Montgomery county, on the Verdigris River, and on the Atchison, Topeka and Santa Fe, the Missouri, Kansas and Texas, four branches of the Missouri Pacific Railroad, and the Union Traction (electric) line; 110 miles s.w. of Fort Scott. It is located in the natural gas and oil field of Kansas, is an important shipping point for grain, and has railroad shops, a cotton gin, and manufactures of cars, lumber, iron, chemicals, oil, brick, flour and meal. Pop. (1930) 16,198; (1938) 17,565.

Coffin (Lat. *Cophinus*, Gr. *Kophinos*), coffer, chest, basket. The modern coffin, known in many civilized countries as casket, the receptacle in which human bodies are displayed at funeral services and interred. Metal and concrete vaults are now used to enclose caskets to make them more impervious to the elements.

Back as far as recorded time gives evidence humans protected their deceased in differently fashioned receptacles. Among the first coffins were split and hollowed tree trunks, baskets of woven fiber or enclosures of baked clay.

Coffins are now made of selected woods, iron, brass, bronze, copper and other fabricated metals. Some of the cheaper caskets are cloth covered. All are lined with materials corresponding to their value.

In ancient Egypt coffins of *papier maché* or clay, baked around mummified remains took on the form of the bodies they encased, undoubtedly influencing the shape of the old-fashioned coffin. In Rome coffins were made of stone. Limestone quarried in Assos, Troas was used in building the famed sarcophagi. It was believed that this stone entirely consumed the remains, excepting teeth, in forty days. Sarcophagus means eater of flesh. (Gr. sarx, flesh+phagein, eat). Both burials and cremation took place in earliest times. Some tribes of North American Indians practised cremation. Other tribes used canoes and the shells of huge turtles as coffins.

In Great Britain and Scandinavian countries coffins have been used since ancient times. The earliest form, a roughly built enclosure for the body or grave vault was called kistvaen. From the ninth century to the reign of Henry III people of the higher classes were buried in stone coffins. Those of lesser station were merely wrapped in cloth before being consigned to the grave.

One ancient custom of leaving the history of the deceased in hieroglyphics upon coffins and tombs is followed today by enclosing metal cylinders, in caskets, containing brief records of the departed. Mass production methods are now used in the manufacture of caskets which forms one of the world's important industries. See Burial; Burial Customs.

Evan B. Johnson.

Coffin, Charles Albert (1844–1926), American financier and president of the General Electric Company, was born in Somerset county, Maine, and began his business career manufacturing shoes in Lynn, Mass. Together with a group of Lynn industrialists he was instrumental in purchasing the American Electric Company of New Britain, Conn., in the 'eighties of last century. Electricity was then in its infancy, and the company stood on the verge of bankruptcy. Under the able management of Coffin other languishing industries were bought out or amalgamated, resulting in the great General Electric Company (q. v.).

The Charles A. Coffin Foundation was established by the General Electric Company in 1922. A sum of $400,000 was set aside, the income from which, estimated at $20,000 per year, is used to encourage and reward outstanding achievements in pure science and electricity by the award of fellowships for research work.

Coffin, Charles Carleton (1823–96), American journalist, was born in Boscawen, N. H., was occupied as a surveyor and telegrapher in youth, and installed the first electric fire-alarm system in Boston. He was engaged in journalism in Boston from 1855 until the opening of the Civil War, when he went to the front as correspondent for the Boston *Journal*. His letters in this paper, appearing over the signature 'Carleton,' first brought him into prominence. He reported the war between Austria and Prussia in 1866, and the Paris Exposition of the following year. After 1870 he served several terms in the Massachusetts State legislature. He published two notable war stories for boys, *Following the Flag* (1865) and *Winning His Way* (1865), and several historical books, including lives of Lincoln and Garfield.

Coffin, James Henry (1806–73), American meteorologist, was born in Williamsburg, Mass. He was graduated in 1828 from Amherst, and the following year organized in Greenfield, Mass., a boarding school for young men, which in 1832 developed into the first manual-labor school in the United States. While a tutor at Williams College (1840–43), he erected an observatory with self-registering instruments on Mount Greylock. From 1846 until his death he was professor of mathematics and astronomy in Lafayette College, Pa., and there conducted the investigations upon which rests his reputation as a meteorologist.

Coffin, William Anderson (1855–1925), American painter and author, was born in Allegheny, Pa. He was graduated from Yale (1874), and studied art at that university and under Léon Bonnat in Paris, exhibiting at the Salon several times. Returning to the United States in 1882, he maintained his studio in New York. His specialties were landscape and figure paintings, for which he received several prizes and medals at expositions. From 1886 to 1891, and in 1903–4, he was art critic of the New York *Evening Post* and the *Nation*, and from 1896 to 1900 of the New York *Sun*. He was director of fine arts at the Buffalo Exposition (1901–3).

Cogalniceanu, Michael (1817–91), Roumanian historian and statesman. He wrote *Histoire de la Valachie et de la Moldavie* (1837), and, returning to Moldavia, founded, with Alexandri and Negruzzi, *Dacia Litterara* and other publications, by which he awakened the national conscience and helped to prepare for the revolution of 1848. An earnest advocate of the union of the principalities (Wallachia and Moldavia), he became prime minister under Prince Cuza in 1859, and helped him to introduce the democratic legislation of 1864. During the reign of King Carol I he was minister of the interior, and represented Roumania at the Congress of Berlin. He also published *Cronicele Romaniei* and *Esquisse sur les Tziganes*.

Coghlan, Charles Francis (1841–99), Irish-American actor and dramatist, was born in Paris, France. He received his education in that city and in London. Though intended for the bar, he early adopted the stage, making his first appearance at the Haymarket Theatre, London, as Mafoi in *The Pilgrim of Love* (1860). He played with increasing success in London and provincial cities until 1869, from which year until 1875 he was a member of the Bancroft stock company of the Prince of Wales' Theatre. His first appearance in New York was in Augustin Daly's company as Alfred Evelyn in *Money* (1876), from which time, for many years, he was one of the most popular leading men in the United States.

Coghlan, Joseph Bullock (1844–1908), American naval officer, was born in Frankfort, Ky. He was graduated from the U. S. Naval Academy in 1863. He commanded the *Raleigh* on the Asiatic station in 1898, and took part in the battle of Manila Bay, the *Raleigh* firing the first shot. He was the commander of the subsequent expeditions to reduce the batteries at the entrance to Manila Bay, and in the capture of the Isla Granada at Subig Bay. He was made rear-admiral in 1902, and was in command of the North Atlantic Station (1902–3). He was commandant of the Brooklyn Navy Yard in 1904–7, although retired in 1906.

Coghlan, Rose (1851–1932), Irish-American actress, sister of Charles F. Coghlan (q. v.), was born in Peterborough, England. She received her initial training for the stage at the Theatre Royal, Cheltenham, of which she became leading lady. She played in comedy and farce in London and provincial theatres until her first appearance in New York, with Lydia Thompson, in 1872. She afterward played with E. A. Sothern and with Barry Sullivan in London. Returning to the United States in 1877, she was leading lady at Wallack's Theatre, New York, until 1889. During this engagement her brother Charles was leading man for one season, and subsequently (1891) they toured the country in his play, *Lady Barter*. She afterward played leading parts in various companies in America and England, and appeared also in vaudeville.

Cognac, town, southwestern France, in the department of Charente, on the River Charente; 25 miles N.W. of Angoulême. It is built on a hill crowned by the old castle where Francis I was born in 1494. The town is a center of brandy production, giving its name to the famous Cognac brandy. Many of the inhabitants are engaged in cooperage and bottle works, and there is trade in cattle and grain. In Cognac was concluded (1526) the Holy Alliance between Francis, Henry VIII of England, the Pope (Clement VII), and the Duke of Milan against Charles V of Germany. Pop. 17,452.

Cognates, an ancient civil-law term denoting collateral relations through the female line. They did not have the same rights of inheritance as the *agnates* or realtions through the male line, though special provision was made for them in this respect in certain cases. This term is seldom employed in law at present, as the above distinction has been practically abolished in most jurisdictions. See Agnates.

Cognition, the act of knowing or becoming discriminatingly conscious of—either as to an object or an abstract truth. In a strict psychological sense, it is the presentation of an object by any means to the conscious understanding. See Metaphysics.

Cognizance. See Badge.

Cogs'well, Joseph Green (1786–1871), American bibliographer, was born in Ipswich, Mass., and was graduated from Harvard (1806). He was professor of geology and librarian at Harvard (1820–3), and conducted the Round Hill School at Northampton, Mass. (1823–36). He was then editor of the New York *Review* for several years. From 1848 to 1861 he was superintendent of the Astor library in New York, and collected the books for that institution and prepared its catalogues. Consult Ticknor's *Life*.

Cog Wheel. See Gearing.

Co'han, George M. (1878–[illegible]), American playwright, producer and composer, was born in Providence, R. I. He began his stage career when nine years old, and at twelve played the title rôle in *Peck's Bad Boy*. In 1901 he began appearing in plays written by himself. *The Gover-*

2 6 193

nor's Son and *Running for Office* were followed by *Little Johnny Jones* (1904), *Forty-five Minutes from Broadway* (1905), *George Washington, Jr.* (1907), *Fifty Miles from Boston* (1907), *The Talk of New York* (1908), *Get-Rich-Quick Wallingford* (1911), *Seven Keys to Baldpate* (1913), *The Miracle Man* (1914), *A Prince There Was* (1919), *Little Nellie Kelly* (1922), *The Rise of Rosie O'Reilly* (1923), *The Song and Dance Man* (1923), *American Born* (1925), *The Baby Cyclone* (1927), *The Merry Malones* (1927), *Billie* (1928), *Gambling* (1929), *I'd Rather Be Right* (1937). Among his many songs are *Give My Regards to Broadway; So Long, Mary; Yankee Doodle Boy; Nellie Kelly, I Love You;* and the popular war song, *Over There.* Died Nov. 5, 1942.

Cohas'set, town, Massachusetts, Norfolk county, on the Atlantic coast, and on the New York, New Haven, and Hartford Railroad; 20 miles southwest of Boston. It is a favorite summer resort. Pop. (1930) 3,083; (1935) 3,418.

Coherer. See ELECTRO-MAGNETIC WAVES; WIRELESS TELEGRAPHY.

Cohesion is the molecular force that holds together the particles of solids or liquids. In solids it is measured by the tensile stress under which they break. After rupture, as the molecular force acts only over the very minutest distance, cohesion cannot be restored without reuniting the solid by such a process as fusion; though some fraction of it may be recovered by making the surfaces a very perfect fit and pressing them in contact. Thus, if two plane and bright surfaces of lead or copper are brought together, it requires considerable force to separate them; while the adhesion of materials glued together, or when deposited in contact, as in electro-plating, is of the same nature.

Cohesion of liquids is less marked than that of solids, and is of two kinds—(1) that due to the skin action, to which such phenomena as the formation of drops, etc., are due (see SURFACE TENSION); and (2) the cohesion throughout the mass of the liquid, which, though difficult to observe, will resist considerable stress. See SOLIDS; LIQUID; STRENGTH OF MATERIALS.

Cohn, ADOLPHE (1851–1930), French-American educator and writer, was born in Paris, France. He was graduated from the University of Paris (1868), and served as a volunteer in the Franco-German War (1870–1). He came to the United States in 1875, taught French at Columbia and Harvard Universities, and in 1891 became professor of Romance languages and literature at Columbia. He was editor of the Silver series of modern language text-books, and of *French Classics for English Readers.* He contributed to various American and French magazines, and wrote, in collaboration with others, *Voltaire's Prose* (1897), *Le Sage's Gil Blas* (1889), and *Montaigne* (1907). After retiring from his professorship he was for several years the representative in America of the War Library and Museum of the French Government. He founded the Alliance Française de New York in 1898.

Cohn, kōn, FERDINAND JULIUS (1828–98), German botanist, was born in Breslau. He was educated at the universities of Berlin and Breslau, and appointed extraordinary professor of botany in the latter in 1859, and full professor in 1871. He was among the first to carry on investigations into plant life and animal cells, and made many important discoveries concerning the lower forms of life. He may fairly be termed the founder of bacteriology, having in 1854 established the fact that bacteria are plants. He received the gold medal of the Linnæan Society in 1895. His principal published works were *Empusa Muscæ* (1854); *Zur Naturgeschichte des Protococcus pluvialis* (1851); *Untersuchungen über die Entwickelungsgeschichte der mikroskopischen Algen und Pilze* (1854); *Neue Untersuchungen über Bakterien* (1872–5). Consult *Memoir* by his wife.

Cohoes, kō-hōz' (Indian CHAHOOS), city, New York, Albany county, on the west bank of the Hudson River, at the mouth of the Mohawk River, and on the New York State Barge Canal, and the New York Central, and the Delaware and Hudson Railroads; 9 miles north of Albany. Electric power is developed from a large storage dam above the falls (75 feet) in the Mohawk River. Cohoes is a flourishing manufacturing city, noted particularly for its manufactures of knitted goods of cotton, wool, and worsted. It also manufactures collars, shirts, textile, soaps, boats, rayon, paper and paper boxes, and has tube works and machine shops. Cohoes was settled by the Dutch about 1665, was incorporated as a village in 1848, and received its city charter in 1870. Pop (1920) 22,987; (1930) 23,226.

Co'hort, a division of the Roman legion, containing originally 600 men, divided into six centuries, with a *vexillum,* or standard-guard. In every legion there were ten cohorts. See LEGION.

Co'hosh, Black (*Cimicifuga racemosa*), commonly known also as *black snakeroot,* is a medicinal plant belonging to the ranunculus or crowfoot family. It grows in cool, moist woods to a height of from three to eight feet, blooming in the summer with tall, wand-like spikes of feathery white flowers, sometimes three feet in length. The extract of the root is used for rheumatic affections. Among the Indians it is used for snake-bite.

Coif, the close-fitting cap of white lawn or silk, originally worn by sergeants-at-law. It was formerly the custom to wear a small skull-cap of black silk or velvet over the white coif; later the coif was represented by a small round patch of black silk edged with white, worn on the crown of the wig.

Coil, Induction. See ELECTRICITY, CURRENT.

Coimbatore, kō-im'ba-tōr', or KAYAMBATUR, capital of the fertile Coimbatore district, Madras, India, 85 miles southeast of Calicut. It has important textile manufactures, and produces sugar and coffee. It has two colleges, also schools of agriculture and forestry. Commanding the Palghat Gap and the Gazalhatti Pass, it is an important military post. Pop. (1931) 95,198.

Coimbra, kō-ēm'brä, a district of Beira, Portugal, stretching from the Serra da Estrella to the Atlantic. Area, 1,508 sq. m. Pop. (1930) 387,808.

Coimbra, city and episcopal see, Portugal, capital of the province of Beira, on the Mondego, 110 miles northeast of Lisbon, and 75 miles by rail southeast of Oporto. It is divided into two parts, the older Upper Town which still has a mediæval aspect, and the modern Lower Town lying along the river banks. The most notable buildings and institutions are the university, founded in 1290, and having a famous library of 100,000 volumes; the Church of Santa Cruz with its tombs of the first Affonsos; the Bishop's Palace, now a ruin; the old cathedral of twelfth-century architecture, and the ancient convent of Santa Clara, partly in ruins. There are also a botanical garden and an observatory. Pottery, linen, and wool are manufactured. Several Portuguese sovereigns held their court in Coimbra from the twelfth to the fifteenth century, and here Inez de Castro, beloved of Pedro the Cruel, was murdered (1355). Pop. (1930) 27,333.

Coin, ko-een', town, Spain, in the province of Malaga, finely situated on the northern slopes of the Sierra de Mijas; 20 miles s.w. of Malaga. It is known as the 'Garden of Andalusia,' and is set in the midst of orchards, vineyards, and gardens of great luxuriance. There are numerous rapid streams, partly utilized for mills, and quarries of marble and jasper in the adjacent hills. The chief exports are fruit, grain, cattle, and white marble. Textiles of linen and wool, wine, and oil are manufactured. Pop. about 12,000.

Coin'age, the making of coins for use as money; also the money so made. The right of coinage is usually a prerogative of the state, the purpose of the exclusive exercise of this right by the government being to provide coins that are of guaranteed uniformity in weight and fineness, easily cognizable, and so constructed as to prevent counterfeiting, clipping, and abrasion. The metallic money of a nation includes two classes: (1) The standard coinage, consisting of those coins which are made in unlimited quantities for persons who deposit bullion, and which are full legal tender for all debts. (2) The subsidiary coinage, consisting of those coins, usually of smaller denominations, which the government makes in limited amounts, and sells to individuals for more than bullion value for use in small transactions, and which are usually of limited legal-tender power.

In the United States, Art. I. Sec. 8 of the Federal Constitution gives Congress the exclusive right to coin money and regulate the value thereof. The first coinage act, that of April 2, 1792, provided for coins of gold, of silver, and of copper. The silver dollar of 371¼ grains of pure silver and 44¾ grains of alloy was made the unit of value. Gold coins were authorized as follows: the eagle, containing 247½ grains of pure gold and 22½ grains of alloy, equal in value to ten silver dollars; the half-eagle, and the quarter-eagle. Other coins authorized were the half-dollar, quarter, dime, and half-dime, containing respectively 185⅝, 92 13/16, 37⅛, and 18 9/16 grains of pure silver plus a suitable amount of alloy; and the cent and half-cent, containing respectively 11 and 5½ pennyweights of copper. This act made both gold and silver coins legal tender. From 1793 to 1857 the coins of various foreign nations were, at different times, accorded the legal-tender privilege owing to the scarcity of metallic money in this country.

Gold, being undervalued, as compared with silver, by the established ratio of 15:1, left the country as fast as coined; and since the silver dollar of 371¼ grains was lighter than the Spanish dollar, which it resembled, brokers sent it to the West Indies, where it readily passed for that coin. In order to avoid operating the mints for the profit of these brokers, coinage of the dollar was suspended from 1806 to 1836. In 1834 Congress attempted to adjust the relation of gold to silver by reducing the pure gold content of the eagle to 232 grains, and that of the half-eagle and quarter-eagle in proportion, thus establishing the approximate ratio of 16:1. In 1837 the amount of alloy in all gold and silver coins was fixed at one-tenth. In order to prevent the exportation of minor silver coins, Congress in 1853 reduced the weight of the half-dollar to 192 grains nine-tenths fine, and the weight of the smaller coins in proportion. The legal-tender power of these token coins was limited to amounts not exceeding five dollars.

In 1873 the gold dollar containing 25 4/5 grains nine-tenths fine was made the unit of value, while the silver dollar, which was not in circulation, and of which only $8,031,238 had been coined since the act of 1792, was omitted from the list of authorized coins. In 1878, however, owing to the silver agitation, the Secretary of the Treasury was authorized to buy not less than $2,000,000 nor more than $4,000,000 worth of silver monthly, and to coin the same into standard silver dollars, whose legal-tender power was again declared to be unlimited. By the act of July 14, 1890, the Secretary was authorized to purchase 4,500,000 ounces of silver monthly, to be paid for in treasury notes. The bullion, when coined, was to be used to redeem the notes.

Succeeding financial and monetary disturbances, attributable in part to these provisions, caused their repeal (Nov. 1, 1893); but in 1898 provision was again made for coining the accumulated bullion for the purpose of retiring the Treasury notes of 1890. The coinage of the silver dollar has practically ceased in recent years. By the act of Jan. 14, 1900, the gold dollar was declared to be the 'standard unit of value' of the monetary system of the United States; but the obligation is placed upon the Treasury of maintaining the silver dollar at a parity of value with gold.

On April 5, 1933, President F. D. Roosevelt issued an Executive order requiring all persons to deliver, on or before May 1, 1933, to stated banks 'all gold coin, gold bullion and gold certificates' held by them, with certain exceptions, the holders to receive 'an equivalent amount' of other forms of coin or currency. This measure removed from circulation the double-eagle, the eagle, half and quarter eagles.

The metallic money of the United States consists of (1) the silver dollar; (2) smaller silver coins, half-dollars, quarter-dollars and dimes; (3) the nickel five-cent piece and the bronze cent. See Currency; Dollar; Minting; Tender.

Coin Collecting. See Numismatics.

Coir, the fiber of the husk of the cocoanut, used in the manufacture of cordage, matting, etc. Coir is obtained by soaking the husk of the cocoanut in water for several months, when it is beaten with a stick and rubbed, until the connecting tissue is completely separated from the fibers. For maritime purposes coir rope is useful, as the fibers are improved and strengthened by immersion in sea-water. A coir cable has the peculiarity of making a curve upward between the vessel and the anchor, while a cable of hemp curves downward. See Cocoanut.

Coire (German *Chur,* or *Cur;* Rumonsch, *Cuera*), capital of the Swiss canton of the Grisons, the *Curia Rhætorum* of the Romans, on the Plessur, in the valley of the Upper Rhine. The old part of the town, partially walled, is still very quaint and mediæval. It has an old Romanesque cathedral, partly of the eighth century, an ancient chapel, and a library of 80,000 volumes. The meeting point of routes through several Italian passes, it is an active trading center. It stands (alt. 1,952 ft.) 74 m. by rail southeast of Zürich; in summer it is much frequented by tourists. The bishop's see dates from the fourth century. Pop. 15,600.

Coit, James Milnor (1845–1925), American educator, was born in Harrisburg, Pa., and was graduated (1865) at Hobart College. From 1873 to 1875 he was general manager of the Cleveland Tube Works. In 1876 he became master of mathematical sciences at St. Paul's School, Concord, N. H., and was made vice-rector of the same school in 1904. He was acting rector in 1906. Dr. Coit invented a number of new appliances in chemical apparatus, and published *Manual of Chemical Arithmetic* (1886); *Qualitative Analysis* (1895); *Treatise on the X-Rays* (1897); *Liquid Air* (1899). In 1909 he went to the University of Munich to engage in research work.

Cojedes, a state of Venezuela, created in 1909 when the republic was redivided under a new constitution. It embraces 5,713 sq. m., and its great plains are devoted chiefly to the raising of cattle, horses, and mules, and to general agriculture, mainly cotton and sugar. Its capital is the ancient city of San Carlos, founded in the sixteenth century. Pop. (1941) 49,769.

Cojutepeque, market town, Salvador, Central America, 15 m. northeast of San Salvador; capital of the district of Cuscatlan. It has an active transit trade. Population about 10,000.

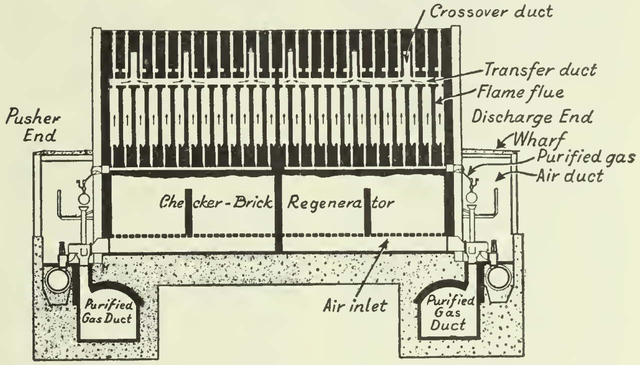
Coke is the porous coherent mass that remains when so-called 'coking coals,' in the absence of air, have been heated to a temperature roughly between 1,500 and 1,900 degrees F. In this process, the volatile constituents escape as gases. Recently, it has become customary to term this product 'high-temperature coke,' and to designate the material made by heating certain coals at a temperature roughly between 750 and 1,100 degrees F. as 'low-temperature coke.'

Coke can not be made from cannels, anthracitic, semi-anthracitic, sub-bituminous or lignitic coals. Not all bituminous coals coke in satisfactory degrees, and some do not coke at all.

History.—About 1735, coke was manufactured in England to supplement charcoal in the smelting of iron. In the United States, anthracite was early used for such smelting, and its use, long abandoned, is still being advocated, but in 1825 America began to recognize the advantages of coke for that purpose. Natural bituminous coals could not be used for smelting, especially in a high furnace, because they swell and fuse, will not support the burden of limestone and iron ore above them and will not let the gases travel upward as they do when coke or anthracite is used as fuel. For decades, the 30 to 40 per cent of small sizes produced in mining had no market, but after it was coked this coal could be sold. Manufacture of coal gas for illumination purposes also resulted in a coke residue, but one neither as hard nor as free from volatile matter as other coke but more readily burned and suitable to certain industrial and domestic uses.

Quality.—Coke was formerly not regarded as good unless partly covered with the bright and silvery carbon deposited by oven gases. It had to be hard and strong, though light and porous, but today hardness, strength and purity are the features most stressed. No coal will coke after long exposure to the elements. Strength in coking varies greatly, and coals exercise destructive pressure on the oven when coking.

Coke Making.—Originally, coke was made by piling coal in a 'meiler'—a low pyramidal or domed heap with a loose-laid brick shaft or chimney in the center. The coal was ignited with wood, and at appropriate times the drafts were checked and the pile covered with damp coal dust, so that the coal distilled rather than burned, the volatiles escaping by the chimney. Regulation was difficult, so an encircling wall of brick was provided which later was covered by a dome forming a structure like a beehive.



Becker-Type Oven.

In the large door in the front of the oven, shaped like a beehive, a dry wall of refractory brick, two feet high is laid. The coal is then charged through a large hole, or 'trunnel,' in the dome from a car, a larry, traveling on a track, which, supported by pillars, passes so near the trunnels of the ovens that coal can be spouted into them. Five or six tons is placed in each oven, after which the coal is leveled to the top of the dry wall in the doorway. The door is kept open until the heat of the wall and paved floor has had time to dry the coal, if wet, and to start incipient combustion. Then the dry wall is raised almost to the top of the oven door and mudded with a mixture of clay and coke breeze. Later, the wall is completed and made air tight, the trunnel also being covered with a plate. The heat drives off the volatile matter in the coal which becomes coke. After the closing wall has been removed the coke is watered judiciously to shrink but not waterlog it, and then it is raked out onto the coke wharf through the aforesaid door. Usually the ovens are 'burned' three times in a week, twice for 48 hours and once with a somewhat larger charge for 72 hours. The '48-hour coke' is known also as 'furnace coke' and the '72-hour coke' as 'foundry coke.' The latter is the better product with less volatile matter and greater hardness.

Byproduct Ovens.—Wasteful of heat, coke and byproducts, the beehives and the Belgian ovens, were slowly displaced by the byproduct oven which economizes all three. Thus 100 tons of coal gives an average of 70.47 tons of byproduct coke and only 63.23 tons of beehive coke. For a time the new coke encountered prejudice. In a recent survey, active beehive ovens still exceeded numerically active byproduct ovens, but the byproduct production was 16 times as large as the beehive production, for the byproduct oven is more speedy and capacious. It cokes the coal in 10 to 15 hours and frequently holds about 20 tons of coal.

Byproduct ovens may be divided into horizontal-flue or vertical-flue ovens, dependent on whether the ovens are heated through floor or sides. They may be recuperative or regenerative, in which latter more usual case the hot waste gases at perhaps 2,000 degrees F. are taken to a big chamber full of checkered brick to which they contribute most of their heat. Later, usually after a 30-minute interval, the flow is reversed and air is passed between the bricks and becoming hot is directed to the flame flues in which it is to be used for burning the gas.

The ovens, on the other hand, may have no means of regeneration, and the waste gases may be passed through flues to a point where their heat may be used to raise steam or to serve some other purpose. These are known as 'waste-heat ovens.' Coke-oven gas has a high thermal value and can be piped economically for some distance. It is uneconomical, therefore, to use more than is necessary for heating coal charges. To supplement it, either producer gas or blast-furnace gas must be used in the flame flues. Either of these gases has to be heated in a regenerator because it is so lean that a large quantity has to be used to give the required heat, so it is heated in sections of the regeneration chambers, though all regenerative spaces are mutually exchangeable, being used alternately for air and gas. If the gas were cool before burning it would not generate enough heat to warm the oven walls sufficiently.

In the order named, Koppers, Semet-Solvay and Wilputte are the three most numerously represented byproduct ovens in the United States. The most recent type of Koppers oven is known as the Becker. Each oven internally is about 16 inches wide at the pusher end and 18 inches wide at the wharf end, about 12 feet wide and about 40 feet long; dimensions, etc. vary. A larry passing over the oven bank almost fills the ovens through refractory pipes with coal slack, about ⅝-inch in diameter and under. On one side of the oven are some thirty flues in which gas is burned. The combustion gases from these pass into a transfer duct and thence into one of about six crossover ducts that carry the hot gases over the tops of the ovens to a transfer duct on the other side and thence down to the thirty flame flues located on the far side of the oven, which they warm by their sensible heat, passing on to the regenerator, stack flue and stack. Later, the current is reversed so that combustion may occur alternately on each side of the oven; thus even and effective coking heat is provided over the oven faces at all times but, for the preservation of the refractories, the temperature should not exceed 2,600 degrees F.

When the coking time is complete, the air and gas are shut off, the two oven doors are opened and a big electric ram the full height of the oven pushes out the incandescent mass over a short dock where the coke breaks and, held by guides, rolls into a car where it is quenched with water.

Among the many low-temperature carbonization processes two only are now in active operation in the United States, and one of these, the Curran-Knowles sole-flue oven, is really an intermediate-temperature carbonizer. Its product is known as Carbonite. Another is the Disco system which after treatment of the coal to make it amenable to processing delivers it to a revolving cylinder where under heat it forms balls of a size dependent on its earlier treatment.

The purpose in every instance is to make a smokeless coal and to remove the volatile sulphur. Non-volatile sulphur is unobjectionable in domestic coke and its analogues. See GAS.

Consult J. Fulton, *Coke* (1907); A. W. Belden, *Metallurgical Coke* (1913); Paper 50, U. S. Bureau of Mines; H. C. Porter, *Coal Carbonization* (1924); *Minerals Yearbook* (annual publication, U. S. Bureau of Mines).

R. DAWSON HALL,
Engineering Editor, *Coal Age*,
New York.

Coke, SIR EDWARD (1552–1634), English lawyer and public official, was born in Mileham, Norfolk. He was called to the Inner Temple (1578), almost immediately acquiring a lucrative practice, and rising rapidly through the various stages of promotion to solicitor-general, Speaker of the House of Commons, and attorney-general—the last when only forty-one years old. His success made him enemies, and an overbearing manner and obstinate pedantry contributed their share to his unpopularity. His most dangerous foe at first was his brilliant legal rival, Francis Bacon. Until the death of Queen Elizabeth, Coke seems to have defeated Bacon on every occasion. But with the accession of James I (1603) a dangerous coalition was formed against him. Bacon was pliant, flattering James' high views of prerogative; while the latter was grateful for such assistance, and pushed the fortunes of his favorites. Coke was too proud to truckle to a king whom he probably regarded as a foreigner; nevertheless, he was given the lucrative office of chief justice of the Common Pleas (1606).

This, however, was the height of his success. The clergy, already cementing that alliance with the crown which was a feature of the 17th century, resented the attitude of the common law courts toward ecclesiastical tribunals. James, appealed to, eagerly accepted a position flattering to his vanity, but found himself helpless before the professional authority of Coke. The first quarrel was followed by others on the great question of the prerogative, the most important being those on the royal power of raising money, on the validity of the Court of High Commission, on the jurisdiction of the Court of Chancery, etc. On all these points Coke took the right view; and so formidable was his opposition that, after having been removed to the nominally higher but less lucrative office of chief justice of the King's Bench (1613), he was removed from the bench altogether (1616).

Coke thereafter became one of the leaders of the growing Parliamentary opposition. He took a considerable share in drawing up the Petition of Right (1628), but retired from Parliament in 1629. His writings, despite their fame, are characterized more by learning, minuteness, and enthusiasm than by order, principle, or method. They are *Institutes of the Laws of England,* in four parts—(1) *A Commentary upon Littleton;* (2) *Exposition of Statutes;* (3) *Pleas of the Crown* (*i.e.,* Crimes); (4) *The Jurisdiction of Courts* (1628–44); *Compleat Copyholder* (1630). The best short biography of Coke is that by MacDonell in the *Dictionary of National Biography.*

Consult, C. W. Johnson, *Life of Sir Edward Coke* (1837); H. W. Woolrych, *The Life of Sir Edward Coke* (1826); Lord Birkenhead, *Fourteen English Judges* (1926).

Coke, SIR JOHN (1563–1644), English politician, was educated at Cambridge University, and entered the service of William Cecil, Lord Burghley. He held various positions and later was elected to Parliament in 1621. He was knighted in 1624 and later served as secretary of State. It was he who placed the king's (Charles I) requests for money before Parliament. Coke was particularly useful to the king when Charles ruled without a parliament. After the humiliating treaty of Berwick with the Scots, Coke was dismissed from office in 1630.

Coke, THOMAS WILLIAM, EARL OF LEICESTER (1754–1842), known as Coke of Norfolk, English agriculturist, was the son of Wenman Roberts who took the name of Coke in 1750. He was an aggressive Whig, was a member of Parliament in 1776–84, 1790–1806, and 1807–32, and friend and supporter of Charles James Fox. His fame, however, was as an agriculturist. He introduced many improvements on his lands at Holkham in Norfolk, growing wheat successfully and breeding superior cattle, sheep, and pigs. It is stated that 'his practice is really the basis of every treatise on modern agriculture.' He was created an earl in 1837. Consult A. M. W. Stirling, *Coke of Norfolk and his Friends* (1907).

Colban, ADOLFINE MARIE, *née* SCHMIDT (1814–84), Norwegian author. In 1836 she married the philologist N. A. Colban. Eight years after her husband's death (1850) she settled in Paris as a correspondent and translator, where she lived from 1859 to 1883. She was the author (1869–82) of several novels, very popular in their day, such as *Laererinden* (1869); *Tre nye Noveller* (1875); *Jeg lever* (1877); *En gammel Jomfru* (1879); *Thyra* (1882).

Colberg. See Kolberg.

Colbert, Jean Baptiste (1619–83), son of a wool merchant in Reims, became one of the greatest of French financiers. He was a member of the establishment of Mazarin 1649–61, and was recommended by that statesman to Louis XIV. On the dismissal of Fouquet, Colbert was appointed (1661) superintendent of finances. His first measure was the reduction of the *taille,* a direct property tax. Then he introduced system and economy into the exchequer by bringing the farmers of the taxes to book; and in a few years, while remitting taxes, he actually increased the net revenue of Louis XIV from 84 million to 114 million livres, while the expenses of collection diminished from 52 millions to 23 millions.

Colbert undertook the reorganization of the commercial policy of the country, endeavoring to encourage manufactures and shipbuilding at home by a system of protection and of bounties, and reforming the administration of the colonies. He was carried too far in his zeal for method, and it was he who elicited the famous phrase *'Laissez faire.'* He gave French industry its bias toward the production of articles of luxury and taste. He bestowed great care upon the national cultivation of the arts and the sciences, and encouraged them by founding academies. To him also belongs the credit of having virtually laid the foundation of the French navy. He greatly improved the means of communication in France. But when the extravagance of Louis XIV took the form of military expenditure, Colbert saw his system nullified and is said to have died of a broken heart at the ingratitude of the king. Consult *Lives,* in French, by Neymarck and Dussieux; Clément's *Lettres et Mémoires de Colbert.*

Colborne, Sir John, first Baron Seaton (1778–1863), English general, became military secretary to Sir John Moore (1808); was at the retreat of Corunna, and with Wellington in the Peninsula (1809); was wounded near Ciudad Rodrigo, and fought in the Battle of Waterloo. He quelled the Canadian rebellion (1838), and was elevated to the peerage (1839).

Colby, Bainbridge (1869–), American lawyer and public official, was born in St. Louis, studied at Williams College, Mass. and the Columbia and New York Law Schools. He acted as counsel in celebrated law-suits and served in the N. Y. Assembly 1901–2. During the First World War he was connected with the U. S. Shipping Board, accompanied the American Mission to negotiate peace in Paris, 1919, and was appointed Secretary of State in President Wilson's Cabinet, March 1920, in which capacity he served until the end of the President's term, after which he resumed his law practice.

Colby, Frank Moore (1865–1925), American editor, born in Washington, D. C., and educated at Columbian and Columbia Universities. He was acting professor of history at Amherst College (1890–91); lecturer on history at Columbia (1891–95), and professor of economics at New York University (1895–1900). He was associated with several encyclopaedic works; was an editor of the *New International Encyclopaedia* (1900), and of *Nelson's Encyclopaedia* (1905–6). He edited the *International Year Book* (1898–1902), and resumed a new series beginning in 1907. He published *Outlines of General History* (1900); *Imaginary Obligations* (1904); *Constrained Attitudes* (1911).

Colby, Thomas Frederick (1784–1852), English general, became connected with the ordnance survey (1802–47), after 18 years' service becoming director. He was one of the founders (1820) of the Royal Astronomical Society. He made a valuable survey of Ireland, which, begun in 1825, was completed in 1846.

Colby College, a four-year, coeducational, liberal arts college in Waterville, Me. It offers the B.A. degree. Colby School of Nursing gives a five-year course in conjunction with affiliated hospital facilities. The college was chartered in 1813 under Baptist auspices, and the name changed in 1867 from Waterville College in recognition of aid given by Gardner Colby of Boston. On Mayflower Hill a group of colonial buildings were erected in 1937 costing $3,000,000 which comprise an outstanding college plant.

Colchagua, province, Chile, extending from the Andes to the Pacific, bounded on the north by Santiago and O'Higgins, and on the south by Curicó. Stock raising and mining are the chief industries. Area about 3,422 sq. m. Pop. (1940) 138,036.

Colchester, municipal and parliamentary borough, market town, and port, England, in Essex, 22 m. northeast of Chelmsford, and 52 m. by rail from London. It is on the River Colne, 12 m. from the sea. Remains of the largest Norman castle in England, built in the reign of William Rufus, still survive. Ruins also remain of the twelfth-century Augustinian Priory of St. Botolph, and a gateway represents the eleventh-century Abbey of St. John. The Church of St. James dates from before the Norman Conquest.

Public buildings include the Town Hall, Albert School of Science and Art, the Grammar School (16th century), and the Eastern Counties Asylum. The town's industrial establishments include iron foundries, machine shops, clothing and boot factories, breweries, and flour mills. The town is the center of a large agricultural district, and has considerable shipping trade. The principal exports are grain and malt. There are extensive oyster beds on the coast at the mouth of the Colne. It is a permanent military district. It was made the see of a suffragan bishop by Henry VIII, and was re-established a diocese suffragan to St. Albans in 1882.

The place was occupied and strongly fortified by the Romans. After their departure it was a stronghold of the Saxons, but suffered severely from the Danes, who held it in the time of Alfred. Edward the Elder took the town and rebuilt the walls. During the Civil War, after being starved out, it was captured (1648) by the Parliamentary army under Fairfax, after a siege of eleven weeks. Area 11,333 ac. Pop. (1945 est.) 45,100.

Colchester, Charles Abbot, first Baron (1757–1829), English statesman, was born in Abingdon. He was called to the bar (1783), and from 1794 to 1801 was clerk in the Kings Bench Court. Returned to Parliament for Helston, Cornwall (1795), he was mainly instrumental in establishing the practice of making yearly tables of temporary laws, and furnishing public corporations with copies of Acts of Parliament when printed. To him were due the appointment of a committee on the British national records (1800), and the first Census Act. He was Speaker of the House of Commons (1802–16), and retired with a peerage and a pension.

Colchicum, a genus (containing about 30 species) of autumnal-blooming, liliaceous plants, belonging to the Hellebore family, and popularly known as Meadow Saffrons or Autumn Crocus. All of them are acrid-poisonous. The flowers are very handsome, the colors being mostly purple or white, and the form much like large crocuses. The colchicums are principally natives of the middle and south of Europe and the west of Asia. Some species are found in Ireland and Switzerland. Under cultivation they are given a fairly rich soil and a situation exposed to the sun. As the leaves appear in spring and fade away in summer, whereas the flowers appear in autumn, it is desirable to carpet the ground with some low-growing plants, or to grow the colchicums in grass. The corms should be planted in July, as soon as the leaves fade, and should be set about three inches below the surface. They are best left undisturbed for several years.

Colchicum autumnale.
1. Fruit.

Among the species and varieties worth cultivating are the well-known *C. autumnale,* which produces clusters of four or five purple flowers from each spathe in autumn, and its varieties; the large-flowered *C. speciosum;* the large, cup-flowered *C. Sibthorpii;* and the prettily checkered *C. Parkinsoni.* There are a few spring-blooming species, of which the best is *C. hydrophyllum.*

For medicinal use, the fresh corm of *C. autumnale* is collected in June, slipped, sliced, and dried. It is a drug which, like the seeds, is emetic, cathartic, and sedative. From it are prepared an extract and a wine. Its principal use in medicine is in acute gout, in which condition it it thought to assuage the pain. It is also a powerful cholagogue. Large doses are poisonous, and when growing in meadows the plant can be injurious to cattle that eat it. Horace alludes to the narcotic action of the corm of this plant.

Colchis, region of Asia, bounded on the west by the Black Sea and on the north by the Caucasus, now known as Mingrelia (q. v.) and Ieretia. It is famous in Greek legend in connection with the story of the Argonauts. Mithridates made it part of his kingdom (about 100 B.C.). The Romans defeated him, and overran it (72–66 B.C.), but did not conquer it until the time of Trajan.

Colcothar (*Chalcitis, Crocus Martis;* Fe_2O_3), the residuum of brownish red ferric oxide, after the distillation of acid from ferrous sulphate (green vitriol). It is used as paint (Indian red) and, when pulverized, for polishing glass.

Cold. (1.) In its physical sense, see HEAT; FREEZING. (2.) In its medical sense, see CORYZA.

Cold Cream consists of white beeswax, spermaceti, oil of almonds, rose-water, and attar of rose to perfume it. The solid ingredients are melted and mixed with the oil; the hot mixture is strained through muslin, and the whole stirred until of a creamy consistence, when the rose-water (warmed) is dropped in slowly, and finally the attar of rose. This preparation is in great favor as an emollient application for the face and hands.

Colden, CADWALLADER (1688–1776), American colonial governor and naturalist, was born in Dunse, Scotland. He was graduated (1705) at the University of Edinburgh, and studied medicine. He emigrated to Philadelphia, Pa., in 1708, where he practiced his profession for ten years, then removed to New York. He was lieutenant governor of New York from 1761 until his death. He was an active Royalist, and incurred the hostility of the New York patriots. He was also a diligent student of botany, and introduced the Linnaean system into America, sending to Linnaeus descriptions of many American plants. He wrote a *History of the Five Indian Nations of Canada* (1727).

Cold Frame. See HOT-BED.

Cold Harbor, Virginia, a locality in Hanover county, about 9 miles northeast of Richmond, the scene of two battles during the Civil War. The first was fought on June 27, 1862, and is more generally known as the Battle of Gaines' Mill. (See GAINES' MILL, BATTLE OF.)

The second battle was fought during Grant's final campaign against Lee, on June 3, 1864. Lee, with a force greatly inferior to that of Grant, had occupied a nearly impregnable position at Cold Harbor, though much of his first line was captured by an assault on June 1. Grant, nevertheless, decided to assault rather than to try to dislodge his opponent by a flanking movement, and at 4.30 A.M. on June 3 the assault was made 'all along the line.' The Federals attacked with great bravery, but were repulsed with fearful loss—estimated at 7,000 in killed and wounded, the Confederate loss being relatively small. Grant remained in the vicinity for nine days, and continued the fighting, but without making another assault; and on June 12 he continued his march for the south side of the James. Between June 1 and June 12 the Federals lost, in killed and wounded, about 15,000 men, the Confederates about 2,000.

The assault of June 3 has been regarded as the greatest blemish on General Grant's military career, and he himself, in his *Memoirs,* says: 'No advantage whatever was gained to compensate for the heavy loss we sustained.'

Coldingham, coast parish and village, Scotland, Berwickshire, 3 m. northwest of Eyemouth. Fast Castle, 3½ m. northwest of St. Abb's Head, is pointed out as the Wolf's Crag of Scott's *Bride of Lammermoor.* There are the ruins of a priory founded in 1098 by Edgar, king of Scots. Pop. 2,749.

Cold Spring, village, New York, Putnam county, 52 m. north of New York City, on the east bank of the Hudson River, in the Highlands, about 1 m. above West Point. It is on the New York Central Railroad. It has a large iron foundry, gun foundry, and boring mills. Pop. (1930) 1,784; (1940) 1,897.

Cold Spring Harbor, village, New York, Suffolk County, 32 miles East of New York City, on the North Shore of Long Island and on the Long Island Railroad. It has a marine biological station, and a state fish hatchery. The biological laboratories of the Carnegie Institution are situated there. In the Institution is also the Eugenics Record Office, a section of the Department of Genetics. Pop. 750.

Cold Storage. See Refrigeration.

Coldstream Guards. See Guards.

Coldwater, city, Mich., co. seat of Branch co., 105 m. w.s.w. of Detroit, on the Lake Shore and Michigan Southern R. R. A state school for dependent children is situated here. The manufactures include agricultural implements, leather, shoes, flour, liniment and Portland cement. Pop. (1910) 5,945.

Cold Wave is caused by a cool or cold wind blowing equatorward, following in the wake of a cyclonic storm. In the United States it is the name applied to a fall of temperature lower than 32° F. in the N.W., or lower than 40° F. in the S., affecting an area of not less than 50,000 sq. m., with a change of at least 20° in twenty-four hours.

Cole, Belle (?–1905), an American contralto singer. She was born at Chautauqua, N. Y., and began her early career as a church soloist in New York city. She was leading contralto with Theodore Thomas's Festival tour in 1883, and five years later sang in the *Elijah*, in London, under Sir Joseph Barnby. Afterward she sang in various festivals in London, and made several long tours, including one around the world in 1901. After 1888 she lived in London.

Cole, Sir Henry (1808–82), English administrator and art critic, born at Bath; was appointed assistant-keeper of the records (1838), having helped to establish the Records Office. He edited the *Historical Register*, the *Journal of Design*, and published editions of Dürer's *Small Passion* and *Henry VIII.'s Scheme of Bishoprics*. He founded the S. Kensington Museum, of which he was appointed director in 1860; helped to organize the Great Exhibition of 1851; originated the first Christmas card; K.C.B. (1875). See *Fifty Years of Public Work*, being memoirs of Sir Henry Cole, by his sons, A. S. and H. Cole (2 vols. 1884).

Cole, Thomas (1801–48), American painter, was born at Bolton-le-Moor, England, and emigrated to Ohio in 1819 with his father. He studied under a local artist, and removed to New York in 1825, where he joined the group of artists headed by Durand and Trumbull. Mr. Cole became a landscape painter, and his best works are scenes along the Hudson R. and among the Catskills. He also painted a number of allegorical pictures, of which two series, the *Voyage of Life* and the *Course of Empire*, became well-known through engravings. See Isham's *American Painting* (1905).

Cole, Timothy (1852), American wood-engraver. was born in London, England, whence he was brought by his parents to America in 1857. After several years' residence in Chicago, he removed to New York in 1871 and became associated with *Scribner's Monthly* (now the *Century Magazine*). He was commissioned by the *Century Magazine* in 1883 to execute engravings of the paintings of the old masters in Europe. His series of engravings, which appeared in that periodical, include *Old Italian Masters* (1892), *Dutch and Flemish* (1896), *English* (1900), and *Old Spanish* (not yet completed). The accompanying *Notes* were also written by Mr. Cole, who meanwhile lived in the different countries of Europe where his subjects were to be found, and through the rise and development was enabled to preserve, of process work, the art and traditions of the old school of wood engraving.

Cole, Vicat (1833–93), English landscape painter, born at Portsmouth. In 1853 two of his pictures were hung in the Royal Academy, and in 1880 he was elected R.A. His paintings were popular, owing chiefly to his choice of subjects, most of them being scenes on the banks of the Thames or in the pastoral county of Surrey. *The Pool of London*, which, however, is not a characteristic specimen of his art, is in the National Gallery of British Artists. See Chignell's *Vicat Cole* (1893).

Colebrooke, Henry Thomas (1765–1837), British Sanscrit scholar, born in London. He entered the service of the E. India Company in 1782. Throughout his Indian career, which lasted till 1814, he advocated administrative reform, particularly after 1807, when he was called to the governor-general's council. His career is notable for the stimulus given to the study of Sanscrit and its literature, whereof he was the European pioneer, inasmuch as in 1794 he began publishing papers in the *Asiatic Researches* of the Calcutta Asiatic Society, where are included his famous articles on the Vedas and on the sect of the Jains. He published also a *Digest of Hindu Law on Contracts and Successions*, translated from the Sanscrit (1798), supplemented in 1810 by *Two Treatises on the Hindu Law of Inheritance;* also a *Sanscrit Grammar*, of which the first volume only was issued (1805). The scientific spirit of his work was acknowledged by Max Müller (*Biog. Essays*, 1884).

Colectomy, the operation of removing part of the colon. This is sometimes done in cases of tumor, strangulation, or stricture. The upper portion of the bowel is either reunited to the lower or attached to an opening in the abdominal wall (enterostomy).

Coleman, Leighton (1837–1907), American P. E. prelate, b. in Philadelphia, Pa., and graduated (1861) at the Genera Theological Seminary in New York. He was rector of churches in Pa., Del., and O., until 1879, when he resigned on account of failing health, and passed eight years in England engaged in lighter church duties. Returning to the U. S. he became rector of the Church of the Redeemer at Sayre, Pa., and, as in the case of previous parishes, was instrumental in erecting a handsome new building for his church. He was elected and consecrated bishop of Del. in 1888. He published *History of the Lehigh Valley* (1872), *The Church in America* (1895), and *History of the Church in the United States* (1901), besides numerous sermons and essays.

Coleman, William Tell (1824–93), American pioneer and merchant, born in Harrison co., Ky. He was educated at the St. Louis University, emigrated to California in 1849, and eventually settling at San Francisco, became one of the most successful merchants and one of the most influential men in the state. He is remembered chiefly as the president of the famous Vigilance Committees of 1852 and 1856 in San Francisco. After the Civil War he did much to relieve the sufferings of the destitute in the Southern states.

Colenso, vil. and ry. stn., on the Tugela, Natal, 70 m. by rail N.W. of Pietermaritzburg. It was the scene of Buller's unsuccessful attempt to cross the Tugela on Dec. 15, 1899.

Colenso, John William (1814–83), English mathematician, and harbinger in England of the modern 'higher criticism' of the Bible, was born at St. Austell, Cornwall; graduated as second wrangler at St. John's College, Cambridge (1836). His mathematical textbooks were published as follows: *Arithmetic* (1840), *Algebra* (1841), and *Plane Trigonometry* (1851). In 1853 he issued *Village Sermons*, and the same year was appointed bishop of Natal. His objections to the doctrine of eternal punishment were unfolded in his *Translation of St. Paul's Epistle to the Romans, commented on from a Missionary Point of View* (1861). In 1862 the bishop began the publication of his chief work in Biblical criticism, *The Pentateuch and the Book of Joshua Critically Examined*, completed in 1879. This treatise excited a storm of theological controversy almost unparalleled, although its scientific conclusions are now generally accepted. The bishop was widely denounced; both houses of Convocation condemned the book of heretical (1864); and the bishop as

Cape Town (Gray) endeavored to depose Dr. Colenso from his see. But the Privy Council, in March, 1865, declared the deposition 'null and void.' Nevertheless, the bishop of Cape Town publicly excommunicated Dr. Colenso, and consecrated Dr. Macrorie as bishop of Maritzburg (1869)—a new title for what was really the bishopric of Natal. Besides the works named, Dr. Colenso was the author of a *Zulu Grammar* (1859) and a *Dictionary* (1861), of a work upon the *Moabite Stone* (1873), and of the *New Bible Commentary Literally Examined* (1871–4). See Sir G. W. Cox's *Life of J. W. Colenso, Bishop of Natal* (2 vols. 1888), and the *Annual Register* for 1883.

Coleoptera, an order of insects which includes not only all beetles, but also such forms as glowworms, 'ladybirds,' weevils, cockchafers, and others not always recognized as close allies of the beetles. Characteristic are the hard elytra or wing-covers, usually with membranous wings beneath, the strong mandibles of the mouth, and the complete metamorphosis, the larva being a soft maggot or grub.

Coler, Bird Sim (1867), American politician, born at Champaign, Ill. He was educated at the Polytechnic Institute and at Andover Academy, engaged successfully in banking in New York, and became prominent, as a Democrat, in local and state politics. As comptroller of New York city (1898–1901) he attracted general attention by his opposition to measures of the Van Wyck administration and to policies of Tammany Hall, with which he had been identified. In 1902 he was the Democratic candidate for governor of N. Y., but was defeated by B. B. Odell. He was then for a short time a member of the New York Civil Service Commission, and in 1905 was elected president of the Borough of Brooklyn on the Hearst or Municipal Ownership ticket. He published *Municipal Government, as illustrated by the Charter, Finances, and Public Charities of New York* (1900).

Coleridge, Derwent (1800–83), English author and educationist, third son of Samuel Taylor Coleridge; born at Keswick, England; numbered among his friends Praed, Macaulay, and John Moultrie. Ordained by Bishop Carey of Exeter (1825), he was appointed master of the grammar school, Helston in Cornwall; first principal of St. Mark's College, Chelsea (1841); prebendary of St. Paul's Cathedral (1846); and rector of Hanwell (1864). He died at Eldon Lodge, Torquay.

Coleridge, Hartley (1796–1849), English poet, biographer, and essayist, eldest son of Samuel Taylor Coleridge, born at Clevedon, Somersetshire. He was from the first 'a poetic child.' In 1825 he was elected probationary fellow of Oriel College; but at the end of the first year (1826) he was deprived of his fellowship, mainly on the score of intemperance. The misfortune and disgrace tended to confirm the habit which marred and overwhelmed his life. He went to London, and endeavored to support himself by his pen, but without success. Returning to Ambleside (1828), he struggled through four or five years of unsuccessful school-keeping, and thereafter lived in lodgings at Townsend, Grasmere. In 1832 he undertook to bring out a series of *Worthies of Yorkshire and Lancashire*, and for this purpose removed to Leeds; but the publisher failed, and in the spring of 1833 Hartley returned to Grasmere. An octavo edition, entitled *Biographia Borealis*, was published in 1833, of which a second edition, in three volumes, renamed *Northern Worthies*, was issued in 1852. A 'first' volume of *Poems by Hartley Coleridge* was also published at Leeds in 1833. His latest work was to write the *Lives* for Moxon's edition of Massinger and Ford, published in 1840. He died from an attack of bronchitis. As a poet his fame rests on a few great sonnets; but in all his verse there is a tender grace, united to a singular purity of feeling and expression. His brother, Derwent Coleridge, collected his scattered writings, and in 1851 published two volumes of *Poems* (with a Memoir), and two volumes of *Essays and Marginalia*.

Coleridge, Herbert (1830–61), English scholar and philologist, son of Henry Nelson Coleridge and Sara Coleridge. A paper by Dean Trench on *The Deficiencies in our English Dictionaries* seems to have impelled him to take up the study of philology. He began to make a list of archaisms, and proposed to his friend, Mr. F. J. Furnivall, the secretary of the Philological Society, 'that a committee should be formed to supplement these dictionaries.' Of this he was a prominent member, and may be regarded as one of the founders of the *New English Dictionary*, of which (see Preface) he was the 'first general editor.' A finished scholar of the older type, he was quick to apprehend and ready to appropriate new ideas and modern methods. He died of consumption. See article on him by Lord Coleridge in *Macmillan's Magazine* (November, 1861, pp. 56–60).

Coleridge, Sir John Duke, first Baron Coleridge (1820–94), English judge, eldest son of Sir John Taylor Coleridge, born at Heath Court, Ottery St. Mary. He was called to the bar in 1846. A Liberal in politics, he sat as M.P. for the city of Exeter (1865–73), the chief event of his parliamentary career being the passing of the Bill for the Abolition of Religious Tests in the Universities. He also took a prominent part in the debates on the disestablishment of the Irish Church. Appointed solicitor-general and knighted (1868), in 1871 he became attorney-general, and was raised to the bench as lord chief-justice of the Common Pleas in 1873. In 1880 he succeeded Sir Alexander Cockburn as lord chief-justice of England. His great forensic triumph was his prolonged cross-examination of the 'claimant,' Arthur Orton, in the Tichborne case (1871–2), and his opening speech for the defendant, which lasted twenty-three days.

Coleridge, Samuel Taylor (1772–1834), English poet, philosopher, and critic, born at Ottery St. Mary, Devonshire, son of the Rev. John Coleridge (1719–81), vicar of the parish. In the summer of 1790 he swam the New River in his clothes, caught rheumatic fever, and was confined for some months to the sick-ward of the hospital. This illness, and, as may be conjectured, doses of opium administered to allay the 'seas of pain' (see his sonnet *To Pain*), affected the whole of his after life. He was educated at Christ's Hospital, and in 1791 entered Jesus College, Cambridge, where the next year he obtained a prize for a Greek ode. At the close of the second year, in despondency due to the pressure of debt, he left Cambridge for London, and enlisted as a trooper in the 15th Light Dragoons (1793), but relatives obtained his discharge in 1794. He returned to Cambridge, and in June of that

Samuel Taylor Coleridge.

year visited Oxford, where he made friends with Robert Southey. The two lads persuaded each other that a new life, based on principles of equality and fraternity, might be lived in the U. S. where, on the banks of the Susquehanna, they and their friends would found a colony, but this scheme, which Coleridge christened 'pantisocracy,' came to naught. Six weeks later a second meeting took place at Bristol, where Southey introduced Coleridge to the widow and daughters of a tradesman named Fricker. One of the daughters (Edith) was betrothed to Southey, and Coleridge became engaged to her elder sister (Sarah). Returning to Cambridge he published *The Fall of Robespierre*, a play in three acts, the joint production of himself and Southey. In December, 1794, he left the university for good, without a degree. Coleridge was married to Sarah (hereafter known as Sara) Fricker, Oct. 4, 1795, and the next year (1796) was passed at Bristol. In the spring he published his first volume of *Poems*, for the copyright of which his publisher, Joseph Cottle, paid him thirty guineas. On the last day of the year he removed to Nether Stowey, in Somersetshire. Here his poetical faculties reached their fullest development. *Osorio*, better known as *Remorse*, was begun and finished in 1797. *The Ancient Mariner* was begun in November, 1797, and *Christabel* (part i.) and *Kubla Khan* were written in 1797–8. In the summer of 1797 Wordsworth and his sister Dorothy settled at Alfoxden, a large manor-house three miles from Stowey. In January, 1798, Coleridge was nominated minister of the Unitarian chapel at Shrewsbury, but resigned the appointment out of regard to the wishes of the brothers Josiah and Thomas Wedgwood, who settled on him an annuity of £150 on the understanding that he should devote his time and talent to literature. The end of the Stowey period is marked by the publication of the first edition of the *Lyrical Ballads* (see WORDSWORTH, WILLIAM), to which Coleridge contributed four poems. On Sept. 16, 1798, Coleridge left England for Germany in company with the Wordsworths. After visiting Hamburg, he settled first at Ratzeburg, and then (Feb. 12, 1799) at Göttingen, where he matriculated as a student of the university. He returned to England in July, and in November to December accompanied Wordsworth on a walking tour through the Lake District. In 1800 he devoted himself to the translation of the second and third parts of Schiller's *Wallenstein*. In order to be near Wordsworth, who had taken a cottage at Grasmere, Coleridge settled with his family at Keswick, in a newly-built house named Greta Hall (1800). In the autumn of this year he wrote the second part of *Christabel*, and assisted Wordsworth in preparing a second edition of the *Lyrical Ballads*. His published works during this period consisted of fifteen or more articles published in the *Morning Post* (November, 1801, to November, 1802), and the poems *The Picture*, *The Hymn before Sunrise*, and *Dejection: an Ode*. The change from south to north was for the worse. The wet climate of Keswick increased an inherited tendency to rheumatic gout and cognate maladies. Severe pain and constant malaise resulted in habitual resort to opium, which weakened the bodily, if not the mental powers, and made regular work all but impossible. Domestic unhappiness—in part, but not wholly, his own fault—was perhaps his crowning misfortune. A change both of scene and of climate seeming imperative, he went to Malta (1804), where he remained as secretary to the governor until 1805. On returning to England in 1806 he wrote for the newspapers, and did not rejoin his family till the middle of October. Life at Greta Hall, now shared permanently with Southey, proved impracticable, and he went to London in 1808, where he delivered a course of lectures at the Royal Institution, London, on Shakespeare; these lectures 'gave satisfaction,' but there were 'intermissions' through illness. The next two years (August, 1808, to October, 1810) were spent in the Lake country, either as Wordsworth's guest at Grasmere, or in his own house at Greta Hall. He had formed a plan of writing, printing, and publishing a weekly periodical, to be entitled the *Friend*, which proved unsuccessful, and soon perished. Under the roof of some old Bristol friends named Morgan, he made his home off and on for more than five years. He again lectured on Shakespeare, in London, in that and the following year. At the end of the year 1812 Josiah Wedgwood withdrew his moiety of the annuity of £150, which had been reserved for the maintenance of Mrs. Coleridge and the children. The income which remained was insufficient for their need, and henceforth they were partly, but never wholly, dependent on Southey's forbearance and generosity. On Jan. 23, 1813, *Remorse: a Tragedy*, a remodelled version of the *Osorio* of 1797, was brought out at Drury Lane, and was played for twenty nights. The play was a success, and Coleridge's profits amounted to at least £400. In 1814 he was again lecturing, although he confessed that at this time his nerves were shattered and his life endangered by 'the one crime of opium.' In March, 1816, he went up to London and, acting on advice, consulted James Gillman, a surgeon, who at once received Coleridge as his patient, the latter continuing under his care as patient and practically, though never formally, as his guest, for the remainder of his life. Thanks to the devotion of the Gillmans and to his own efforts, the opium habit was greatly controlled. He was rewarded by renewed powers of work, public recognition, and abundant reverence from friends and disciples. Thenceforth his life was uneventful. *Christabel*, *Kubla Khan* (1798), and *The Pains of Sleep* (1803) were published in pamphlet form by Murray (1816). For some years after 1819 his time was employed in compiling and dictating portions of his *magnum opus* on philosophy, and in privately instructing a class of two or three pupils, who took notes of his philosophic discourses. In May, 1824, he was elected an associate of the Royal Society of Literature. In 1825 *Aids to Reflection*, illustrated by passages from Archbishop Leighton, was published. Great authorities praised the work, but few copies were sold. Since 1836 there have been numerous reissues. In June to July, 1828, he accompanied Wordsworth and his daughter in a tour on the banks of the Rhine. His well-known *jeu d'esprit* on Cologne dates from this tour. The marriage of his daughter Sara to her cousin, H. N. Coleridge (Sept. 9, 1829), gave him a new interest in life. The *Table Talk* (2 vols. 1835) is a record of conversations between the poet and his son-in-law. In 1828 and 1829 collected editions of Coleridge's *Poetical Works* were issued, and in 1830 a pamphlet *On the Constitution of Church and State*. Other works which bear his name were posthumous—*e.g.*, *Literary Remains* (4 vols. 1836–9); *Confessions of an Inquiring Spirit* (1840); *Notes and Lectures upon Shakespeare* (2 vols. 1849); *Hints towards.... a more Comprehensive Theory of Life* (ed. by Seth. B. Watson, 1848); *Essays on His Own Times* (articles contributed to the *Morning Post* and the *Courier*), 3 vols. 1850; *Notes on English Divines*, etc. (2 vols. 1853); *Notes Theological and Political* (1853); and *Anima Poetæ* (selections from unpublished notebooks), 1895. For the last three or four years of his life he was, 'with few and brief intervals, confined to a sick-room.' He died July 25, 1834. For the biography of S. T. Coleridge, see

Samuel Taylor Coleridge: a Narrative, by James Dykes Campbell, 1894 (for authorities, see p. ix); an estimate of Coleridge by Emerson in his *English Traits; Letters of Samuel Taylor Coleridge,* 2 vols. 1895 (for authorities, see vol. i., pp. xiii, xiv). Compare also Brandl's *S. T. Coleridge und die Englische Romantik* (1886); Beers' *English Romanticism in the Nineteenth Century* (1900); and *Bibliography* of Coleridge's works by J. L. Haney (1903).

Coleridge, Sara (1802–52), daughter of Samuel Taylor Coleridge; born at Greta Hall, Keswick. Her first work was a translation (3 vols. 1822) of the *Historia de Abiponibus* of the Jesuit missionary Martin Dobrizhoffer. In 1825 she published a translation of the 'Loyal Servitor's' *Right Joyous History* of the Chevalier Bayard (2 vols.). In 1834 she published *Pretty Lessons for Good Children;* and in 1837 *Phantasmion,* a fairy story interspersed with songs and lyrics, which, of their kind, are perfect. In 1843 she took up the task of editing the works of her father. With this end in view she wrote, among other things, the Introduction, Notes, and (in part) the Biographical Supplement to the second edition of *Biographia Literaria* (2 vols. 1847); and the Introduction and Notes to *Essays on his Own Times* (3 vols. 1851). She left a son, Herbert, and a daughter, Edith, who in 1873 published *Memoirs and Letters of Sara Coleridge* (2 vols.).

Coleridge-Taylor, Samuel (b. 1875), musical composer of Anglo-African descent, born in London. He studied at the Royal College of Music (1891), and has already achieved much distinction as a composer. Perhaps his most successful work is his choral-orchestral composition, *Scenes from the Song of Hiawatha.* In 1902 his *Blind Girl of Castel-Cuillé* was produced, and in 1903 his cantata *The Atonement.* He has published numerous songs. In 1904 he visited the U. S. where, at Washington, he conducted his *Hiawatha,* and was appointed conductor of the Handel Society. died 1912

Coles, Cowper Phipps (1819–70), English naval captain; served in the *Agamemnon* in the attack on Sebastopol (1854). He invented a gun-raft, and designed the *Captain,* which capsized off Cape Finisterre and sank with him and others (Sept. 7, 1870).

Colet, John (1467?–1519), dean of St. Paul's, born at London. He lectured at Oxford on divinity and Greek, his revolutionary views evoking vehement protest from the conservative school. Colet was made prebendary and dean of St. Paul's (1505), and founded and endowed St. Paul's School. He wrote *Rudimenta Grammatices, Epistolæ ad Erasmum,* and other works. See *Life of Dr. John Colet,* by J. Knight (1724); Wood's *Athenæ Oxonienses; Life of Colet* (with an appendix of some of his English writings), by J. H. Lupton (1887); and *The Oxford Reformers,* by F. Seebohm (3rd ed. 1887).

Colet, Louise (1810–76), French author, born at Aix. Daughter of a rich merchant (Revoil) from Lyons, she married Hippolyte Colet (1808–51), musical composer, with whom she went to Paris in 1835. She won four times the prize for poetry given by the French Academy. She wrote a part of her autobiography in the novel *Lui* (1859), disclosing her relations with Alfred de Musset, which made a great sensation on its appearance. Among her works in verse are *Fleurs du Midi* (1836); *Ce qui est dans le Cœur des Femmes* (1852); *Le Poème de la Femme* (3 vols. 1853–6). Among her works in prose are *Cœurs Brisés* (1843); *Folles et Saintes* (1844); *Ces Petits Messieurs* (1869), one of her best books; and *Les Dévotes du Grand Monde* (1873).

Coleus, a genus of tropical labiate shrubs and herbs, natives of Asia and Africa. They are grown in greenhouses, chiefly for their brilliant foliage; a great variety of leaf-coloring, some of it exquisitely delicate, having been obtained by hybridization. The garden varieties are all derived from the perennial *C. Blumei,* a native of Java. They are easily propagated by cuttings of the new growth, taken at a joint at any time of the year, and planted separately in small pots, in moderate heat. They are often used for carpet-bedding, as they can stand the continual cutting back. In order to have plants bushy and compact, it is wise to strike first cuttings every spring. In the case of the variegated varieties, the flowers should be pinched out as soon as they appear. Other species worth growing are the white-and-purple-flowered *C. Macraei,* the blue-flowered stove shrub *C. Thyrsoideus,* and the fragrant Abyssinian *C. barbatus.*

Colfax, city, Wash., co. seat of Whitman co., 64 m. s. of Spokane, on the Palouse R. and on the Ore. Ry. and Nav. Co. The manufactures are lumber, flour, malt liquors, and foundry and machine shop products. It is a shipping point for grain, live stock, fruit and lumber. Pop. (1900) 2,121; (1910) 2,783.

Colfax, Schuyler (1823–85), American political leader, born in New York city, a great-grandson of Gen. Philip Schuyler. He received a meagre common-school education, accompanied his mother to Indiana, and in 1845 became editor and proprietor of the *St. Joseph Valley Register,* which he made one of the most influential journals in the state. He himself soon became prominent, first as a Henry Clay Whig, and after 1854 as a Republican, in politics, and was a member of the national House of Representatives (1855–69), in which he was a leading Republican debater, and of which he was Speaker from 1863–9. From 1869 to 1873, during the first administration of Pres. Grant, he was vice-president of the U. S. During this period he was one of those who were charged with corruption in connection with the Crédit Mobilier scandal, the charge referring back to the period of his speakership of the House, and, though the accusation was never conclusively substantiated, his reputation was much impaired and, partly, at least, for this reason, he failed to secure a renomination in 1872.

Colgate, James Boorman (1818–1904), American financier and philanthropist, son of the founder of a great soap and perfumery company, and brother of Samuel Colgate (q.v.), was born in New York city, and after several years in the dry-goods business, established a banking house which in 1873 took the name of James B. Colgate & Co. Mr. Colgate was president of the N. Y. Gold Exchange for several years. Besides erecting a number of churches and colleges, he jointly, with his brother Samuel, gave largely to Madison University at Hamilton, N. Y., the name of which institution was changed to Colgate University in their honor in 1890. Mr. Colgate was of great assistance to the U. S. government in financial matters during the Civil War.

Colgate, Samuel (1822–97), American manufacturer and philanthropist, brother of J. B. Colgate (q.v.) was born in New York city, and, on the completion of his education, succeeded his father as head of the soap and perfumery house of Colgate & Co. With his father and brother he contributed largely to charities, especially those associated with the Baptist church, of many of whose societies he was an officer. Mr. Colgate resided for many years in Orange, N. J.

Colgate University. A collegiate institution at Hamilton, N. Y., founded by the Baptist Education Society in 1819 as the Hamilton Literary and Theological Institution and at first restricted to students for the ministry. In 1846 it was rechartered as Madison University, the present name being assumed in 1890 in recognition of a family of benefactors. The college offers a course in arts and a course in letters and science leading to the bachelor's degree, with graduate courses leading to the master's degrees and the degree of bachelor of divinity.

Colic, a severe griping abdominal pain, spasmodic in character, generally relieved by heat, and unaccompanied by rise of temperature. *Intestinal colic* or *enteralgia* is produced by the spasmodic efforts of the intestinal muscular fibers (exaggerated peristalsis), excited by irritation, obstruction, or cold, and may arise from various causes, of which imperfect or deranged digestion is the most frequent. Colic is especially common in children. In their case, the position with legs flexed on the abdomen, cries of pain, and absence of fever will suggest the condition.

The treatment must depend largely upon the cause. If it is temporary indigestion, the common remedy of a full dose of some purgative—*e.g.*, castor oil—should be efficacious. Hot fomentations, hot poultices, or turpentine stupes can do no harm, and will often give great relief. In a few cases opium should be given, and the patient starved for twenty hours. Where there is reason to believe that there are no serious complications, and especially where there is great distention through flatulence, hot enemata will very likely be all that is required. Carminatives will relieve gastric flatulence, and laxatives may be given later. The colic of infants can often be prevented by attention to the diet, and to methods of feeding. Recurrent colic in older children is treated with drop doses of Fowler's solution of arsenic, taken immediately before meals. Warmer clothing about the abdomen will often prevent attacks where they are due to cold.

Special forms of colic are *appendicular* or *vermicular colic,* due to inflammation of the appendix; *biliary colic,* arising from the passage of gallstones (q. v.) along the bile duct; and *renal colic* caused by the passage of a stone along the ureter; and *gastric colic* (q. v.). The so-called *painters'* or *lead colic* is due to lead poisoning (see Trades, Dangerous).

Coligny, kō-lēn'yi, Gaspard de (1517–72), French admiral, was born in Châtillon-sur-Loing, third son of the Marechal de Châtillon and his wife Louise de Montmorency, sister to the famous duke and constable of that name. He served in Italy under Francis i, and was made (1547) colonel-general of infantry by Henry ii, in which capacity he remodelled the military system. He was created admiral of France in 1552. With a small force he defended St. Quentin for seventeen days against Philip ii of Spain (1557), but he was finally forced to surrender. During his subsequent imprisonment he embraced (1557) the reformed faith, becoming joint leader with Condé of the Huguenot party.

On the accession of Francis ii in 1559, the Guises became all-powerful, and opposed any toleration of the Huguenots. Coligny, however, by his high character and his abilities succeeded, in conjunction with the heads of the Bourbon family, in effecting the treaty known as the 'Pacification of Amboise' (1563), by which the Huguenots were allowed freedom of worship. This concession having been gradually withdrawn by the queen-mother, Catherine de' Medici, the second Huguenot war broke out in 1567, and, on the death of the prince of Condé, Coligny was appointed generalissimo of the forces of Henry of Navarre. Peace was concluded in 1570. Catherine de' Medici, however, again becoming alarmed at the ascendency of Coligny over the young king, Charles ix, organized the massacre of St. Bartholomew. Coligny was murdered in his bed, and his body was thrown into the street.

Consult biographies by Blackburn (2 vols.), Bersier (Eng. trans.), Delaborde (3 vols.), and Whitehead (1904).

Colima, kō-lē'mä, small State, Mexico, on the Pacific coast. Its surface is for the most part mountainous; Colima volcano, on the northern frontier, being 12,750 feet high. Agriculture is the principal occupation of the State, the chief products are sugar, rice, coffee, Indian corn and palm oil. Its principal export is coffee. The area, including the Revilla Gigédo islands, is 2,272 square miles, and the population (1930) 61,923. The chief port is Manzanillo; the capital, Colima.

Colima, city, Mexico, capital of the State of Colima, on the Colima River; 30 miles n.e. of Manzanillo, with which it is connected by rail; and about 36 miles inland from the Pacific coast. It stands in a fertile valley, is well-built, has several cotton factories, and is of commercial importance. Pop. 28,500.

Coliseum. See Colosseum.

Colitis, kō-lī'tis, inflammation of the mucous membrane of the colon. See Enteritis; Diarrhœa.

Colkitto. See Montrose, Marquis of.

Coll, one of the Inner Hebrides Islands, Scotland; 7 miles n.w. of Mull. It is fourteen miles long by two and a half broad, and has an area of 30 square miles. Pop. about 380.

Collab'ora'tion (Lat. *con,* 'with'; *laborare,* 'to work'), the united labor of two or more persons in an artistic production. The term is usually confined to conjoint effort in literary work, as the partnership of Charles Reade and Dion Boucicault (qq. v.) in *Foul Play.* The most famous of all collaborations is that of Beaumont and Fletcher, who lived together for ten years, and as the outcome of their 'mysterious double personality' produced fifty-two plays, a masque, and a number of minor poems. The collaboration of the French writers Erckmann and Chatrian is also notable; the partners began their united career in 1847, and produced a long series of historical novels and dramas.

Collagen. See Albuminoids.

Collapse, a condition of complete nervous exhaustion. It precedes death in certain exhausting diseases, such as cholera; it may follow upon severe hæmorrhage, traumatism even without great loss of blood, deep or widespread burns, and great mental shock, and it results from certain poisons. The body is cold, and often covered with sweat; the pulse is thready, and barely perceptible; the temperature is sub-normal; the face is pale and drawn; the eyes are sunken; the breathing is shallow, at times suspended, at times interrupted by long-drawn sighs. Cardiac stimulants, such as strychnine or adrenalin are indicated, and artificial heat must be applied to the body. In cases resulting from great hæmorrhage, fluid must be supplied by rectal injections of blood-warm normal saline solution (a teaspoonful of table salt to a pint of water), or by the injection of saline solution or blood into a vein. See Shock.

Collapse, Pulmonary (apneumatosis), a condition of a lung, or part of a lung, in which the alveoli no longer expand with air on inspiration, and their walls consequently become approximated. Pulmonary collapse may be caused by positive pressure outside, or by negative pressure inside, the lung. A common cause of positive pressure is the effusion of fluid in pleurisy or pericarditis, while negative pressure in the air-spaces is a result of some obstruction to the free entry of air during inspiration—*e.g.*, a growth or tumor blocking or compressing a bronchial tube, or the swelling and exudation that accompany acute inflammatory troubles of the bronchi in young children, in whom, owing to the narrow caliber of the bronchi, stoppage may easily take place. In such conditions a plug of mucus may act as a ball-plug, being drawn deeper and to the narrower part of the tube with inspiration. This prevents the entrance of air, though the obstruction readily moves upward, and so allows any remaining air to escape on expiration. The tendency to collapse is greater where, through weakness of the chest wall (as, for example, in rickets), inspiratory efforts are difficult. When there is collapse of any considerable extent of lung, respiration is, of course, much affected. The child becomes restless, with a low temperature, livid face, and shallow breathing. Over the inactive part the breath sounds are lost, and the chest gives a dull note on percussion. The danger lies in the possibility of slow suffocation. Every effort must be made to keep up the strength, and to promote expectoration of mucus. Ipecacuanha is useful but it is also a depressant. Bronchoscopic aspiration yields relief in some cases. Inhalation of carbon dioxide in oxygen has been recommended and opiates will relieve pain.

Collar Bone. See Clavicle.

Collaterals, and Collateral Relations, terms used synonymously in law to describe persons who are descendants from a common ancestor, but not in the same direct line of descent, and who, therefore, do not bear the relationship of ancestor and descendant as to each other. Brothers and sisters, cousins, aunts and uncles by blood relation, and nephews and nieces of a given person are collateral relations; whereas his children and grandchildren are known as *lineal* descendants. The degree of relationship is important in the matter of heirship; collaterals being considered heirs and next of kin of a person only when he leaves no lineal descendants.

Collateral Security, sometimes spoken of simply as collateral, is property transferred or delivered, or a separate obligation given to secure or guarantee the payment of a debt or performance of an obligation. The term is most commonly used to designate a delivery or transfer of negotiable paper, bonds, stocks and other securities for the above purpose; but is also properly applied to a pledge of personal property. It signifies something in addition to a principal obligation. In the event of a default in the performance of the obligation or payment of the debt, the creditor is entitled to convert the security into money, apply it towards the satisfaction of his claim, charging the debtor with any deficiency, or paying over to him any surplus remaining after he is indemnified. See Guaranty; Mortgage; Warranty.

Colle, kol'lā, distinguished as Colle di val d'Elsa, town and episcopal see, Italy, 21 miles by rail northwest of Siena. It consists of an old town, with a thirteenth-century cathedral and sixteenth-century houses, and a lower, newer town, with iron, paper, and glass factories. Pop. (1936) 11,052.

Col'lect, a short prayer used in the services of the Roman Catholic Church and the Anglican communion, proper to the day or to some special object. The origin of the name is uncertain. The original expression was *oratio ad collectam,* referring to the gathering for prayer. In the Book of Common Prayer are included some very ancient collects—*e.g.,* those for the 3d, 5th, 9th, 10th, 12th, 13th, and 14th Sundays after Easter, which are all found in the Sacramentary of St. Leo (A.D. 440–461). Twenty-one (as for the 4th Sunday in Advent, Easter Day, etc.) are found in the Sacramentary of St. Gelasius A.D. 492–496). Thirty-two (as for St. Stephen, Epiphany, etc.) are found in the Sacramentary of St. Gregory (A.D. 590–604). Others are adapted from ancient prayers (as the collects for the 1st Sunday in Advent, Christmas Day, Ash Wednesday, and the 1st Sunday after Easter). In addition to these are fifteen composed in A.D. 1549, one in 1552, and three in 1661. Consult Blunt's *Annotated Book of Common Prayer;* Canon Bright's *Ancient Collects;* and *On the Collects.*

Collective Bargaining. See Trade Unions.

Collectivism, a term expressing the central idea in the economic theory of socialism, that industry should be carried on with a collective capital, not owned and controlled by individuals, but by groups of associated workers. See Socialism.

College. The term college (*collegium*) in its Roman significance denoted any association of persons organized for a specific purpose—mercantile, religious or political, as the College of Augurs (see Augur), or the College of Magistrates; and traces of this usage still remain, as in the College of Heralds of England and Scotland (see Herald). In modern use generally, however, the word college denotes an institution of higher learning. In England it is applied usually to the sub-corporation of a university—as Trinity College, Cambridge, Balliol College, Oxford, etc. In the United States and Canada, as in Scotland, the distinction between the college and the university is less clear than in England. In general it may be said that the term college covers all institutions of higher learning, while university is restricted to institutions offering graduate work and having affiliated professional schools.

For discussion of the development of both college and university, see Universities. See also Education; Education in Canada; Education in the United States; and articles on the various colleges and universities of the world. See list of Colleges.

Collège de France, kō-lezh' de fräns', The, founded at Paris about 1530 by Francis I, to further the study of languages and oppose the prevailing scholasticism of the university. Originally only two lecturers were appointed, Greek and Hebrew; but Latin was added in 1534, and the institution was then known as the Collège de Trois Langues. Medicine, botany, Arabic, Syriac, literature, law, and various sciences were added under successive monarchs, until now there are forty-two chairs, and the curriculum embraces the whole field of human knowledge. Instruction is free, but no diplomas are given. The college is now under the sole charge of the minister of public instruction, but is in reality self-governing. When a vacancy occurs in the professoriate, a list of candidates is presented by the Collège de France and another list by the Institute of France, and from these two lists the new professor is selected by the president of the republic. Consult Lefranc's *Histoire du Collège de France* (1892).

College Point, former village, Long Island, New York, on the East River; one mile north of Flushing. It was incorporated in the Borough of Queens, New York City, in 1898.

Collegia Nationalia, kol-lā'jä nä-tzō-nä'li-ä, or Pontificia, several schools at Rome in which pupils of various nationalities are specially trained for spreading the Roman Catholic faith after their return to their native countries. The first college of this kind, the Collegium Germanicum, was founded by Ignatius Loyola in 1552, and reorganized in 1573 by Pope Gregory XIII who on the same model founded Greek, Maronite, English, and other colleges. A Scottish college was founded in 1600.

American Colleges and Universities

Name	Location and Foundation
Abilene Christian College (coed)	Abilene, Texas (1906)
Adams State College of Colorado	Alamosa, Colorado (1921)
Adelphi College (women)	Garden City, N. Y. (1896)
Adrian College (coed)	Adrian, Mich. (1839)
Agnes Scott College (women)	Decatur, Ga. (1889)
Agricultural and Mechanical College of Texas (men)	College Station, Tex. (1876)
Akron, University of	Akron, Ohio (1870)
Alabama College (women)	Montevallo, Ala. (1896)
Alabama Polytechnic Institute (coed)	Auburn, Ala. (1872)
Alaska, University of	College, Alaska (1917)
Albany State College	Albany, Ga. (1904)
Albertus Magnus College (women)	New Haven, Conn. (1925)
Albright College (coed)	Reading, Pa. (1856)
Alcorn Agricultural and Mechanical College (coed; colored)	Alcorn, Miss. (1871)
Alderson-Broaddus College (coed)	Philippi, W. Va. (1932)
Alfred University (coed)	Alfred, N. Y. (1836)
Allegheny College (coed)	Meadville, Pa. (1815)
Allen University (coed; colored)	Columbia, S. C. (1870)
Alma College (coed)	Alma, Mich. (1886)
Alma White College (coed)	Zarephath, N. J. (1921)
Amarillo College	Amarillo, Tex. (1929)
American International College (coed)	Springfield, Mass. (1885)
American University (coed)	Washington, D. C. (1891)
Amherst College (men)	Amherst, Mass. (1821)
Anderson College (women)	Anderson, S. C. (1910)
Andrew College	Cuthbert, Ga. (1854)
Antioch College (coed)	Yellow Springs, Ohio (1853)
Arkansas College (coed)	Batesville, Ark. (1872)
Arkansas State A. and M. College	Magnolia, Ark. (1909)
Armstrong College	Berkeley, Calif. (1918)
Asbury College (coed)	Wilmore, Ky. (1890)
Ashland College (coed)	Ashland, Ohio (1878)
Athens College for Young Women	Athens, Ala. (1842)
Atlanta University (coed; colored)	Atlanta, Ga. (1865)
Atlantic Christian College (coed)	Wilson, N. C. (1902)
Atlantic Union College (coed)	So. Lancaster, Mass. (1882)
Augsburg College and Theological Seminary (coed)	Minneapolis, Minn. (1869)
Augustana College	Sioux Falls, S. D. (1860)
Augustana College and Theological Seminary (coed)	Rock Island, Ill. (1860)
Aurora College (coed)	Aurora, Ill. (1893)
Austin Peay State College	Clarkville, Tenn. (1927)
Baker University (coed)	Baldwin, Kan. (1858)
Baldwin-Wallace College (coed)	Berea, Ohio (1845)
Baltimore, University of	Baltimore, Md. (1925)
Barber-Scotia College	Concord, N. H. (1867)
Bard College	Annandale-on-Hudson, N. Y. (1860)
Barnard College (women)	New York City (1889)
Bates College (coed)	Lewiston, Me. (1864)
Baylor University (coed)	Waco, Texas (1845)
Beckley College	Beckley, W. Va. (1933)
Belhaven College (women)	Jackson, Miss. (1894)
Beloit College (coed)	Beloit, Wis. (1846)
Bennett College (women; colored)	Greensboro, N. C. (1873)
Bennington College (women)	Bennington, Vt. (1925)
Berea College (coed)	Berea, Ky. (1855)
Berry College (coed)	Mount Berry, Ga. (1902)
Bessie Tift College (women)	Forsyth, Ga. (1847)
Bethany College (coed)	Lindsborg, Kan. (1881)
Bethany-Peniel	Bethany, Okla. (1899)
Bethel College (coed)	McKenzie, Tenn. (1847)
Bethel College (coed)	Newton, Kan. (1887)
Bethune-Cookman College	Daytona Beach, Fla. (1872)
Biltmore College	Asheville, N. C. (1927)
Birmingham Southern College (coed)	Birmingham, Ala. (1856)
Bishop College (coed; colored)	Marshall, Texas (1880)
Blackburn College	Carlinville, Ill. (1857)
Bluefield College	Bluefield, Va. (1921)
Bluefield State College	Bluefield, W. Va. (1895)
Blue Mountain College (women)	Blue Mountain, Miss. (1873)
Bluffton College (coed)	Bluffton, Ohio (1900)
Bob Jones College (coed)	Cleveland, Tenn. (1926)
Boston College (men)	Chestnut Hill, Mass. (1863)
Boston University (coed)	Boston, Mass. (1869)
Bowdoin College (men)	Brunswick, Me. (1794)
Bowling Green State Univ. (coed)	Bowling Green, Ohio (1910)
Bradley Polytechnic Institute (coed)	Peoria, Ill. (1897)
Brenau College (women)	Gainesville, Ga. (1878)
Briar Cliff College	Sioux City, S. D. (1930)
Bridgewater College (coed)	Bridgewater, Va. (1880)
Brigham Young Univ. (coed)	Provo, Utah (1875)
Brooklyn College (coed)	Brooklyn, N. Y. (1930)
Brown University (men)	Providence, R. I. (1764)
Bryn Mawr College (women)	Bryn Mawr, Pa. (1885)
Bucknell University (coed)	Lewisburg, Pa. (1846)
Buena Vista College (coed)	Storm Lake, Iowa (1891)
Butler University (coed)	Indianapolis, Ind. (1855)
California Institute of Technology (men)	Pasadena, Calif. (1891)
Calvin College (coed)	Grand Rapids, Mich. (1876)
Campbellsville College	Campbellsville, Ky. (1907)
Canisius College (men)	Buffalo, N. Y. (1870)
Capital University (coed)	Columbus, Ohio (1850)
Carleton College (coed)	Northfield, Minn. (1866)
Carnegie Institute of Technology (coed)	Pittsburgh, Pa. (1900)
Carroll College (coed)	Waukesha, Wis. (1846)
Carroll College (men)	Helena, Mont. (1909)
Carson-Newman College (coed)	Jefferson City, Tenn. (1851)
Carthage College (coed)	Carthage, Ill. (1870)
Case School of Applied Science (men)	Cleveland, Ohio (1880)
Catawba College (coed)	Salisbury, N. C. (1851)
Catholic University of America (men)	Washington, D. C. (1887)
Cedar Crest College (women)	Allentown, Pa. (1868)
Cedarville College (coed)	Cedarville, Ohio (1894)
Centenary College of Louisiana (coed)	Shreveport, La. (1825)
Central College (coed)	Pella, Iowa (1853)
Central College	Conway, Ark. (1892)
Central College (coed)	Fayette, Mo. (1854)
Central College	McPherson, Kan. (1914)
Central Michigan College of Education	Mt. Pleasant, Mich. (1892)
Central State College	Edmond, Okla. (1890)
Centre College (coed)	Danville, Ky. (1819)
Chapman College (coed)	Los Angeles, Calif. (1912)
Chestnut Hill College	Philadelphia, Pa. (1871)
Chico State College	Chico, Calif. (1887)
Christian College	Columbia, Mo. (1851)
Citadel, The (men)	Charleston, S. C. (1842)
Claremont Colleges	Claremont, Calif. (1925)
Clark College	Atlanta, Ga. (1869)
Clark University (men)	Worcester, Mass. (1887)
Clarke College (women)	Dubuque, Iowa (1843)
Clarkson College of Technology (men)	Potsdam, N. Y. (1895)
Coe College (coed)	Cedar Rapids, Iowa (1881)
Coker College (women)	Hartsville, S. C. (1908)
Colby College (coed)	Waterville, Me. (1820)
Colgate University (men)	Hamilton, N. Y. (1819)
College of Charleston (coed)	Charleston, S. C. (1785)
College of Emporia (coed)	Emporia, Kan. (1882)
College of Idaho (coed)	Caldwell, Idaho (1891)
College of Mount Saint Vincent (women)	Mount St. Vincent, N. Y. (1910)
College of New Rochelle (women)	New Rochelle, N. Y. (1904)
College of Notre Dame of Maryland (women)	Baltimore, Md. (1896)
College of Puget Sound (coed)	Tacoma, Wash. (1888)
College of the Sacred Heart	Grand Coteau, La. (1821)
College of St. Benedict (women)	St. Joseph, Minn. (1913)
College of St. Catherine (women)	St. Paul, Minn. (1911)
College of St. Elizabeth (women)	Convent Station, N. J. (1899)
College of St. Francis (women)	Joliet, Ill. (1874)
College of St. Rose (women)	Albany, N. Y. (1920)
College of St. Teresa (women)	Winona, Minn. (1910)
College of St. Thomas (men)	St. Paul, Minn. (1885)
College of the City of New York (men and women)	New York, N. Y. (1847)
College of the Holy Cross (men)	Worcester, Mass. (1843)
College of the Holy Names (women)	Oakland, Calif. (1880)
College of the Ozarks (coed)	Clarksville, Ark. (1891)
College of the Pacific (coed)	Stockton, Calif. (1851)
College of Wooster (coed)	Wooster, Ohio (1866)
Colorado College (coed)	Colorado Springs, Colo. (1874)
Colorado School of Mines (men)	Golden, Colo. (1874)
Colorado State Agricultural College (coed)	Fort Collins, Colo. (1870)
Colorado Woman's College	Denver, Colo. (1888)
Columbia University (coed)	New York City (1754)
Columbia Woman's College	Denver, Colo. (1888)
Concord College	Athens, W. Va. (1872)
Concordia College	St. Paul, Minn. (1893)
Concordia College (coed)	Moorhead, Minn. (1891)
Concordia College	Milwaukee, Wis. (1881)
Connecticut, University of	Storrs, Conn. (1881)
Connecticut College	New London, Conn. (1911)
Converse College (women)	Spartanburg, S. C. (1889)
Cooper Union (coed)	New York City (1859)
Cornell College (coed)	Mt. Vernon, Iowa (1853)
Cornell University (coed)	Ithaca, N. Y. (1865)

American Colleges and Universities—Continued

Name	Location and Foundation
Creighton University (coed)	Omaha, Neb. (1878)
Culver-Stockton College (coed)	Canton, Mo. (1853)
Cumberland University (coed)	Lebanon, Tenn. (1842)
Dakota Wesleyan Univ. (coed)	Mitchell, S. D. (1883)
Dana College	Blair, Neb. (1884)
Dartmouth College	Hanover, N. H. (1769)
Davidson College (men)	Davidson, N. C. (1836)
Davis and Elkins College (coed)	Elkins, W. Va. (1904)
Defiance College (coed)	Defiance, Ohio (1902)
Denison University (coed)	Granville, Ohio (1831)
De Paul University (coed)	Chicago, Ill. (1898)
De Pauw University (coed)	Greencastle, Ind. (1837)
Detroit Institute of Technology	Detroit, Mich. (1891)
Dickinson College (coed)	Carlisle, Pa. (1783)
Dillard Univ. (coed; colored)	New Orleans, La. (1930)
Doane College (coed)	Crete, Neb. (1872)
Drake University (coed)	Des Moines, Iowa (1881)
Drew University (coed)	Madison, N. J. (1867)
Drexel Institute of Technology (coed)	Philadelphia, Pa. (1891)
Dropsie College (coed)	Philadelphia, Pa. (1907)
Drury College (coed)	Springfield, Mo. (1873)
Duchesne College	Omaha, Neb. (1882)
Duke University (coed)	Durham, N. C. (1838)
Duquesne University (coed)	Pittsburgh, Pa. (1878)
D'Youville College (women)	Buffalo, N. Y. (1908)
Earlham College (coed)	Richmond, Ind. (1847)
Eastern Nazarene College (coed; colored)	Wollaston, Mass. (1918)
Eastern New Mexico College	Portales, N. M. (1927)
Elizabethtown College (coed)	Elizabethtown, Pa. (1899)
Elmhurst College (coed)	Elmhurst, Ill. (1871)
Elmira College (women)	Elmira, N. Y. (1855)
Elon College (coed)	Elon College, N. C. (1889)
Emerson College (coed)	Boston, Mass. (1880)
Emmanuel College (women)	Boston, Mass. (1919)
Emmanuel Missionary College (coed)	Berrien Springs, Mich. (1874)
Emory and Henry College (coed)	Emory, Va. (1836)
Emory University (coed)	Atlanta, Ga. (1836)
Erskine College (coed)	Due West, S. C. (1839)
Eureka College (coed)	Eureka, Ill. (1855)
Evansville College (coed)	Evansville, Ind. (1854)
Fairmont State College	Fairmont, W. Va. (1867)
Fenn College (coed)	Cleveland, Ohio (1930)
Findlay College (coed)	Findlay, Ohio (1882)
Fisk University (coed)	Nashville, Tenn. (1865)
Flora Macdonald College (women)	Red Springs, N. C. (1896)
Florida Agricultural and Mechanical College (coed; colored)	Tallahassee, Fla. (1887)
Florida Southern College (coed)	Lakeland, Fla. (1886)
Florida State College for Women	Tallahassee, Fla. (1905)
Fontbonne College	St. Louis, Mo. (1917)
Fordham University (men)	New York City (1841)
Fort Valley State College	Fort Valley, Ga. (1895)
Franklin and Marshall College (men)	Lancaster, Pa. (1787)
Franklin College of Indiana (coed)	Franklin, Ind. (1834)
Franklin University	Columbus, O. (1902)
Friends University (coed)	Wichita, Kan. (1898)
Furman University (men)	Greenville, S. C. (1826)
Gallaudet College (coed)	Washington, D. C. (1864)
Gary College	Gary, Ind. (1932)
Geneva College (coed)	Beaver Falls, Pa. (1848)
Georgetown College (coed)	Georgetown, Ky. (1829)
Georgetown University (men)	Washington, D. C. (1789)
George Washington University (coed)	Washington, D. C. (1821)
George Williams College (coed)	Chicago, Ill. (1890)
Georgian Court College (women)	Lakewood, N. J. (1908)
Georgia School of Technology (men)	Atlanta, Ga. (1888)
Georgia State College	Industrial College, Ga. (1890)
Georgia State College for Women	Milledgeville, Ga. (1889)
Georgia State Woman's College	Valdosta, Ga. (1906)
Gettysburg College (men)	Gettysburg, Pa. (1832)
Glendale College	Glendale, Calif. (1927)
Glenville State College	Glenville, W. Va. (1872)
Gonzaga University (men)	Spokane, Wash. (1887)
Goshen College (coed)	Goshen, Ind. (1894)
Goucher College (women)	Baltimore, Md. (1885)
Graceland College	Lamoni, Ia. (1895)
Grand View College	Des Moines, Ia. (1895)
Greensboro College (women)	Greensboro, N. C. (1838)
Greenville College (coed)	Greenville, Ill. (1892)
Grinnell College (coed)	Grinnell, Iowa (1846)
Grove City College (coed)	Grove City, Pa. (1876)
Guilford College (coed)	Guilford College, N. C. (1834)

Name	Location and Foundation
Gulf Park College	Gulfport, Miss. (1919)
Gustavus Adolphus College (coed)	St. Peter, Minn. (1862)
Hamilton College (men)	Clinton, N. Y. (1812)
Hamline University (coed)	St. Paul, Minn. (1854)
Hampden-Sydney College (men)	Hampden-Sydney, Va. (1775)
Hampton Institute	Hampton, Va. (1868)
Hannibal-LaGrange College	Hannibal, Mo. (1858)
Hanover College (coed)	Hanover, Ind. (1827)
Harding College (coed)	Searcy, Ark. (1924)
Hardin-Simmons Univ. (coed)	Abilene, Texas (1891)
Hartwick College (coed)	Oneonta, N. Y. (1928)
Harvard University (men)	Cambridge, Mass. (1636)
Hastings College (coed)	Hastings, Neb. (1882)
Haverford College (men)	Haverford, Pa. (1833)
Hebrew Union College	Cincinnati, Ohio (1875)
Heidelberg College (coed)	Tiffin, Ohio (1850)
Henderson State Teachers College (coed)	Arkadelphia, Ark. (1929)
Hendrix College (coed)	Conway, Ark. (1884)
High Point College (coed)	High Point, N. C. (1924)
Hillsdale College (coed)	Hillsdale, Mich. (1844)
Hiram College (coed)	Hiram, Ohio (1850)
Hobart and William Smith Colleges	Geneva, N. Y. (1822)
Hofstra College	Hempstead, N. Y. (1935)
Hollins College (women)	Hollins, Va. (1842)
Holy Names College	Spokane, Wash. (1907)
Hood College (women)	Frederick, Md. (1893)
Hope College (coed)	Holland, Mich. (1866)
Houghton College (coed)	Houghton, N. Y. (1923)
Houston, University of	Houston, Tex. (1927)
Howard College (coed)	Birmingham, Ala. (1841)
Howard Payne College (coed)	Brownwood, Tex. (1889)
Howard University (coed; col.)	Washington, D. C. (1867)
Humboldt State College	Arcata, Calif. (1913)
Hunter College (women)	New York City (1870)
Huntington College (coed)	Huntington, Ind. (1897)
Huntingdon College (women)	Montgomery, Ala. (1909)
Huron College (coed)	Huron, S. D. (1883)
Illinois College (coed)	Jacksonville, Ill. (1829)
Illinois Institute of Technology	Chicago, Ill. (1892)
Illinois State Normal University	Normal, Ill. (1857)
Illinois Wesleyan Univ. (coed)	Bloomington, Ill. (1850)
Immaculata College (women)	Immaculata, Pa. (1920)
Incarnate Word College (women)	San Antonio, Tex. (1881)
Indiana Central College (coed)	Indianapolis, Ind. (1902)
Indiana University (coed)	Bloomington, Ind. (1820)
Iowa State College	Ames, Iowa (1869)
Iowa Wesleyan College (coed)	Mount Pleasant, Iowa (1842)
Iowa, University of	Iowa City, Ia. (1847)
Ithaca College	Ithaca, N. Y. (1892)
Jackson College	Jackson, Miss. (1877)
James Millikin Univ. (coed)	Decatur, Ill. (1903)
Jamestown College (coed)	Jamestown, N. D. (1883)
Jarvis Christian College	Hawkins, Tex. (1910)
John Brown University (coed)	Siloam Springs, Ark. (1919)
John B. Stetson Univ. (coed)	Deland, Fla. (1883)
John Carroll University (men)	Cleveland, Ohio (1886)
Johns Hopkins University (men and women)	Baltimore, Md. (1867)
Judson College (men)	Marion, Ala. (1838)
Juniata College (coed)	Huntingdon, Pa. (1876)
Kalamazoo College (coed)	Kalamazoo, Mich. (1833)
Kansas City, University of	Kansas City, Mo. (1929)
Kansas State College of Agriculture and Applied Sciences (coed)	Manhattan, Kan. (1863)
Kansas Wesleyan Univ. (coed)	Salina, Kan. (1885)
Kent State University (coed)	Kent, Ohio (1910)
Kentucky Wesleyan College (coed)	Winchester, Ky. (1860)
Kenyon College (men)	Gambier, Ohio (1824)
Keuka College (women)	Keuka Park, N. Y. (1888)
Keystone College	La Plume, Pa. (1868)
Kilgore College	Kilgore, Tex. (1935)
King College (coed)	Bristol, Tenn. (1867)
Knox College (coed)	Galesburg, Ill. (1837)
Knoxville College (coed)	Knoxville, Tenn. (1875)
Lafayette College (men)	Easton, Pa. (1826)
LaGrange College (women)	LaGrange, Ga. (1831)
Lake Erie College (women)	Painesville, Ohio (1856)
Lake Forest College (coed)	Lake Forest, Ill. (1857)
Lander College (women)	Greenwood, S. C. (1872)
Lane College (coed)	Jackson, Tenn. (1882)
LaSalle College (men)	Philadelphia, Pa. (1863)
LaSierra College	Arlington, Calif. (1922)
Langston University	Langston, Okla. (1897)
LaVerne College (coed)	La Verne, Calif. (1891)

American Colleges and Universities—Continued

Name	Location and Foundation
Lawrence Institute of Technology	Detroit, Mich. (1932)
Lebanon Valley College (coed)	Annville, Pa. (1866)
Lehigh University (men)	Bethlehem, Pa. (1866)
Le Moyne College (coed; colored)	Memphis, Tenn. (1870)
Lenoir-Rhyne College (coed)	Hickory, N. C. (1891)
Lesley College	Cambridge, Mass. (1909)
Lewis and Clark College	Portland, Ore. (1867)
Limestone College (women)	Gaffney, S. C. (1845)
Lincoln College (coed)	Lincoln, Ill. (1865)
Lincoln Memorial Univ. (coed)	Harrogate, Tenn. (1897)
Lincoln University	Jefferson City, Mo. (1866)
Lincoln University (men)	Lincoln University, Pa. (1854)
Lindenwood College for Women	St. Charles, Mo. (1827)
Linfield College (coed)	McMinnville, Ore. (1857)
Livingstone College (coed)	Salisbury, N. C. (1879)
Long Beach City College	Long Beach, Calif. (1927)
Long Island University (coed)	Brooklyn, N. Y. (1926)
Loretto Heights College (women)	Loretto, Colo. (1918)
Los Angeles City College	Los Angeles, Calif. (1929)
Louisburg College	Louisburg, N. C. (1787)
Louisiana College (coed)	Pineville, La. (1906)
Louisiana Polytechnic Institute (coed)	Ruston, La. (1894)
Louisiana State Univ. (coed)	Baton Rouge, La. (1860)
Lowell Textile Institute (coed)	Lowell, Mass. (1895)
Loyola College (men)	Baltimore, Md. (1852)
Loyola University (coed)	Chicago, Ill. (1870)
Loyola University (coed)	New Orleans, La (1911)
Loyola University (men)	Los Angeles, Calif. (1865)
Luther College (men)	Decorah, Iowa (1861)
Lynchburg College (coed)	Lynchburg, Va. (1903)
Macalester College (coed)	St. Paul, Minn. (1885)
MacMurray College for Women	Jacksonville, Ill. (1846)
Madison College	Madison College, Tenn. (1904)
Madison College	Harrisonburg, Va. (1908)
Mallinckrodt College	Wilmette, Ill. (1918)
Manchester College (coed)	No. Manchester, Ind. (1889)
Manhattan College (men)	New York City (1863)
Marian College	Indianapolis, Ind. (1937)
Marietta College (coed)	Marietta, Ohio (1835)
Marion College (coed)	Marion, Ind. (1919)
Marquette University (coed)	Milwaukee, Wis. (1881)
Marshall College (coed)	Huntington, W. Va. (1837)
Martin College	Pulaski, Tenn. (1870)
Mary Baldwin College (women)	Staunton, Va. (1842)
Marygrove College (women)	Detroit, Mich. (1910)
Marymount College	Los Angeles, Calif. (1935)
Marymount College (women)	Salina, Kansas (1919)
Marymount College (women)	Tarrytown, N. Y. (1907)
Maryville College (coed)	Maryville, Tenn. (1819)
Maryville College of the Sacred Heart (women)	St. Louis, Mo. (1872)
Mary Washington College	Fredericksburg, Va. (1908)
Marywood College (women)	Scranton, Pa. (1915)
Massachusetts Institute of Technology (coed)	Cambridge, Mass. (1861)
Massachusetts State College (coed)	Amherst, Mass. (1863)
McKendree College (coed)	Lebanon, Ill. (1828)
McPherson College (coed)	McPherson, Kan. (1887)
Memphis State College	Memphis, Tenn. (1909)
Mercer University (coed)	Macon, Ga. (1833)
Mercyhurst College (women)	Erie, Pa. (1924)
Meredith College (women)	Raleigh, N. C. (1891)
Miami, University of	Coral Gables, Fla. (1925)
Miami University (coed)	Oxford, Ohio (1809)
Michigan College of Mining and Technology (coed)	Houghton, Mich. (1885)
Michigan State College	East Lansing, Mich. (1857)
Middlebury College (coed)	Middlebury, Vt. (1800)
Middle Georgia College	Cochran, Ga. (1875)
Middle Tennessee State College	Murfreesboro, Tenn. (1909)
Middlesex University	Waltham & Boston, Mass. (1845)
Midland College (coed)	Fremont, Neb. (1887)
Miles Memorial College (coed; colored)	Birmingham, Ala. (1902)
Mills College (women)	Oakland, Calif. (1852)
Millsaps College (coed)	Jackson, Miss. (1890)
Milwaukee-Downer College (women)	Milwaukee, Wis. (1851)
Misericordia College (women)	Dallas, Pa. (1923)
Mission House College and Theological Seminary (coed)	Plymouth, Wis. (1862)
Mississippi College (men)	Clinton, Miss. (1826)
Mississippi Southern College	Hattiesburg, Miss. (1910)
Mississippi State College (coed)	State College, Miss. (1878)
Mississippi State College for Women	Columbus, Miss. (1884)
Missouri Valley College (coed)	Marshall, Mo. (1889)
Mitchell College	Statesville, N. C. (1853)
Monmouth College (coed)	Monmouth, Ill. (1856)

Name	Location and Foundation
Montana School of Mines (coed)	Butte, Mont. (1893)
Montana State College (coed)	Bozeman, Mont. (1893)
Montana State Univ. (coed)	Missoula, Mont. (1893)
Monticello College	Alton, Ill. (1835)
Montreat College	Montreat, N. C. (1916)
Moravian College and Theological Seminary (men)	Bethlehem, Pa. (1807)
Moravian Seminary and College for Women	Bethlehem, Pa. (1742)
Morehouse College	Atlanta, Ga. (1867)
Morgan College (coed)	Baltimore, Md. (1867)
Morningside College (coed)	Sioux City, Iowa (1894)
Morris Brown University (coed)	Atlanta, Ga. (1881)
Mount Holyoke College (women)	South Hadley, Mass. (1836)
Mount Mary College (women)	Milwaukee, Wis. (1915)
Mount St. Clare College	Clinton, Ia. (1918)
Mount St. Mary College	Los Angeles, Calif. (1925)
Mount St. Mary College (men)	Emmitsburg, Md. (1808)
Mount St. Scholastica College (women)	Atchison, Kan. (1863)
Mount Union College (coed)	Alliance, Ohio (1846)
Muhlenberg College (men)	Allentown, Pa. (1867)
Multnomah College	Portland, Ore. (1897)
Municipal University of Omaha (coed)	Omaha, Neb. (1908)
Municipal University of Wichita	Wichita, Kan. (1926)
Muskingum College (coed)	New Concord, Ohio (1837)
Nasson College (women)	Springvale, Maine (1912)
National University	Washington, D. C. (1869)
Nazareth College	Louisville, Ky. (1920)
Nazareth College (women)	Nazareth, Mich. (1897)
Nebraska Central College	Central City, Neb. (1899)
Nebraska Wesleyan Univ. (coed)	Lincoln, Neb. (1888)
Newark, University of	Newark, N. J. (1933)
Newberry College (coed)	Newberry, S. C. (1856)
New Mexico College of Agriculture and Mechanic Arts (coed)	State College, N. M. (1889)
New Mexico Highlands University	Las Vegas, N. M. (1893)
New Mexico School of Mines (coed)	Socorro, N. M. (1889)
New York State College of Forestry (men)	Syracuse, N. Y. (1911)
New York University (coed)	New York City (1831)
North Central College (coed)	Naperville, Ill. (1861)
North Dakota Agricultural College (coed)	Fargo, N. D. (1890)
Northeastern University (men)	Boston, Mass. (1898)
North Georgia College (coed)	Dahlonega, Ga. (1873)
North Park College	Chicago, Ill. (1891)
Northern Montana College	Havre, Mont. (1929)
Northland College (coed)	Ashland, Wis. (1907)
Northwestern College (coed)	Watertown, Wis. (1864)
Northwestern State College	Alva, Okla. (1897)
Northwestern University (coed)	Evanston, Ill. (1851)
Norwich University (men)	Northfield, Vt. (1819)
Notre Dame College	South Euclid, Ohio (1922)
Oakland City College (coed)	Oakland City, Ind. (1885)
Oakwood College	Huntsville, Ala. (1896)
Oberlin College (coed)	Oberlin, Ohio (1833)
Occidental College (coed)	Los Angeles, Calif. (1887)
Oglethorpe University (coed)	Oglethorpe University, Ga. (1913)
Ohio State University (coed)	Columbus, Ohio (1870)
Ohio University (coed)	Athens, Ohio (1804)
Ohio Wesleyan Univ. (coed)	Delaware, Ohio (1842)
Oklahoma Agricultural and Mechanical College (coed)	Stillwater, Okla. (1891)
Oklahoma Baptist Univ. (coed)	Shawnee, Okla. (1906)
Oklahoma College for Women	Chickasha, Okla. (1908)
Olivet College (coed)	Olivet, Mich. (1844)
Oregon State College (coed)	Corvallis, Ore. (1868)
Otterbein College (coed)	Westerville, Ohio (1847)
Ouachita College (coed)	Arkadelphia, Ark. (1866)
Pacific College (coed)	Newberg, Ore. (1891)
Pacific Union College (coed)	Angwin, Calif. (1909)
Pacific University (coed)	Forest Grove, Ore. (1849)
Paine College (coed)	Augusta, Ga. (1883)
Park College (coed)	Parkville, Mo. (1875)
Parsons College (coed)	Fairfield, Iowa (1875)
Pasadena College (coed)	Pasadena, Calif. (1902)
Peace College	Raleigh, N. C. (1857)
Pembroke State College for Indiana	Pembroke, N. C. (1887)
Pennsylvania College for Women	Pittsburgh, Pa. (1869)
Pennsylvania Military College (men)	Chester, Pa. (1821)
Pennsylvania State College (coed)	State College, Pa. (1855)
Phillips University (coed)	Enid, Okla. (1907)
Piedmont College (coed)	Demorest, Ga. (1897)
Pikeville College	Pikeville, Ky. (1889)

American Colleges and Universities—Continued

Name	*Location and Foundation*
Polytechnic Institute of Brooklyn (men)	Brooklyn, N. Y. (1853)
Pomona College (coed)	Claremont, Calif. (1887)
Portland, University of	Portland, Ore. (1901)
Prairie View State College (coed)	Prairie View, Texas (1876)
Pratt Institute (coed)	Brooklyn, N. Y. (1887)
Presbyterian College (men)	Clinton, S. C. (1880)
Princeton University (men)	Princeton, N. J. (1746)
Providence College	Providence, R. I. (1917)
Puget Sound College	Tacoma, Wash. (1888)
Purdue University (coed)	Lafayette, Ind. (1869)
Queens College	Charlotte, N. C. (1857)
Queens College	Flushing, N. Y. (1937)
Quincy College	Quincy, Ill. (1860)
Radcliffe College (women)	Cambridge, Mass. (1879)
Randolph-Macon College (men)	Ashland, Va. (1830)
Randolph-Macon Woman's College	Lynchburg, Va. (1893)
Reed College (coed)	Portland, Ore. (1911)
Regis College (men)	Denver, Colo. (1888)
Regis College (women)	Weston, Mass. (1926)
Rensselaer Polytechnic Institute (men)	Troy, N. Y. (1824)
Rhode Island State College (coed)	Kingston, R. I. (1892)
Rice Institute (coed)	Houston, Texas (1912)
Ricks College	Rexburg, Idaho (1888)
Rider College	Trenton, N. J. (1865)
Rio Grande College (coed)	Rio Grande, Ohio (1876)
Ripon College (coed)	Ripon, Wis. (1851)
Riverside College	Riverside, Calif. (1916)
Rivier College	Nashua, N. H. (1933)
Roanoke College (men)	Salem, Va. (1853)
Rockford College (women)	Rockford, Ill. (1847)
Rockhurst College (men)	Kansas City, Mo. (1914)
Rollins College (coed)	Winter Park, Fla. (1885)
Rosary College (women)	River Forest, Ill. (1901)
Rosemont College (women)	Rosemont, Pa. (1921)
Rose Polytechnic Institute (men)	Terre Haute, Ind. (1874)
Russell Sage College (women)	Troy, N. Y. (1916)
Rutgers University (men)	New Brunswick, N. J. (1766)
Sacramento College	Sacramento, Calif. (1916)
Sacred Heart College	Grand Coteau, La. (1821)
St. Ambrose College (men)	Davenport, Iowa (1882)
St. Angelo College	San Angelo, Tex. (1928)
St. Anselm's College (men)	Manchester, N. H. (1889)
St. Augustine's College	Raleigh, N. C. (1867)
St. Benedict, College of	St. Joseph, Minn. (1913)
St. Benedict's College (men)	Atchison, Kan. (1858)
St. Bonaventure College (men)	Allegany, N. Y. (1859)
St. Catherine, College of	St. Paul, Minn. (1911)
St. Charles College	Cantonville, Md. (1830)
St. Francis College	Fort Wayne, Ind. (1890)
St. Francis College (men)	Brooklyn, N. Y. (1858)
St. John's College	Winfield, Kan. (1893)
St. John's College (men)	Annapolis, Md. (1696)
St. John's University (men and women)	Brooklyn, N. Y. (1870)
St. John's Univ. (men)	Collegeville, Minn. (1857)
St. Joseph College (women)	West Hartford, Conn. (1932)
St. Joseph's College (women)	Emmitsburg, Md. (1809)
St. Joseph's College (men)	Philadelphia, Pa. (1857)
St. Joseph's College for Women	Brooklyn, N. Y. (1916)
St. Lawrence College	Mt. Calvary, Wis. (1860)
St. Lawrence Univ. (coed)	Canton, N. Y. (1856)
St. Louis Univ. (coed)	St. Louis, Mo. (1818)
St. Martin's College	Lacey, Wash. (1895)
St. Mary, College of	Omaha, Neb. (1923)
St. Mary College (women)	Leavenworth, Kan. (1923)
St. Mary-of-the-Woods College (women)	St. Mary-of-the-Woods, Ind. (1840)
St. Mary's College (women)	Notre Dame, Ind. (1843)
St. Mary's College (men)	St. Mary, Ky. (1821)
St. Mary's College (men)	St. Mary's, Calif., (1863)
St. Mary's College (men)	St. Mary's, Kan. (1848)
St. Mary's College (men)	Winona, Minn. (1910)
St. Mary's Univ. (coed)	San Antonio, Texas (1852)
St. Michael's College (men)	Winooski Park, Vt. (1904)
St. Norbert College	West De Pere, Wis. (1898)
St. Olaf College (coed)	Northfield, Minn. (1874)
St. Paul's College	Concordia, Mo. (1884)
St. Peter's College (men)	Jersey City, N. J. (1872)
St. Procopius College (men)	Lisle, Ill. (1890)
St. Rose, College of	Albany, N. Y. (1920)
St. Scholastica, College of	Duluth, Minn. (1912)
St. Teresa, College of	Winona, Wis. (1907)
St. Thomas, College of	St. Paul, Minn. (1885)
St. Xavier College	Chicago, Ill. (1912)

Name	*Location and Foundation*
Salem College (coed)	Salem, W. Va. (1888)
Salem College (women)	Winston-Salem, N. C. (1772)
Samuel Houston College	Austin, Tex. (1876)
San Diego State College	San Diego, Calif. (1898)
San Francisco State College	San Francisco, Calif. (1899)
San Jose State College	San Jose, Calif. (1857)
Santa Monica City College	Santa Monica, Calif. (1929)
Sarah Lawrence College (women)	Bronxville, N. Y. (1926)
Scranton, University of	Scranton, Pa. (1888)
Scripps College	Claremont, Calif. (1926)
Seattle College	Seattle, Wash. (1892)
Seattle Pacific College (coed)	Seattle, Wash. (1891)
Selma University	Selma, Ala. (1878)
Seton Hall College (men)	South Orange, N. J. (1856)
Seton Hill College (women)	Greensburg, Pa. (1883)
Shaw University (coed)	Raleigh, N. C. (1865)
Shenandoah College	Dayton, Va. (1875)
Shepherd College	Shepherdstown, W. Va. (1871)
Shorter College (women)	Rome, Ga. (1873)
Shurtleff College (coed)	Alton, Ill. (1827)
Sienna Heights College	Adrian, Mich. (1919)
Simmons College (women)	Boston, Mass. (1899)
Simmons University (coed)	Louisville, Ky. (1873)
Simpson College (coed)	Indianola, Iowa (1860)
Skidmore College (women)	Saratoga Springs, N. Y. (1911)
Smith College (women)	Northampton, Mass. (1871)
Snow College	Ephraim, Utah (1888)
South Dakota State College of Agriculture and Mechanic Arts (coed)	Brookings, S. D. (1881)
South Dakota State College of Mines (coed)	Rapid City, S. D. (1885)
South Georgia College	Douglas, Ga. (1907)
Southern Methodist University (coed)	Dallas, Texas (1911)
Southern University	Scotlandville, La. (1914)
Southwestern College (coed)	Memphis, Tenn. (1875)
Southwestern College (coed)	Winfield, Kan. (1885)
Southwestern Louisiana Institute (coed)	Lafayette, La. (1898)
Southwestern University	Los Angeles, Calif. (1911)
Southwestern University (coed)	Georgetown, Texas (1836)
Spelman College	Atlanta, Ga. (1881)
Springfield College (men)	Springfield, Mass. (1885)
Spring Hill College (men)	Spring Hill, Ala. (1830)
Stanford University (coed)	Stanford University, Calif. (1885)
Sterling College (coed)	Sterling, Kan. (1887)
Stevens Institute of Technology (men)	Hoboken, N. J. (1870)
Stratford College	Danville, Va. (1852)
Suffolk University	Boston, Mass. (1906)
Susquehanna University (coed)	Selinsgrove, Pa. (1858)
Swarthmore College (coed)	Swarthmore, Pa. (1864)
Sweet Briar College (women)	Sweet Briar, Va. (1901)
Syracuse University (coed)	Syracuse, N. Y. (1870)
Tabor College	Hillsboro, Kan. (1908)
Talladega College (coed)	Talladega, Ala. (1867)
Tampa, University of	Tampa, Fla. (1931)
Tarkio College (coed)	Tarkio, Mo. (1883)
Temple University (coed)	Philadelphia, Pa. (1884)
Tennessee College (women)	Murfreesboro, Tenn. (1905)
Tennessee Polytechnic Institute (coed)	Cookeville, Tenn. (1916)
Tennessee Wesleyan College	Athens, Tenn. (1866)
Texarkana College	Texarkana, Tex. (1927)
Texas Christian Univ. (coed)	Fort Worth, Texas (1873)
Texas College	Tyler, Tex. (1894)
Texas State College for Women	Denton, Texas (1901)
Texas Technological College (coed)	Lubbock, Texas (1923)
Texas Wesleyan College (women)	Fort Worth, Texas (1892)
Thiel College (coed)	Greenville, Pa. (1866)
Tillotson College	Austin, Tex. (1877)
Tougaloo College	Tougaloo, Miss. (1869)
Transylvania College (coed)	Lexington, Ky. (1780)
Trinity College (men)	Hartford, Conn. (1823)
Trinity College (men)	Sioux City, Iowa (1912)
Trinity College (women)	Burlington, Vt. (1925)
Trinity College (women)	Washington, D. C. (1897)
Trinity University	San Antonio, Tex. (1869)
Tri-State College	Augola, Ind. (1884)
Tufts College (coed)	Medford, Mass. (1852)
Tulane Univ. of Louisiana (coed)	New Orleans, La. (1834)
Tusculum College (coed)	Greeneville, Tenn. (1794)
Tuskegee Institute (colored)	Tuskegee, Ala. (1881)
Union College (coed)	Barbourville, Ky. (1879)
Union College (coed)	Lincoln, Neb. (1891)
Union College (men)	Schenectady, N. Y. (1795)
Union University (coed)	Jackson, Tenn. (1834)

American Colleges and Universities—Continued

Name	Location and Foundation
U. S. Coast Guard Academy (men)	New London, Conn. (1876)
U. S. Military Academy (men)	West Point, N. Y. (1802)
U. S. Naval Academy (men)	Annapolis, Md. (1845)
University of Akron (coed)	Akron, Ohio (1870)
University of Alabama (coed)	University, Ala. (1831)
University of Alaska (coed)	College, Alaska (1917)
University of Arizona (coed)	Tucson, Ariz. (1885)
University of Arkansas (coed)	Fayetteville, Ark. (1871)
University of Buffalo (coed)	Buffalo, N. Y. (1846)
University of California (coed)	Berkeley, Calif. (1868)
University of Chattanooga (coed)	Chattanooga, Tenn. (1882)
University of Chicago (coed)	Chicago, Ill. (1890)
University of Cincinnati (coed)	Cincinnati, Ohio (1870)
University of Colorado (coed)	Boulder, Colo. (1876)
Univ. of Dayton (coed)	Dayton, Ohio (1850)
University of Delaware (coed)	Newark, Del. (1833)
University of Denver (coed)	Denver, Colo. (1864)
Univ. of Detroit (coed)	Detroit, Mich. (1877)
Univ. of Dubuque (coed)	Dubuque, Iowa (1852)
Univ. of Florida (men)	Gainesville, Fla. (1905)
University of Georgia (coed)	Athens, Ga. (1785)
University of Hawaii (coed)	Honolulu, Hawaii (1907)
University of Idaho (coed)	Moscow, Idaho (1889)
University of Illinois (coed)	Urbana, Ill. (1867)
University of Kansas (coed)	Lawrence, Kan. (1865)
University of Kentucky (coed)	Lexington, Ky. (1865)
University of Louisville (coed)	Louisville, Ky. (1837)
University of Maine (coed)	Orono, Maine (1865)
University of Maryland (coed)	College Park, Md. (1807)
University of Michigan (coed)	Ann Arbor, Mich. (1817)
University of Minnesota (coed)	Minneapolis, Minn. (1851)
University of Mississippi (coed)	Oxford, Miss. (1844)
University of Missouri (coed)	Columbia, Mo. (1839)
University of Montana (coed)	Missoula, Mont. (1895)
University of Nebraska (coed)	Lincoln, Neb. (1869)
University of Nevada (coed)	Reno, Nev. (1886)
University of New Hampshire (coed)	Durham, N. H. (1866)
University of New Mexico (coed)	Albuquerque, N. M. (1889)
University of North Carolina (coed)	Chapel Hill, N. C. (1793)
University of North Dakota (coed)	Grand Forks, N. D. (1883)
University of Notre Dame (men)	Notre Dame, Ind. (1842)
University of Oklahoma (coed)	Norman, Okla. (1890)
University of Oregon (coed)	Eugene, Ore. (1872)
University of Pennsylvania (coed)	Philadelphia, Pa. (1740)
University of Pittsburgh (coed)	Pittsburgh, Pa. (1787)
University of Puerto Rico (coed)	Rio Piedras, P. R. (1903)
University of Redlands (coed)	Redlands, Calif. (1907)
University of Richmond (coed)	Richmond, Va. (1832)
University of Rochester (coed)	Rochester, N. Y. (1850)
University of San Francisco (men)	San Francisco, Calif. (1855)
University of Santa Clara (men)	Santa Clara, Calif. (1851)
University of Santo Tomas (coed)	Manila, P. I. (1611)
University of South Carolina (coed)	Columbia, S. C. (1801)
University of South Dakota (coed)	Vermillion, S. D. (1882)
Univ. of Southern California (coed)	Los Angeles, Calif. (1880)
University of Tennessee (coed)	Knoxville, Tenn. (1794)
University of Texas (coed)	Austin, Texas (1883)
University of the Philippines (coed)	Manila, P. I. (1908)
University of the South (men)	Sewanee, Tenn. (1857)
University of Toledo (coed)	Toledo, Ohio (1872)
University of Tulsa (coed)	Tulsa, Okla. (1894)
University of Utah (coed)	Salt Lake City, Utah (1850)
University of Vermont (coed)	Burlington, Vt. (1791)
University of Virginia (men)	Charlottesville, Va. (1819)
University of Washington (coed)	Seattle, Wash. (1861)
University of Wisconsin (coed)	Madison, Wis. (1848)
University of Wyoming (coed)	Laramie, Wyo. (1887)
Upper Iowa University (coed)	Fayette, Iowa (1857)
Upsala College (coed)	East Orange, N. J. (1893)
Ursinus College (coed)	Collegveille, Pa. (1869)
Valparaiso Univ. (coed)	Valparaiso, Ind. (1859)
Vanderbilt Univ. (coed)	Nashville, Tenn. (1872)
Vassar College (women)	Poughkeepsie, N. Y. (1861)
Villa Maria College (women)	Erie, Pa. (1925)
Villanova College (coed)	Villanova, Pa. (1842)

Name	Location and Foundation
Virginia Military Institute (men)	Lexington, Va. (1839)
Virginia Polytechnic Institute (coed)	Blacksburg, Va. (1872)
Virginia Union Univ. (coed)	Richmond, Va. (1819)
Wabash College (men)	Crawfordsville, Ind. (1832)
Wagner Memorial Lutheran College (coed)	Staten Island, N. Y. (1883)
Wake Forest College (men)	Wake Forest, N. C. (1832)
Waldorf College	Forest City, Ia. (1903)
Walla Walla College (coed)	College Place, Wash. (1892)
Wartburg College	Waverly, Ia. (1868)
Washburn Municipal University	Topeka, Kan. (1865)
Washington College (coed)	Chestertown, Md. (1782)
Washington and Jefferson College (men)	Washington, Pa. (1780)
Washington and Lee Univ. (men)	Lexington, Va. (1749)
Washington Missionary College (coed)	Takoma Park, Wash., D. C. (1904)
Washington State College	Pullman, Wash. (1890)
Washington Univ. (coed)	St. Louis, Mo. (1853)
Wayne University (coed)	Detroit, Mich. (1933)
Waynesburg College (coed)	Waynesburg, Pa. (1850)
Weber College	Ogden, Utah (1889)
Webster College (women)	Webster Groves, Mo. (1915)
Wellesley College (women)	Wellesley, Mass. (1875)
Wells College (women)	Aurora, N. Y. (1868)
Wesley College	Grand Forks, N. D. (1892)
Wesleyan College (women)	Macon, Ga. (1836)
Wesleyan University (men)	Middletown, Conn. (1831)
Western College for Women	Oxford, Ohio (1853)
Western Maryland College (coed)	Westminster, Md. (1867)
Western Reserve Univ. (coed)	Cleveland, Ohio (1826)
Western Union College (coed)	Le Mars, Iowa (1900)
Westminster College	Salt Lake City, Utah (1875)
Westminster College (men)	Fulton, Mo. (1849)
West Virginia Institute of Technology	Montgomery, W. Va. (1895)
West Virginia State College	Institute, W. Va. (1891)
West Virginia Univ. (coed)	Morgantown, W. Va. (1867)
West Virginia Wesleyan College (coed)	Buckhannon, W. Va. (1891)
Wheaton College (coed)	Wheaton, Ill (1860)
Wheaton College (women)	Norton, Mass. (1834)
Wheelock College	Boston, Mass. (1889)
Whitman College (coed)	Walla Walla, Wash. (1859)
Whittier College (coed)	Whittier, Calif. (1901)
Whitworth College (women)	Brookhaven, Miss. (1858)
Whitworth College (coed)	Spokane, Wash. (1890)
Wichita, University of	Wichita, Kan. (1892)
Wilberforce University (coed; colored)	Wilberforce, Ohio (1856)
Wiley College (coed; colored)	Marshall, Texas (1873)
Willamette Univ. (coed)	Salem, Ore. (1844)
William and Mary College (coed)	Williamsburg, Va. (1693)
William Jewell College (coed)	Liberty, Mo. (1849)
Williams College	Berkeley, Calif. (1918)
Williams College (men)	Williamstown, Mass. (1793)
Wilmington College (coed)	Wilmington, Ohio (1870)
Wilson College (women)	Chambersburg, Pa. (1869)
Winthrop College (women)	Rock Hill, S. C. (1886)
Wittenberg College (coed)	Springfield, Ohio (1845)
Wofford College (men)	Spartanburg, S. C. (1851)
Woodstock College	Woodstock, Md. (1867)
Worcester Polytechnic Institute (men)	Worcester, Mass. (1865)
Xavier University (men)	Cincinnati, Ohio (1831)
Yale University (men)	New Haven, Conn. (1701)
Yankton College (coed)	Yankton, S. D. (1881)
Yeshiva College (men)	New York City (1928)
York College (coed)	York, Neb. (1890)
Youngstown College (coed)	Youngstown, Ohio (1908)
Yuba College	Marysville, Calif. (1927)

Canadian Colleges and Universities

Name	Location and Foundation
Acadia University (coed)	Wolfville, N. S. (1838)
Albert College	Belleville, Ont. (1857)
Alma College	St. Thomas, Ont. (1877)
Brandon College	Brandon, Manitoba (1899)
Dalhousie University (coed)	Halifax, N. S. (1818)
Emmanuel College (men)	Saskatoon, Sask. (1879)
Huron College	London, Ont. (1863)
King's College (coed)	Halifax, N. S. (1802)

Name	Location and Foundation
Knox College	Toronto, Ont. (1844)
Laval University (men and women)	Quebec, Que. (1852)
Loyola College	Montreal, Que. (1896)
McGill University (coed)	Montreal, Que. (1821)
McMaster University (coed)	Hamilton, Ont. (1887)
Montreal University (coed)	Montreal, Que. (1878)
Mount Allison University (coed)	Sackville, N. B. (1858)
Notre Dame College	Montreal, Que. (1869)

Canadian Colleges and Universities—Continued

Name	*Location and Foundation*
Pickering College	Newmarket, Ont. (1842)
Prince of Wales College	Charlottetown, P. E. I. (1860)
Queen's University (coed)	Kingston, Ont. (1841)
Regina College	Regina, Sask. (1910)
Sacred Heart University	Bathurst, N. B. (1899)
St. Andrew's College	Saskatoon, Sask. (1912)
St. Anne's College	Church Point, N. S. (1890)
St. Dunstan's University (men)	Charlottetown, P. E. I. (1855)
St. Francis Xavier University (men and women)	Antigonish, N. S. (1866)
St. Jerome's College	Kitchener, Ont. (1864)
St. Joseph's University	St. Joseph, N. B. (1864)
St. Mary's College	Halifax, N. S. (1841)
St. Patrick's College	Ottawa, Ont. (1929)
St. Paul's College	Winnipeg, Manitoba (1931)
St. Thomas More College	Saskatoon, Sask. (1936)

Name	*Location and Foundation*
Trinity College (coed)	Toronto, Ont. (1851)
United College	Winnipeg, Manitoba (1871)
University of Alberta (coed)	Edmonton, Alta. (1906)
University of Bishop's College (men and women)	Lennoxville, Que. (1843)
Univ. of British Columbia (coed)	Vancouver, B. C. (1908)
University of Manitoba (coed)	Winnipeg, Man. (1877)
Univ. of New Brunswick (coed)	Fredericton, N. B. (1800)
University of Ottawa (men)	Ottawa, Ont. (1866)
Univ. of St. Joseph's College (men)	Memramcook, N. B. (1864)
Univ. of Saskatchewan (coed)	Saskatoon, Sask. (1907)
University of Toronto (coed)	Toronto, Ont. (1827)
Univ. of Western Ontario (coed)	London, Ont. (1878)
Victoria College	Victoria, B. C. (1902)
Waterloo College	Waterloo, Ont. (1924)
Wycliffe College	Toronto, Ont. (1877)

American Colleges and Universities—Continued

NAME	Location	Year of Organization	Governing Official	Students	Teachers
Nebraska Central College (coed)	Central City, Neb.	1899	O. W. Carrell, A.B., B.D.	106	11
Nebraska Wesleyan University (coed)	Lincoln, Neb.	1888	J. B. Schreckengast, B.S., Ph.M., S.T.B.	520	50
Newberry College (coed)	Newberry, S.C.	1856		372	20
New Jersey College for Women	New Brunswick, N. J.	1918	Mabel S. Douglass	1,066	107
New Mexico College of Agriculture and Mechanic Arts (coed)	State College, N. M.	1889	H. L. Kent, M.S.	465	48
New Mexico School of Mines (men and women)	Socorro, N. M.	1889	E. H. Wells, E.M.	124	9
New Rochelle College (women)	New Rochelle, N. Y.	1904	N. M. Ignatius	802	65
New York State College of Forestry (men)	Syracuse, N. Y.	1911		404	35
New York University (coed)	New York City	1831	Elmer E. Brown, Ph.D., LL.D.	40,665	1,814
North Carolina College for Women	Greensboro, N. C.	1892	Julius I. Foust, LL.D.	1,677	120
North Carolina State College of Agriculture and Engineering (coed)	Raleigh, N. C.	1889	E. C. Brooks, A.B., Litt.D., LL.D.	1,790	149
North Central College (coed)	Naperville, Ill.	1861	E. E. Rall, Ph.D.	521	38
North Dakota Agricultural College (coed)	Fargo, N. D.	1890	John H. Shepperd	1,526	123
Northeastern University (men)	Boston, Mass.	1898	Frank P. Speare, LL.B., M.H.	5,927	287
North Georgia College (coed)	Dahlonega, Ga.	1871	John W. West, A.M.	191	15
Northland College (coed)	Ashland, Wis.	1982	J. D. Brownell, D.D.	150	18
Northwestern College (coed)	Watertown, Wis.	1865	Rev. E. E. Kowalke, A.B.	215	16
Northwestern University (coed)	Evanston and Chicago, Ill.	1857	Walter Dill Scott, Ph.D., LL.D.	14,562	1,126
Norwich University (men)	Northfield, Vt.	1819	C. A. Plumley, A.M., LL.D.	306	38
Oakland City College (coed)	Oakland City, Ind.	1890	W. P. Dearing, A.B., LL.D.	280	15
Oberlin College (coed)	Oberlin, Ohio	1833	Ernest H. Wilkins, A.M., Litt.D., Ph.D.	1,754	197
Occidental College (coed)	Los Angeles, Calif.	1887	Remsen D. Bird, A.B., D.D.	631	60
Oglethorpe University (coed)	Oglethorpe University, Ga.	1913	Thornwell Jacobs, A.M., LL.D., Litt.D.	330	21
Ohio Northern University (coed)	Ada, Ohio	1871	Robert Williams	686	42
Ohio State University (coed)	Columbus, Ohio	1873	George W. Rightmire, M.A., LL.D.	10,798	851
Ohio University (coed)	Athens, Ohio	1804	Elmer B. Bryan, LL.D., L.H.D.	2,563	227
Ohio Wesleyan University (coed)	Delaware, Ohio	1842	E. D. Soper	1,643	157
Oklahoma Agricultural and Mechanical College (coed)	Stillwater, Okla.	1891	Henry G. Bennett	4,040	253
Oklahoma Baptist University (coed)	Shawnee, Okla.	1901	William Cooke Boone	439	27
Oklahoma City University (coed)	Oklahoma City, Okla.	1911	Eugene M. Antrim, S.T.B., Ph.D., D.D.	720	43
Oklahoma College for Women	Chickasha, Okla.	1909	M. A. Nash	900	57
Olivet College (coed)	Olivet, Mich.	1859	James King	266	21
Oregon State Agricultural College (coed)	Corvallis, Ore.	1868	State Board of Higher Education	3,694	283
Ottawa University (coed)	Ottawa, Kan.	1865	Warren P. Behan, Acting President	244	20
Otterbein College (coed)	Westerville, Ohio	1847	W. G. Clippinger, D.D., LL.D.	394	35
Ouachita College (coed)	Arkadelphia, Ark.	1866	Charles D. Johnson, Ph.D.	248	24
Our Lady of the Lake College (women)	San Antonio, Texas	1896	Mother M. Angelique, A.M.	341	35
Oxford College for Women. See Miami University.					
Pacific College (coed)	Newberg, Ore.	1891	Levi T. Pennington, A.M., D.D.	80	14
Pacific Union College (coed)	Angwin, Calif.	1882	William E. Nelson, B.S.	426	30
Pacific University (coed)	Forest Grove, Ore.	1849	J. F. Dobbs, M.A., D.D.	284	23
Paine College (coed)	Augusta, Ga.	1882	Edmund C. Peters	234	18
Park College (coed)	Parkville, Mo.	1875	F. W. Hawley, M.A., LL.D., D.D.	527	39
Parsons College (coed)	Fairfield, Iowa	1875	Clarence W. Greene	250	28
Pembroke College (women)	Providence, R. I.	1892	M. S. Morriss	490	103
Penn College (coed)	Oskaloosa, Iowa	1873	H. Clark Bedford	279	28
Pennsylvania College for Women	Pittsburgh, Pa.	1869	Cora H. Coolidge, Litt.D.	281	35
Pennsylvania Military College (men)	Chester, Pa.	1821	Frank K. Hyatt	180	25
Pennsylvania State College (coed)	State College, Pa.	1855	R. D. Hetzel, LL.D.	4,844	435
Pennsylvania State Forest School (men)	Mont Alto, Pa.	1929	R. D. Hetzel, LL.D.	75	7
Phillips University (coed)	Enid, Okla.	1907	L. N. McCash, A.M., D.D., LL.D.	901	36
Piedmont College (coed)	Demorest, Ga.	1897	Henry C. Newell, D.D.	216	23

American Colleges and Universities—Continued

NAME	Location	Year of Organization	Governing Official	Students	Teachers
Polytechnic Institute of Brooklyn (men)	Brooklyn, N. Y.	1853	Parke R. Kolbe, A.M., Ph.D.	2,524	148
Pomona College (coed)	Claremont, Calif.	1887	Charles K. Edmunds	840	82
Presbyterian College (men)	Clinton, S. C.	1880	John McSween	299	18
Princeton University (men)	Princeton, N. J.	1746	John G. Hibben, Ph.D., LL.D., Litt.D.	2,554	331
Purdue University (coed)	Lafayette, Ind.	1869	Edward C. Elliott, Ph.D.	4,655	451
Queens College (women)	Charlotte, N. C.	1857	W. H. Frazer, A.B., D.D.	336	30
Radcliffe College (women)	Cambridge, Mass.	1879	Ada L. Comstock, A.M., LL.D., Litt.D., L.H.D.	1,038	300
Randolph-Macon College (men)	Ashland, Va.	1830	R. E. Blackwell, A.M., LL.D.	280	25
Randolph-Macon Woman's College	Lynchburg, Va.	1891	Nathan A. Pattillo, Ph.D., Acting President	642	66
Reed College (coed)	Portland, Ore.	1911	Norman F. Coleman, A.M., LL.D.	413	36
Regis College (men)	Denver, Colo.	1888	. . . .	172	19
Rensselaer Polytechnic Institute (men)	Troy, N. Y.	1824	Palmer C. Ricketts, C.E., D.D., LL.D.	1,653	138
Rhode Island State College (coed)	Kingston, R. I.	1892	Raymond Bressler	798	53
Rice Institute (coed)	Houston, Texas	1912	Edgar O. Lovett, Ph.D., LL.D.	1,454	99
Rio Grande College (coed)	Rio Grande, Ohio	1876	William A. Lewis, Acting President	124	7
Ripon College (coed)	Ripon, Wis.	1851	Silas Evans, D.D., LL.D.	407	33
Roanoke College (men)	Salem, Va.	1853	Charles J. Smith, A.M., D.D.	312	26
Rockford College (women)	Rockford, Ill.	1847	William A. Maddox, Ph.D., LL.D.	400	50
Rockhurst College (men)	Kansas City, Mo.	1914	W. P. Manion	172	15
Rollins College (coed)	Winter Park, Fla.	1885	Hamilton Holt, Litt.D., LL.D.	475	68
Rosary College (women)	River Forest, Ill.	1902	Sister Mary Ruth	305	39
Rose Polytechnic Institute (men)	Terre Haute, Ind.	1874	Donald B. Prentice	333	26
Russell Sage College (women)	Troy, N. Y.	1916	J. L. Meader	445	45
Rust College (coed; colored)	Holly Springs, Miss.	1866	Lee M. McCoy, A.M., Litt.D.	258	17
Rutgers University (men)	New Brunswick, N. J.	1766	Philip M. Brett, Acting President	2,761	290
St. Ambrose College (men)	Davenport, Iowa	1882	Very Rev. Martin Cone, Ph.D.	266	24
St. Anselm's College (men)	Manchester, N. H.	1889	. . . .	200	20
St. Benedict's College (men)	Atchison, Kan.	1858	Rt. Rev. Martin Veth, O.S.B., S.T.D., LL.D.	210	22
St. Bernard College (men)	St. Bernard, Ala.	1892	Rt. Rev. Bernard Menges, O.S.B.	66	. .
St. Bonaventure College (men)	Allegany, N. Y.	1854	Very Rev. T. Plassmann, D.D., Ph.D.	540	43
St. Edward's University (men)	Austin, Texas	1881	Rev. Hugh O'Donnell, C.S.C.	198	19
St. Francis College (men)	Brooklyn, N. Y.	1858	Rev. Brother Columba, O.S.F.	200	19
St. Francis College (men)	Loretto, Pa.	1845	Rev. Raphael Breheny, T.O.R.	300	30
St. Francis Xavier College for Women	Chicago, Ill.	1915	Mother Mary Sophia	220	20
St. Ignatius College. See University of San Francisco.					
St. John's College (men)	Annapolis, Md.	1696	Douglas H. Gordon	298	28
St. John's College (coed)	Brooklyn, N. Y.	1870	Very Rev. Thomas F. Ryan, C.M.	7,000	250
St. John's University (men)	Collegeville, Minn.	1857	Rt. Rev. Alcuin Deutsch	450	50
St. John's University (coed)	Toledo, Ohio	1907	G. A. Fitzgibbons	1,075	67
St. Joseph's College (women)	Emmitsburg, Md.	1809	Sister Isabelle	178	34
St. Joseph's College (men)	Philadelphia, Pa.	1851	Rev. W. T. Tallon, S.J.	415	30
St. Joseph's College for Women	Brooklyn, N. Y.	1916	Rev. William T. Dillon	325	35
St. Lawrence College (men)	Mt. Calvary, Wis.	1861	Benedict Mueller	166	12
St. Lawrence University (coed)	Canton, N. Y.	1856	Richard Eddy Sykes, D.D.	691	54
St. Louis University (men and women)	St. Louis, Mo.	1818	Rev. Robert S. Johnston, S.J., A.M., S.T.D.	3,890	600
St. Mary-of-the-Woods College (women)	St. Mary of the Woods, Ind.	1840	Mother Mary Raphael	240	37
St. Mary's College (men)	Oakland, Calif.	1872	Brother Leo, L.H.D.	642	34
St. Mary's College (women)	Notre Dame, Ind.	1855	Sister Irma	301	46
St. Mary's College (men)	St. Mary's, Kan.	1869	Rev. George R. Kister, S.J.	165	20
St. Mary's College (men)	St. Mary, Ky.	1821	Peter J. Ellert, C.R.	104	7
St. Michael's College (men)	Winooski Park, Vt.	1904	Very Rev. Eugene Alliot	140	13
St. Olaf College (coed)	Northfield, Minn.	1874	L. W. Boe, D.D., LL.D.	884	81
St. Procopius College (men)	Lisle, Ill.	1890	Rt. Rev. Valentine Kohlbeck, O.S.B.	80	11
St. Stephen's College (men)	Annandale-on-Hudson, N. Y.	1860	Rev. D. Bernard I. Bell	122	19
St. Viator College (men)	Bourbonnais, Ill.	1872	Very Rev. J. W. R. Maguire, C.S.V., A.M.	175	15
St. Vincent College and Ecclesiastical Seminary (men)	Latrobe, Pa.	1846	Rt. Rev. Alfred Koch, D.D.	350	39

American Colleges and Universities—Continued

NAME	Location	Year of Organization	Governing Official	Students	Teachers
St. Xavier College (men)	Cincinnati, Ohio	1831	Hugo F. Sloctemyer, S.J.	431	43
Salem College (women)	Winston-Salem, N. C.	1772	Howard E. Rondthaler, Ph.B., D.D.	331	40
Salem College (coed)	Salem, W. Va.	1888	S. Orestes Bond, A.M., Pd.D.	356	22
School of Engineering of Milwaukee (men)	Milwaukee, Wis.	1903	Oscar Werwath, E.E.	600	31
Seton Hall College (men)	South Orange, N. J.	1856	Rt. Rev. T. H. McLaughlin, S.T.D.	308	17
Seton Hill College (women)	Greensburg, Pa.	1883	James A. Reeves	270	41
Shaw University (coed)	Raleigh, N. C.	1865		251	21
Shorter College (women)	Rome, Ga.	1877	W. D. Furry, Ph.D.	200	25
Shurtleff College (coed)	Alton, Ill.	1827	George M. Potter, A.M., LL.D.	261	17
Simmons College (women)	Boston, Mass.	1899	Henry Lefavour, Ph.D., LL.D.	1,558	150
Simmons University (coed)	Louisville, Ky.	1873	M. B. Lanier	62	5
Simmons University (coed)	Abilene, Texas	1891	J. D. Sandefer, LL.D.	601	42
Simpson College (coed)	Indianola, Iowa	1867	John L. Hillman, S.T.B., D.D.	544	40
Sioux Falls College (coed)	Sioux Falls, S. D.	1883	C. R. Sattgast	338	23
Skidmore College (women)	Saratoga Springs, N. Y.	1911	Henry T. Moore, Ph.D.	670	65
Smith College (women)	Northampton, Mass.	1871	W. A. Neilson, Ph.D., LL.D., L.H.D., Litt.D.	2,025	225
South Dakota State College of Agriculture and Mechanic Arts (coed)	Brookings, S. D.	1883	C. W. Pugsley, B.Sc., D.Agr.	1,168	95
South Dakota State College of Mines (coed)	Rapid City, S. D.	1887	C. C. O'Harra, Ph.D.	367	24
Southern College (coed)	Lakeland, Fla.	1886	Ludd M. Spivey, M.A., B.D., LL.D.	861	34
Southern Methodist University (coed)	Dallas, Texas	1912	Charles C. Selecman, D.D., LL.D.	3,218	142
Southwestern College (coed)	Memphis, Tenn.	1875	Charles E. Diehl, A.M., D.D., LL.D.	400	30
Southwestern College (coed)	Winfield, Kan.	1885	Frank E. Mossman	1,715	48
Southwestern Louisiana Institute (coed)	Lafayette, La.	1898	Edwin Lewis Stephens, Pd.D.	906	62
Southwestern University (coed)	Georgetown, Texas	1872	King Vivion, B.A., M.A., B.D., D.D., LL.D.	400	30
Spring Hill College (men)	Spring Hill, Ala.	1830	Rev. J. M. Walsh, S.J.	210	21
State College of Washington (coed)	Pullman, Wash.	1893	Board of Regents	3,215	205
Sterling College (coed)	Sterling, Kan.	1887	R. T. Campbell, D.D.	255	22
Stevens Institute of Technology (men)	Hoboken, N. J.	1870		502	55
Susquehanna University (coed)	Selinsgrove, Pa.	1858	G. Morris Smith, A.M., D.D.	408	45
Swarthmore College (coed)	Swarthmore, Pa.	1864	F. Aydelotte, D.Litt., L.H.D., LL.D.	566	75
Sweet Briar College (women)	Sweet Briar, Va.	1901	Meta Glass, Ph.D	467	45
Syracuse University (coed)	Syracuse, N. Y.	1870	Charles W. Flint, A.M., D.D., LL.D.	5,500	650
Tabor College (Closed)	Tabor, Iowa	....		...	...
Talladega College (coed)	Talladega, Ala.	1867	F. A. Sumner, A.M.	214	22
Tarkio College (coed)	Tarkio, Mo.	1883	Robert N. Montgomery	194	24
Taylor University (coed)	Upland, Ind.	1846	Robert Lee Stuart	353	24
Teachers College (coed)	Bowling Green, Ky.	1906	Board of Regents	4,201	105
Temple University (coed)	Philadelphia, Pa.	1884	Charles E. Beury, LL.D.	11,922	728
Tennessee College (women)	Murfreesboro, Tenn.	1907	E. L. Atwood, A.M., D.D.	150	16
Texas Christian University (coed)	Fort Worth, Texas	1873	E. M. Waits, A.B., LL.D	1,392	80
Texas Presbyterian College. See Austin College.					
Texas State College for Women	Denton, Texas	1903	Louis H. Hubbard, Ph.D., LL.D.	1,338	140
Texas Technological College (coed)	Lubbock, Texas	1925	P. W. Horn, A.M., LL.D.	2,319	135
Texas Woman's College	Fort Worth, Texas	1914	T. W. Brabham	262	23
Thiel College (coed)	Greenville, Pa.	1866	E. Clyde Xander, D.D.	261	23
Transylvania College (coed)	Lexington, Ky.	1780	Arthur Braden	494	25
Trinity College (men)	Hartford, Conn.	1823	Remsen B. Ogilby, LL.D., Litt.D.	426	44
Trinity College (women)	Washington, D. C.	1897	Sister Julia of the Trinity, A.M.	359	46
Trinity University (coed)	Waxahachie, Texas	1869	J. H. Burma, D.D.	300	30
Tufts College (coed)	Medford, Mass.	1852	John A. Cousens, LL.D.	1,967	470
Tulane University of Louisiana (men and women)	New Orleans, La.	1834	A. B. Dinwiddie, Ph.D.	4,556	441
Tusculum College (coed)	Greeneville, Tenn.	1794	C. A. Anderson	263	20
Union College (coed)	Barbourville, Ky.	1879	John O. Gross	249	13
Union College (men)	Schenectady, N. Y.	1795	Frank Parker Day	835	85
Union University (coed)	Jackson, Tenn.	1834	Rev. Henry E. Watters, A.M., D.D., LL.D.	960	30
United States Military Academy (men)	West Point, N. Y.	1802	Maj. Gen. William R. Smith, U. S. Army	1,256	145

American Colleges and Universities—Continued

NAME	Location	Year of Organization	Governing Official	Students	Teachers
United States Naval Academy (men)	Annapolis, Md.	1845	Rear Admiral T. C. Hart, U. S. Navy	2,022	238
University of Akron (coed)	Akron, Ohio	1870	George F. Zook, Ph.D.	1,183	84
University of Alabama (coed)	University, Ala.	1831	G. H. Denny, A.M., Ph.D., LL.D., D.C.L.	4,375	200
University of Arizona (coed)	Tucson, Ariz.	1885	Homer LeRoy Shantz	2,000	175
University of Arkansas (coed)	Fayetteville, Ark.	1871	John Clinton Futrall, M.A., LL.D.	1,687	200
University of Buffalo (coed)	Buffalo, N. Y.	1846	S. P. Capen, Ph.D., L.H.D., Sc.D., LL.D.	3,893	428
University of California (coed)	Berkeley, Calif.	1868	Robert Gordon Sproul	19,235	1,733
University of Chattanooga (coed)	Chattanooga, Tenn.	1882	Alex Guerry, D.C.L	762	42
University of Chicago (coed)	Chicago, Ill.	1890	Board of Trustees	7,613	829
University of Cincinnati (coed)	Cincinnati, Ohio	1870	Herman Schneider	11,977	596
University of Colorado (coed)	Boulder, Colo.	1876	George Norlin, Ph.D., LL.D.	3,287	300
University of Dayton (men and women)	Dayton, Ohio	1850	Rev. B. P. O'Reilly, S.M., M.A., D.D.	1,156	72
University of Delaware (men and women)	Newark, Del.	1833	Walter Hullihen, Ph.D., D.C.L., LL.D.	751	85
University of Denver (coed)	Denver, Colo.	1864	Frederick M. Hunter	3,730	200
University of Detroit (coed)	Detroit, Mich.	1877	John P. McNichols, S.J.	3,054	160
University of Dubuque (coed)	Dubuque, Iowa	1852		306	30
University of Florida (men)	Gainesville, Fla.	1905	J. J. Tigert, A.M.(Oxon.), D.Ed., Ph.D., LL.D.	2,435	165
University of Georgia (coed)	Athens, Ga.	1785	C. M. Snelling, A.M., Sc.D.	1,908	145
University of Hawaii (coed)	Honolulu, Hawaii	1907	David L. Crawford, M.A.	1,092	87
University of Idaho (coed)	Moscow, Idaho	1889	M. G. Neale	1,879	163
University of Illinois (coed)	Urbana, Ill.	1867	Harry Woodburn Chase	14,986	1,490
University of Iowa (coed)	Iowa City, Iowa	1847	W. A. Jessup, Ph.D., LL.D.	5,500	545
University of Kansas (coed)	Lawrence, Kan.	1865		400	239
University of Kentucky (coed)	Lexington, Ky.	1866	Frank L. McVey, Ph.D, LL.D.	3,222	265
University of Louisville (coed)	Louisville, Ky.	1837	Raymond A. Kent	2,015	214
University of Maine (coed)	Orono, Me.	1865		1,682	167
University of Maryland (coed)	College Park, Md.	1807	Raymond A. Pearson, M.S., D.Agr., LL.D	3,253	500
University of Michigan (coed)	Ann Arbor, Mich.	1817	Alexander G. Ruthven, Ph.D., LL.D	15,500	887
University of Minnesota (coed)	Minneapolis, Minn.	1851	Lotus D. Coffman, Ph.D., LL.D.	13,864	615
University of Mississippi (coed)	Oxford, Miss.	1844	Joseph Neely Powers	1,143	69
University of Missouri (coed)	Columbia, Mo.	1839	Walter Williams	3,993	456
University of Montana (coed)	Missoula, Mont.	1895	C. H. Clapp, Ph.D.	1,500	96
University of Nebraska (coed)	Lincoln, Neb.	1869		11,724	359
University of Nevada (coed)	Reno, Nev.	1886	Walter E. Clark, Ph.D	945	78
University of New Hampshire (coed)	Durham, N. H.	1866	Edward M. Lewis, A.M., LL.D., Litt.D	1,644	156
University of New Mexico (coed)	Albuquerque, N. M.	1889	J. F. Zimmerman, Ph.D	1,037	71
University of North Carolina (coed)	Chapel Hill, N. C.	1793	Frank P. Graham	2,850	215
University of North Dakota (coed)	Grand Forks, N. D.	1883	Thomas Kane, Ph.D., LL.D	2,680	176
University of Notre Dame (men)	Notre Dame, Ind.	1842	Rev. C. L. O'Donnell, C.S.C.	3,172	210
University of Oklahoma (coed)	Norman, Okla	1890	W. B. Bizzell, Ph.D.	5,173	311
University of Omaha (coed)	Omaha, Neb.	1930	H. E. Sealock	560	35
University of Oregon (coed)	Eugene, Ore.	1872	Arnold B. Hall, J.D., LL.D.	3,610	278
University of Pennsylvania (men and women)	Philadelphia, Pa.	1740	T. S. Gates, Ph.B., LL.B., LL.D.	15,800	1,443
University of Pittsburgh (coed)	Pittsburgh, Pa.	1787	John G. Bowman, LL.D	14,342	985
University of Porto Rico (coed).	Rio Piedras, Porto Rico	1903	Carlos E. Chardon	1,700	133
University of Redlands (coed)	Redlands, Calif.	1907	Victor L. Duke, A.M., LL.D.	602	50
University of Richmond (men and women)	Richmond, Va.	1832	F. W. Boatwright, M.A., LL.D.	1,200	70
University of Rochester (coed)	Rochester, N. Y.	1850	Rush Rhees, A.M., D.D., LL.D.	1,151	137
University of San Francisco (men)	San Francisco, Calif.	1855	Rev. Edward J. Whelan, S.J.	785	39
University of Santa Clara (men)	Santa Clara, Calif.	1851	Cornelius J. McCoy, S.J., A.M.	540	42
University of South Carolina (coed)	Columbia, S. C.	1801	Leonard T. Baker	1,660	98
University of South Dakota (coed)	Vermilion, S. D.	1882	Herman G. James	984	92
University of Southern California (coed)	Los Angeles, Calif.	1880	R. B. von KleinSmid, A.M., Sc.D., Litt.D.	16,000	550
University of Tennessee (coed)	Knoxville, Tenn.	1794	H. A. Morgan, B.S.A., LL.D.	5,993	224
University of Texas (coed)	Austin and Galveston, Texas	1883	Harry Y. Benedict, Ph.D., LL.D.	6,337	409
University of the City of Toledo (coed)	Toledo, Ohio	1872	Henry J. Doermann, Ed.D.	2,457	106
University of the Philippines (coed)	Manila, P. I.	1908	Rafael Palma, LL.B., LL.D.	7,828	366

American Colleges and Universities—Continued

NAME	Location	Year of Organization	Governing Official	Students	Teachers
University of the South (men)	Sewanee, Tenn.	1857	B. F. Finney, LL.D.	248	28
University of Tulsa (coed)	Tulsa, Okla	1894	John D. Finlayson, B.D., S.T.M., Th.D.	723	59
University of Utah (coed)	Salt Lake City, Utah	1850	George Thomas, Ph.D.	3,700	200
University of Vermont (coed)	Burlington, Vt.	1791	Guy W. Bailey, A.B., LL.D.	1,263	199
University of Virginia (men and women)	Charlottesville, Va.	1819	John L. Newcomb, Acting President	2,525	150
University of Washington (coed)	Seattle, Wash.	1861	Matthew L. Spencer, Ph.D., LL.D.	6,924	465
University of Wisconsin (coed)	Madison, Wis.	1848	Glenn Frank, M.A., L.H.D., Litt.D., LL.D.	8,765	586
University of Wyoming (coed)	Laramie, Wyo.	1887	A. G. Crane, M.A., Ph.D.	1,235	116
Upper Iowa University (coed)	Fayette, Iowa	1858		225	18
Upsala College (coed)	East Orange, N. J.	1893	Carl G. Erickson, Ph.D.	314	20
Ursinus College (coed)	Collegeville, Pa.	1869	George L. Omwake, Pd.D., LL.D.	475	36
Valparaiso University (coed)	Valparaiso, Ind.	1873	O. C. Kreinheder	584	50
Vanderbilt University (coed)	Nashville, Tenn.	1873	J. H. Kirkland, LL.D., D.C.L., Ph.D.	1,411	280
Vassar College (women)	Poughkeepsie, N. Y.	1861	H. N. MacCracken, Ph.D., LL.D., L. H.D.	1,142	165
Villanova College (coed)	Villanova, Pa.	1842	Rev. James J. Griffin, LL.D.	1,189	48
Virginia Military Institute (men)	Lexington, Va.	1839		719	54
Virginia Polytechnic Institute (coed)	Blacksburg, Va.	1872	Julian A. Burruss, A.M., Ph.D.	1,617	136
Virginia Union University (coed)	Richmond, Va.	1899	W. T. Johnson	394	36
Wabash College (men)	Crawfordsville, Ind.	1832	L. B. Hopkins, A.M.	380	25
Wake Forest College (men)	Wake Forest, N. C.	1834	T. D. Kitchin	740	40
Walla Walla College (coed)	College Place, Wash.	1892	John E. Weaver	490	35
Wartburg College (coed)	Clinton, Iowa	1868	Otto L. Proehl, A.B.	181	21
Washburn College (coed)	Topeka, Kan.	1865	Philip C. King	1,052	74
Washington College (coed)	Chestertown, Md.	1782	Paul E. Titsworth, Ph.D., LL.D.	266	24
Washington and Jefferson College (men)	Washington, Pa.	1787	E. M. Weyer	447	33
Washington and Lee University (men)	Lexington, Va.	1749	F. P. Gaines	864	58
Washington Missionary College (coed)	Takoma Park, Wash., D. C.	1904	H. H. Hamilton, A.B.	400	26
Washington University (coed)	St. Louis, Mo.	1853	George R. Throop, Ph.D., LL.D.	7,355	656
Waynesburg College (coed)	Waynesburg, Pa.	1850	Paul R. Stewart, A.M., Sc.D.	345	15
Webster College (women)	Webster Groves, Mo.	1916	George F. Donovan, Ph.D.	156	34
Wellesley College (women)	Wellesley, Mass.	1875	Ellen Fitz Pendleton, Litt.D., LL.D.	1,559	165
Wells College (women)	Aurora, N. Y.	1868	Kerr D. Macmillan, B.D., S.T.D.	260	42
Wesleyan College (women)	Macon, Ga.	1836		441	51
Wesleyan University (men)	Middletown, Conn.	1831	J. L. McConaughy, Ph.D., LL.D.	637	71
Western College for Women	Oxford, Ohio	1853	Ralph K. Hickok	394	40
Western Maryland College (coed)	Westminster, Md.	1868	Albert N. Ward, A.M., D.D., LL.D.	461	47
Western Reserve University (men and women)	Cleveland, Ohio	1826	Robert E. Vinson, D.D., LL.D., L.H.D.	9,043	685
Western Union College (coed)	Le Mars, Iowa	1900	D. O. Kime	197	14
Westminster College (men)	Fulton, Mo.	1853	M. E. Melvin, D.D.	294	18
Westminster College (coed)	New Wilmington, Pa.	1852	Charles Freeman, Ph.D., LL.D., Acting President	528	33
West Virginia University (coed)	Morgantown, W. Va.	1867	John R. Turner	3,535	240
West Virginia Wesleyan College (coed)	Buckhannon, W. Va.	1891	Ray McCuskey	454	28
Wheaton College (coed)	Wheaton, Ill.	1843		650	40
Wheaton College (women)	Norton, Mass.	1834	J. Edgar Park, A.B., D.D., LL.D.	453	65
Whitman College (coed)	Walla Walla, Wash.	1859	S. B. L. Penrose, D.D., LL.D.	500	40
Whittier College (coed)	Whittier, Calif.	1888		425	35
Whitworth College (women)	Brookhaven, Miss.	1858	George F. Winfield	243	21
Whitworth College (coed)	Spokane, Wash.	1890	Ward W. Sullivan	140	17
Wilberforce University (coed; colored)	Wilberforce, Ohio	1856	Gilbert H. Jones, M.A., Ph.D. (Jena), LL.D.	1,438	73
Willamette University (coed)	Salem, Ore.	1844	Carl G. Doney, Ph.D., LL.D., D.D.	634	45
William and Mary College (coed)	Williamsburg, Va.	1693	J. A. Chandler, Ph.D., LL.D.	1,622	75
William Jewell College (coed)	Liberty, Mo.	1849	John F. Herget	471	25
Williams College (men)	Williamstown, Mass.	1793		801	83
Wilmington College (coed)	Wilmington, Ohio	1871	O. F. Boyd, Acting President	308	30
Wilson College (women)	Chambersburg, Pa.	1869	E. D. Warfield, D.D., LL.D., Litt.D.	450	45
Winthrop College (women)	Rock Hill, S. C.	1886		1,723	81
Wittenberg College (coed)	Springfield, Ohio	1845	Rees E. Tulloss, D.D., Ph.D.	2,434	89

American Colleges and Universities—Continued

NAME	Location	Year of Organization	Governing Official	Students	Teachers
Wofford College (men)	Spartanburg, S. C.	1854	H. N. Snyder, M.A., Litt.D., LL.D.	376	25
Woman's College of Alabama	Montgomery, Ala.	1909	Walter D. Agnew, A.M., Ph.D.	389	41
Worcester Polytechnic Institute (men)	Worcester, Mass.	1865	Ralph Earle, D.Sc., D.Eng.	704	74
Yale University (men)	New Haven, Conn.	1701		5,388	839
Yankton College (coed)	Yankton, S. D.	1881	G. W. Nash, LL.D.	545	40
York College (coed)	York, Neb.	1890	J. R. Overmiller	388	18

Canadian Colleges and Universities

NAME	Location	Year of Organization	Governing Official	Students	Teachers
Acadia University (coed)	Wolfville, N. S.	1838	F. W. Patterson, D.D.	514	46
Dalhousie University (coed)	Halifax, N. S.	1818	Carleton Stanley	970	146
Laval University (men and women)	Quebec, Que.	1852	Mgr. Ph. Fillion	1,288	184
McGill University (coed)	Montreal, Que.	1821	Sir Arthur W. Currie, LL.D.	3,237	538
McMaster University (coed)	Hamilton, Ont.	1887	H. P. Whidden, D.D.	591	33
Montreal University (coed)	Montreal, Que.	1878	Mgr. A. V. Piette	7,355	625
Mount Allison University (coed)	Sackville, N. B.	1862	George J. Trueman, Ph.D.	465	31
Queen's University (coed)	Kingston, Ont.	1841	W. H. Fyfe	1,728	133
St. Dunstan's University (men)	Charlottetown, P. E. I.	1855	Rev. J. A. Murphy	167	14
St. Francis Xavier University (men and women)	Antigonish, N. S.	1853	Rev. H. P. MacPherson	278	20
Trinity College (coed)	Toronto, Ont.	1852	Rev. F. H. Cosgrave, D.C.L.	304	22
University of Alberta (coed)	Edmonton, Alta.	1908	R. C. Wallace, M.A., F.G.S.	1,617	81
University of Bishop's College (men and women)	Lennoxville, Que.	1843	Rev. A. H. McGreer, D.D.	157	14
University of British Columbia (coed)	Vancouver, B. C.	1912	L. S. Klinck, M.S.A., D.Sc.	2,044	169
University of King's College (coed)	Halifax, N. S.	1789	Rev. A. H. Moore	110	15
University of Manitoba (coed)	Winnipeg, Man.	1877	James A. McLean, Ph.D., LL.D.	2,832	274
University of New Brunswick (coed)	Fredericton, N. B.	1800	C. C. Jones, LL.D.	372	18
University of Ottawa (men)	Ottawa, Ont.	1866	Rev. G. Marchand	1,013	75
University of St. Joseph's College (men)	Memramcook, N. B.	1864	Rev. L. Guertin	90	13
University of Saskatchewan (coed)	Saskatoon, Sask.	1907	Walter C. Murray, LL.D.	1,563	141
University of Emmanuel College (men)	Saskatoon, Sask.	1879	Rev. Canon R. H. A. Haslam	53	7
University of Toronto (coed)	Toronto, Ont.	1827	Sir Robert A. Falconer, D.C.L., LL.D.	7,847	756
University of Western Ontario (coed)	London, Ont	1878	W. S. Fox, Ph.D., LL.D.	1,016	146
Victoria College (coed)	Toronto, Ont.	1841	Rev. E. W. Wallace, D.D.	984	32

and an Irish one in 1628. The Collegium Urbanum de Propaganda Fide is the most important of all. It receives alumni from all parts of the world. Since 1622 the administration of all these schools has been entrusted to the congregation De Propaganda Fide. From the very earliest days the training in these colleges has been of a very efficient character; but as the teachers are mostly Jesuits, the pupils on their return home are frequently looked upon with some misgiving by most of the European governments. See Mejer's *Die Propaganda, ihre Provinzen und ihr Recht* (2 vols. 1852–3).

Collegiate Church differs from a cathedral in that it is not the seat of a bishop; it is served by a body of canons, or, in the Anglican Church, by a dean, provost and canons, living together in collegia. It is under the jurisdiction of the bishop of the diocese, who is the 'visitor' of the foundation; in the Roman Catholic Church no collegiate church can be established save with the express sanction of the Pope. At the reformation in England there were about ninety such foundations, but nearly all were suppressed in the time of Edward VI. Some of those which remained—*e.g.* Ripon, Southwell, and Manchester—have since been erected into cathedrals for new dioceses. The name is sometimes given to a church with an associated body of clergy or several church buildings, like the Collegiate Reformed Dutch Church of New York City.

Colleoni, BARTOLOMEO (1400–75), Italian mercenary commander, born at Solza, near Bergamo. His great military talents caused his services to be eagerly desired both by the Venetians and the Milanese, who were then at war, and he served impartially on either side. In 1451, while serving the Venetians, the Council of Ten tried, but unsuccessfully, to have him assassinated. In 1455 he was appointed generalissimo of the Venetian land forces. His statue by Verocchio, considered the finest equestrian statue in the world, stands in a square in Venice. See Bonomi's *I Conti Martinengo-Colleoni* (1884).

Colles's Fracture, a common fracture of the radius, above the wrist; is usually the result of a fall on the palm of the hand. It is diagnosed by the history, by finding a tender point a little above the wrist, on the thumb side, with the alteration in the relative position of the two prominent styloid processes of the wrist. The process on the radial side is normally lower than that on the ulnar side. Colles's fracture brings the two bones much to the same level; their relative positions can be compared with those on the other wrist. The treatment is forcibly to extend the wrist; and sometimes the wrist has to be bent across the knee before the fragment will resume its proper position. An anterior and posterior splint are necessary, the posterior reaching to the knuckles, and the anterior to the flexure in the palm. The fingers can be moved in a week (passive movement—*i.e.* not by the patient), and the splints can be taken off in three weeks. Occasionally, after the first week, the splints are removed for a few minutes, and the wrist given passive exercise while the fracture is carefully grasped and steadied. Some surgeons advocate a double band of sticking-plaster, two and a half inches wide, just above the wrist, the hand being suspended high across the chest by string passed through a hole in the plaster on the thumb side. The hand then hangs thumb upward.

Collett, JACOBINE CAMILLA, *née* WERGELAND (1813–95), Norwegian author, sister of the poet Henrik Wergeland. Her literary life began with the publication of her novel *Amtmandens Dötre* (1855), which in essence is a sharp attack on the demoralizing habit regarding marriage as a 'woman's sole bread-winning business,' and is remarkable not only for its clear-cut, brilliant style, but also for its realistic descriptions of Norwegian domestic life. Her later books, clever as they all are, fall far below *Amtmandens Dötre*, with the exception of the volume of poems *I de lange Naetter* (1863). Her other writings include *Skrifter* (1892–4); *Sidste Blader* (1868–72); *Fra de Stummes Lejr* (1877); *Mod Strommen* (1879). See Clara Tschudi's *Tre Nutidskvinder* (1894–).

Colletta, PIETRO (1775–1831), Italian historian, statesman, and general, born at Naples. In 1815 he had to capitulate to the Austrians at Casalanza; but his services were considered indispensable, and he continued to hold offices under the Bourbons. After quelling the revolution in Sicily (1820) he was for a short time war minister (1821), but was eventually imprisoned, and banished to Brunn, in Moravia, whence, on being reprieved (1823), he retired to Florence, where he remained till his death. During his sojourn at Florence he wrote *Storia del Reame di Napoli dal* 1734 *sino al* 1825 (1st ed. 1834; Eng. trans. by Horner, 1858), the materials for which were collected with the greatest care, and it remains the standard work on the subject. See *Life* by Capponi (1846). The *Opere Ined. e Rare di Pietro Colletta* (1861) contain much of interest, including a fragmentary autobiography, and a Life by D'Ayala.

Colley, SIR GEORGE POMEROY (1835–81), English major-general, governor of Natal, became a border magistrate at the Cape (1857–8), executing a survey of the Transkei country. He proceeded to China (1860), and was present at the capture of the Taku forts. He served under Sir Garnet Wolseley in Ashanti, and in 1876 became Lord Lytton's military secretary in India. He commanded in Natal (1880), and was killed at Majuba Hill (1881).

Collie, THE SCOTCH. The Scotch collie perhaps enjoys more favor than any other dog. His intelligence is only realized when one sees a well-trained collie collecting sheep, detecting and expelling strangers, and, finally, folding the flock. He exhibits the same intelligence in his amusements, and combines with it an affection and an exuberance of spirits that compel sympathy. The assertion, sometimes made, that the collie is treacherous, has no foundation in fact. Originally the colors were confined to tan, black and white, but sable and sable and white have become more popular of recent years. Points: Head long; skull not too wide or too round; muzzle fine, tapering and of fair length; eyes dark, expressive, and set obliquely; ears small, set rather far back, and high—when excited ears semi-erect, with points hanging down and forwards; mask of face smooth; a well-knit, active, and sinewy frame; chest deep, but not wide; hind quarters drooping slightly; fore legs straight; hocks well bent; feet compact and strong; coat (in the rough variety), a dense furry undercoat, with a coat of hard, straight, rather stiff hair over; ruff and frill very full; a little feather on fore legs, but none on the hind ones below the hocks; brush long, with an upward swirl at the end, but normally carried low; colors various. In the smooth variety a merle or marbled color is often much fancied. Average height for dogs, 23 in.; for bitches, 21 in. See R. Lee, *The Collie or Sheepdog* (1890).

Collier, JEREMY (1650–1726), English nonjuring bishop and controversialist, born at Stow Quy, Cambridgeshire. A zealous partisan of the Stuarts, he issued a reply (*The Desertion discussed in a Letter to a Country Gentleman*) to Bishop Burnet's *Inquiry into the State of Affairs* (1688), which entailed imprisonment in Newgate. Arrested in connection with a treasonable plot (1692), he was compelled to leave the country, being formally outlawed, but never brought to trial. In 1698 Collier published his *Short*

View of the Immorality and Profaneness of the English Stage, in which he severely attacked Dryden, Wycherley, Congreve, and other dramatists of the time. The work caused an immense sensation, doing much to bring about the reformation of the stage. Efforts were made to answer him, but unavailingly; and Dryden, in the preface to his *Fables*, issued in 1700, confessed that in many things his critic had justly reproved him, though he had misrepresented him in others. Collier further wrote *Essays upon Several Moral Subjects* (1697–1705), *A Great Historical, Geographical, Genealogical, and Poetical Dictionary* (1701–21), *An Ecclesiastical History of Great Britain to the End of the Reign of Charles II.* (1708–14). His views on episcopacy and church government were practically those advocated nearly two centuries later by Pusey and Newman. See Collier's *Eccles. Hist., with Life of Author*, ed. by F. Barham (1840–1), and a new edition of the same work, with Life, by T. Lathbury (1852). See also Johnson's *Life of Congreve* (1897); Macaulay's *Comic Dramatists of the Restoration* (1862).

Champion 'Right Away,' Exhibiting the Highest Type of Collie.

Collier, JOHN PAYNE (1789–1883), English Shakespearean scholar and bibliographer, born in London. Collier's first volume was *The Poetical Decameron* (1820), and in 1825–7 he prepared his edition of *Dodsley's Old Plays*, to which he added six meritorious dramas not hitherto reprinted. His *History of English Dramatic Poetry to the Time of Shakespeare, and Annals of the Stage to the Restoration*, was published in 1831. In 1842 appeared his edition of Shakespeare's *Works*, with Life, and in 1846 his *Memoirs of Actors in the Plays of Shakespeare.* In 1852 Collier stated that he had become possessed of a copy of the Shakespeare folio edition of 1632, on the margins of which were written notes evidently dating back to the middle of the 17th century; and these annotations were issued as *Notes and Emendations to the Plays of Shakespeare*, being afterward adopted wholesale in Collier's edition of the dramatist published in 1853, and again in that of 1858. The alleged discovery produced a great sensation in England, Germany, and the U. S., leading to prolonged and animated controversy. In the end leading authorities on the text pronounced the notes to be forgeries. The discovery of other forgeries followed—facts which bore very black testimony against Collier's honor. Nor were these his only forgeries (see Sidney Lee's *Life of Shakespeare*, 1899, appendix i.). He also published a valuable edition of *Spenser's Works* (1862), and *Bibliographical and Critical Account of the Rarest Books in the English Language* (1865). See Dr. Ingleby's *Complete View of the Shakspere Controversy* (1861).

Colliery. See COAL-MINING.

Collimation, a mode of telescopic adjustment by which the optical axis, or line of sight, is rendered strictly perpendicular to the axis of movement. The purpose is effected, in the important case of a transit instrument, by observing a distant object, first with the telescope in its ordinary position, then reversed in its bearings. Half the angular amount of the discrepancy, should any be apparent, is the 'collimation error.'

Collimator, an auxiliary telescope for determining collimation error. It is mounted horizontally in front of the transit instrument to be adjusted, and fitted with crossed wires which serve as a convenient *point de mire.* The collimator of a spectroscope is a tube with a slit at one end and a lens at the other, by means of which the rays to be analyzed are admitted and rendered parallel. A collimating eyepiece is used in determinations of the nadir point. Between the two lenses of a common eyepiece a glass plate is diagonally inserted, from which artificial light, striking through a hole in the side of the tube, is reflected towards the reticule of a transit, and illuminates the wires sufficiently for observation.

Collingswood, town, Camden county, New Jersey, on the Pennsylvania Railroad; 3 miles southeast of Camden. Trucks and wall paper are manufactured. Pop. (1930) 12,723.

Collingwood, town and port, Ontario, Canada, on the south shore of Georgian Bay, Lake Huron, and on the Canadian National Railway; 70 miles northwest of Toronto. A government fish hatchery and rifle range are located here. It has ship-building yards and dry-docks, grain elevators and steel works. It exports lumber, grain, and produce. Other industries include planing and saw mills, foundries and machine shops, fruit and canning factories. Pop. (1931) 5,809.

Collingwood, city, Bourke county, Victoria, Australia, between Melbourne (q. v.), of which it is a northeast suburb, and the Yarra Yarra. Pop. 35,000.

Collingwood, CUTHBERT, LORD (1750–1810), British admiral. Sent to sea at the age of eleven, his life was spent almost wholly on board ship. He first saw service in the American Revolutionary War, and fought on shore at the Battle of Bunker Hill (1775). From 1778 his career was closely connected with that of Lord Nelson (q. v.), whom he followed up the ladder of promotion step by step, until Nelson's death left the topmost round vacant for him. Among the naval victories in which Collingwood bore a part were those of Lord Howe off Brest in 1794; of Lord Jervis off Cape St. Vincent in 1797; and of Trafalgar in 1805, where he held the second command, until Nelson had received his death wound, when he assumed the chief direction. For his services in this campaign he was raised to the peerage and given a pension of $10,000 a year. He died on board the *Ville de Paris,* near Port Mahon, Minorca, and was brought to England and buried in the crypt of St. Paul's, London. Consult *Correspondence and Life,* by his son-in-law; *Lives* by W. Davies and W. Clark Russell.

Collins, city, Covington county, Mississippi, on the Gulf and Ship Island Railroad; 58 miles southeast of Jackson. Pop. (1930) 935.

Collins, ANTHONY (1676–1729), English deist, was born near Hounslow, and became the disciple and friend of John Locke (q. v.). In 1707 he published his *Essay Concerning the Use of Human Reason,* and in 1709 his *Priestcraft in Perfection.* His next work was a *Vindication of the Divine Attributes.* Collins was a philosophical Necessitarian, and advocated his opinions in his *Philosophical Inquiry Concerning Liberty and Necessity* (1715). In 1713 he published his *Discourse on Free Thinking,* the best known and the most important of all his works. In 1724 appeared *Grounds and Reasons of the Christian Religion;* in 1727, *Scheme of Literal Prophecy Considered.*

Collins, A[RCHIE] FREDERICK (1869–), American physicist, was born in South Bend, Ind., and was educated in the old University of Chicago. He has made important researches concerning the effect of electric waves on brain cells, and was the first person (1899) to apply the direct current arc to wireless telephony (q. v.), for which he was awarded a gold medal at the Alaska-Yukon-Pacific Exposition (1909). He has written on wireless subjects for NELSON'S PERPETUAL LOOSE-LEAF ENCYCLOPÆDIA, and published *Wireless Telegraphy* (1905); *Manual of Wireless-Telegraphy* (1906); *Construction of Induction Coils* (1909); *The Book of Wireless* (1915); *The Book of the Stars* (1915); *The Book of Magic* (1916); *The Book of Electricity* (1916), besides a large number of books on aviation, chemistry, business, etc.

Collins, FRANK SHIPLEY (1848–), American botanist, was born in Charlestown, Mass. While engaged primarily in commercial pursuits, he also devoted much time to botanical research, and contributed extensively to scientific journals. He published: *Flora of Middlesex County* (1888); *The Green Algæ of North America* (in *Tufts College Studies,* 1909); *Phyotheca Boreali-Americana* (1894–1913).

Collins, JAMES FRANKLIN (1863–), American botanist, was born in North Anson, Me. He was for many years engaged in art metal work, became interested in botany through private study, and was successively instructor (1899–1905) and assistant professor (1905–11) of botany in Brown University. He was curator of the University Herbarium from 1894 to 1911, when he became forest pathologist in the U. S. Department of Agriculture. He wrote *Practical Tree Surgery,* and collaborated in *Key to New England Trees, An Illustrated Key to the Trees of Northeastern North America, The Present Status of the Chestnut Bark Disease,* and *The Control of the Chestnut Bark Disease.*

Collins, JÓHN CHURTON (1848–1908), English man of letters. His works include: *Bolingbroke and Voltaire in England* (1886); *Study of English Literature* (1891); *Illustrations of Tennyson* (1891); *Jonathan Swift: a Biographical and Critical Study* (1893); *Essays and Studies* (1895); *Ephemera Critica* (1901); *Studies in Shakespeare* (1904); *Essays in Poetry and Criticism* (1905); *Rousseau and Voltaire* (1908). Besides editing Dryden's *Satires* (1901) and a *Treasury of Minor British Poetry* (1896), he published scholarly editions of *Cyril Tourneur's Plays and Poems* (1878), *Poems of Lord Herbert of Cherbury* (1881), *Plays and Poems of Robert Greene* (1899) and Sir Thomas More's *Utopia* (1904). Consult L. C. Collins, *Life and Memoirs of John Churton Collins* (1911).

Collins, JOSEPH (1866–), American neurologist, was born in Brookfield, Conn. He studied at the University of Michigan (1884–5), was graduated in medicine from New York University (1888), and did post-graduate work at Frankfort, Germany. From 1897 to 1909 he was professor of neurology at the New York Post-Graduate Medical School. He published *Diseases of the Brain; Faculty of Speech; Diseases of the Nervous System; Pathology of Nervous Diseases; Sympathetic Nervous System; The Way with the Nerves; Sleep and the Sleepless; The Doctor Looks at Love and Life; The Doctor Looks at Life and Death; The Doctor Looks at Marriage and Medicine; The Doctor Looks at Doctors; My Italian Year.*

Collins, JOSEPH WILLIAM (1839–1904), American pisciculturist, was born in Isleboro, Me. He worked on a schooner at ten years of age, and taught himself in the intervals of fishing. Subsequently he commanded schooners sailing from Gloucester, Mass., and was engaged to make a statistical inquiry for the tenth census (1879–80). In 1880 he became U. S. Fish Commissioner, a post which he held until 1892. He was connected with various commissions; received many medals and diplomas, including an honor medal (1893) as 'one of the makers of the World's Columbian Exposition'; was honorary member of many scientific societies, and chairman of the Massachusetts Fish and Game Commission. He was the author of numerous papers and reports on fisheries.

Collins, WILLIAM (1721–59), English poet, was born in Chichester. At the age of twelve he was sent to Winchester School, where he remained seven years. While there he wrote his *Oriental Eclogues,* which attained popularity. In 1741 he proceeded to Oxford, where he was distinguished by 'his genius and indolence.' Later, he took up his residence in London, and sought to make a living by literature. He fell into irregular habits, and was at times reduced to the greatest straits. It was during this period that he wrote his *Odes*, upon which his fame as a poet now rests. About this time he met Home, the author of *Douglas*, to whom he addressed his *Ode on the Popular Superstitions of the Highlands of Scotland*, a poem in which, according to James Russell Lowell, 'the whole Romantic School is foreshadowed.' In 1753 Collins' reason completely gave way.

Collins, WILLIAM (1788–1847), English landscape and figure painter, was born in London. In 1812 his *Sale of the Pet Lamb* was sold for $700, and from this time his pictures became popular. He exhibited 169 works, of which the best known are *The Blackberry Gatherers* and *The Birdcatchers* (1814); *Scene on the Coast of Norfolk* (1815), now at Windsor; *The Fisherman's Departure* (1826), *As Happy as a King* (1836), and *Early Morning* (1846). He was elected R.A. in 1820. Consult *Life* by Wilkie Collins.

Collins, WILLIAM WILKIE (1824–89), English novelist, born in London, eldest son of William Collins (q. v.), the painter. He became a student at Lincoln's Inn, but soon turned his attention from law to literature, and his first production was the *Life* of his father (1848). Two years afterward his first novel, *Antonina, or the Fall of Rome*, appeared, and was accorded an encouraging reception; then in 1852 a second novel, *Basil*, a story of modern life, which made Collins more widely known. He became associated with Dickens, first upon *Household Words* (1855), and then on *All the Year Round* (1859). *Mr. Wray's Cashbox* (1852) and *Hide and Seek* (1854) showed a distinct advance in literary workmanship; and the narrator's art became apparent in such novels as *After Dark* (1856), *The Dead Secret* (1857), and *The Queen of Hearts* (1859).

It was on the publication of *The Woman in White* (1860) that Collins gained general recognition as a novelist of power. In character, incident, and development of plot it showed great skill and mastery. In 1862 appeared *No Name*, and in 1863 *My Miscellanies*. *Armadale* appeared in 1866, and *The Moonstone* in 1868. Collins now wrote in rapid succession, *Man and Wife* (1870), *Poor Miss Finch* (1872), *Miss or Mrs.?, and Other Stories* (1873), *The New Magdalen* (severely attacked for its defiance of the conventionalities, 1873), *The Law and the Lady* (which also called forth much adverse criticism, 1875), and *The Two Destinies* (1876). Collins visited America in the seventies, and gave readings from his works. His later novels were: *The Haunted Hotel* (1878); *The Fallen Leaves* (1879); *A Rogue's Life* (1879); *Jezebel's Daughter* (1880); *The Black Robe* (1881); *Heart and Science* (1883); *'I Say No'* (1884); *Little Novels* (1887); *The Legacy of Cain* (1888); and *Blind Love*, which was running as a serial in *The Illustrated London News* at the time of his death. He wrote two dramas — *The Lighthouse* (1855), produced at Tavistock House; and *The Frozen Deep* (1874), in which Dickens and other literary celebrities appeared. He also collaborated with Dickens in *No Thoroughfare* (1867). Several of his novels have been dramatized, *The Woman in White* and *The New Magdalen* successfully.

As a novelist, Collins depended chiefly upon the skilful unwinding of his intricate and exciting plots. He lacked humor and appreciation of the finer shades of character, but he conceived some striking individualities, such as Count Fosco, Mercy Merrick, and Margaret Vanstone. Consult E. von Wolzogen's *Wilkie Collins*.

Collinsia, a genus of annual flowering plants belonging to the order Scrophulariaceæ, and popular as garden plants. The seed may be sown in the open, either in spring or in autumn. The flowers are in whorls, are two-lipped, and have a wide range of color, but there is no yellow-flowered variety. Some of the best known are *C. verna*, with white and blue flowers in April and May; *C. grandiflora*, purple; and *C. bicolor*, purple and white, with its several varieties.

Collinson, PETER (1694–1768), English naturalist and botanist, was born near Windermere. He founded a botanic garden at Mill Hill, north of London, and improved the English system of agriculture by introducing foreign methods and products. He sent English plants to America, and introduced many species of American plants into England. He also urged the cultivation in America of flax, hemp, silk, and wine, and these industries were accordingly introduced in several of the States. He established an acquaintance by correspondence with Benjamin Franklin, which ripened into a lifelong friendship.

Collinson, SIR RICHARD (1811–83), English admiral; served as surveyor and pilot in the First Chinese War (1841), and in the *Enterprise* sailed for the relief of Sir John Franklin (1849), being absent several years. Though unsuccessful, he added considerably to geographical knowledge, and was awarded the gold medal of the Royal Geographical Society. He edited, for the Hakluyt Society, *The Three Voyages of Martin Frobisher* (1867).

Collinsville, city, Madison county, Illinois, on the Pennsylvania Railroad; 12 miles E.N.E. of St. Louis. It has coal-mining industries, lead smelter and zinc works, knitting and flour mills. Pop. (1920) 9,753; (1930) 9,235.

Collio, summer resort of Northern Italy, chief town in the Trompia valley, in the province of Brescia; 20 miles northeast of Brescia city. It has iron mines and other industries.

Collision Bulkhead. See BULKHEADS.

Collisions at Sea. A collision at sea between two ships may happen — (1) when neither party is to blame, as, for instance, where it has been caused by the act of God, in which case the misfortune must be borne by the person on whom it has happened to fall; (2) when both are in fault and there has been negligence on both sides, in which case the law is that the loss must be apportioned between them — *i.e.*, the total amount of loss to both ships is estimated, and each bears one-half; (3) by the misconduct of the suffering party only, and then the sufferer must bear his own burden; and (4) when it has been the fault of the ship which ran the other down, and in that case the injured party is entitled to compensation from the other.

The action for damages in respect of a collision is usually an action *in rem* brought in an admiralty court, the damages being a charge on the ship itself; and if the owner surrenders his vessel to satisfy the claim for damages, he may escape further personal liability, unless the owner himself was aboard and was personally responsible for the accident, in which case he may be held individually liable. Under U. S. Federal law, the owners of a vessel alleged to have been damaged by the negligence of another may file a *libel* in the U. S. court, and detain the vessel until the termination of the action, or the owners give a bond to cover the amount claimed.

A maritime collision may also take place upon inland waters. Under the Constitution of the United States, all such actions are brought in the Federal courts.

For the rules to prevent collisions at sea, see RULE OF THE ROAD AT SEA.

Collisions on Land are subject to the general rules of negligence and liability for such. See RULE of the Road; Railroads; Wreck.

Collo'dion (Greek *kollao*, 'I stick') is a colorless, somewhat viscid liquid obtained by dissolving the lower nitrates of cellulose in a mixture of ether and alcohol. Cotton itself is not soluble in alcohol or ether; but when treated in the form of cotton wool, rags, or paper with a mixture of strong nitric and sulphuric acids, it can be dissolved in ether, or in a mixture of ether and alcohol. To this modification the name *pyroxylin* (q. v.) is applied.

There are many varieties of collodion, divisible into surgical or medicated collodions and photographic collodions. When one part of pyroxylin is dissolved in thirty-six parts of ether and twelve parts of alcohol, a thickish liquid is obtained, which evaporates rapidly, leaving a thin film of pyroxylin. As an application to wounds, where it is desired to keep the edges close together, this form of collodion is of use, owing to the contraction of the pyroxylin film which it leaves; but for general purposes a flexile or flexible collodion (see Flexile Collodion) is desirable. Collodion also plays an important part in photography, being used in the manufacture of films (see Photography).

Colloids, a term first used in 1861–4 by Thomas Graham, an English chemist, in the course of his studies on dialysis (q.v.), to describe various mucilaginous substances, as gelatine, glue, and starch, which in solution were either incapable of diffusion through organic membranes or diffused at a very slow rate, and which he differentiated from a second class of substances called by him *crystalloids.* Later investigations proved, however, that this property is not limited to any definite class, but under proper conditions may be exhibited by practically all substances. The terms Colloid and Colloidal, therefore, like the terms gaseous, liquid, and solid, have come to denote not a form of matter, but a state. Colloidal solutions in which the particles of colloid matter are highly dispersed so that the solution is in a fluid state are known as *sols;* those which occur in a gelatinous state are known as *gels.*

Colloidal solutions merge on the one hand into true or homogeneous solutions, and on the other into suspensions. In general, when the mixture is of such a character that it is evident the two constituents will eventually separate, as in a mixture of fine sand and water, it is known as a *suspension;* when the dispersed particles are so fine that they will not settle out, and yet not so fine but that their size can be estimated by appropriate methods, the mixture is known as a *colloidal solution;* and when the particles are so infinitesimal as to be no longer discernible by microscopic or ultra-microscopic methods, the mixture is a true solution. The smallest particles yet to be distinguished are those of a red colloidal gold solution, the diameters of which have been calculated as 6 $\mu\mu$ (millimicrons).

Colloidal solutions vary markedly, the most essential characteristics being the tendency for the solute to remain almost indefinitely in suspension, and the low osmotic pressure (see Osmosis). Viewed through the ultramicroscope, the suspended particles are seen to differ greatly in size and to be in a state of rapid motion, known as the Brownian Movements (q.v.). The particles are electrically charged—in some solutions negatively, in some positively. Another property, manifested especially by the *gels,* is that of adsorption, or the capacity of condensing the dissolved matter from a solution and retaining it.

In general, colloidal solutions are of two main types, shading imperceptibly into each other—the viscous, gelatinizing type, known as *emulsoids,* including a large group of organic substances, as gelatine, agar-agar, etc., which can be dissolved directly in the medium; and the non-viscous, non-gelatinizing type, known as *suspensoids,* including solutions of the various metals which require special laboratory preparation. Most emulsoids are reversible—*i.e.,* capable after evaporation of being redissolved; while the suspensoids are usually irreversible, or incapable of thus reproducing the colloidal state. As a rule, suspensoids are sensitive to the addition of electrolytes that cause coagulation and precipitation of the suspended solid. Emulsoids, on the contrary, are not only generally non-sensitive to electrolytic action, but their addition to a suspensoid frequently exerts a protective action, preventing the coagulation that would otherwise occur.

The principles of colloidal chemistry find a wide application in science and the industrial arts. These principles are of special importance in biology and biochemistry, as most of the products which are active in life processes are to be found in the living organism in the colloidal state. Among the arts and industries in which they play an important *rôle* are photography, metallurgy, ceramics, tanning, brewing, dyeing, sewage and water purification, the manufacture of soap, rubber, paper, artificial silk, celluloid, sugar, explosives, metallic mirrors, tungsten lamps, cement, and varnish, and the various cooking processes.

Consult J. Alexander, *Colloid Chemistry* (4 vols. 1926–32); W. D. Bancroft, *Applied Colloid Chemistry* (1932); E. S. Hedge, *Colloids* (1931); H. B. Weiser, *Inorganic Colloid Chemistry* (2 vols. 1933–5); A. W. Thomas, *Colloid Chemistry* (1934); J. C. Ware, *Chemistry of the Colloidal State* (1930); H. N. Holmes, *Introductory Colloid Chemistry* (1934); T. Svedberg, *Colloid Chemistry* (1928).

D. H. Killeffer.
Engineering Chemist.

Collot d'Herbois, kō-lō' der-bwä', Jean Marie (1750–96), French revolutionist, was born in Paris. A provincial actor, he was attracted by the Revolution to Paris, where his impudence, his loud voice, and his *Almanach du Père Gérard* secured him his election for Paris to the National Convention. In 1793 he became president of the Convention, and a member of the Committee of Public Safety. Sent by Robespierre to Lyons in November of the same year, he took bloody revenge on the inhabitants for having once hissed him off the stage. Increased popularity having followed an attempt to assassinate him, Robespierre sought his destruction, but was himself destroyed. Collot d'Herbois was finally expelled from the Convention, and banished to Cayenne, where he died.

Col'lotype is a method of printing in a greasy ink from a gelatin surface adhering to a glass plate which has been sensitized with bichromate of potassium and exposed under a photographic negative. The portions of the film that are acted upon by the light transmitted through the clearer portions of the negative become insoluble in water. A plate thus exposed, washed, and dried will, when treated like a lithographic stone, give similar results. See Process Work.

Collu'sion signifies a fraudulent scheme entered into by two or more parties, to deprive others of their legal rights, or to interfere with the course of justice. A common form is where spouses make agreement whereby one of them shall illegally sue for divorce. Another is where an insolvent party agrees to give certain of his creditors advantages above the rest. Proceedings vitiated by collusion and judicial decrees induced thereby are either null and void, or voidable at the instance of the party prejudiced, or of the public attorney in the general interest. See Conspiracy; Fraud.

Coll'yer, Robert (1823–1912), American clergyman, was born in Keighley, Yorkshire, England, and became successively a mill hand, a blacksmith, and a Methodist local preacher. In 1850 he emigrated to America, and until 1859 was a local Methodist preacher, while also working as a blacksmith. In 1859 he joined the Unitarian Church. He removed to Chicago, and there founded the Unity Church, of which he was pastor from 1860 to 1879, when he accepted a call from the Church of the Messiah in New York City, of which he was afterward pastor and pastor emeritus. During the Civil War, and after, he gained a wide reputation as a pulpit and platform orator. Among his books are: *Nature and Life* (1865); *The Life That Now Is* (1871); *The Single Truth* (1877); *Talks to Young Men* (1888); *Things New and Old* (1893); *Clear Grit*, lectures and poems edited by J. Haynes Holmes (1914).

Colman, kōl'man, BENJAMIN (1673–1747), American clergyman, was born in Boston, and was graduated from Harvard. He began to preach in 1693, and two years later was captured by a privateer on his way to England and held prisoner in France. In 1699 he returned to America, and became pastor of the Brattle Street Congregational Church, Boston, a post he held until his death. This church was founded in opposition to the Cambridge platform, and was for many years in a state of isolation. Colman was a powerful preacher, and is remembered as a generous donor to Harvard and Yale, having refused the presidency of the former in 1724. He published sermons and some poems. Consult Turell's *Life and Character of Benjamin Colman*.

Colman, GEORGE, 'the Elder' (1732–94), English dramatic author and theatrical manager, was born in Florence. In 1760 his first dramatic piece, entitled *Polly Honeycomb*, was produced at Drury Lane with success. Next year he gave to the world his comedy of *The Jealous Wife*, and in conjunction with Garrick he wrote *The Clandestine Marriage*, which was played at Drury Lane (1766). In 1767 he became one of the purchasers and acting manager of Covent Garden Theatre. In 1777 he purchased the patent of the Haymarket Theatre. He married Miss Ford, the actress, and was the author of meritorious translations of Terence (1765), the *Mercator* of Plautus, and Horace's *De Arte Poetica*. A number of his *Dramatic Works* were published in collected form in 1777, and *Prose on Several Occasions, with Some Pieces in Verse*, in 1787. His *Memoirs* were posthumously published (1795).

Colman, GEORGE, 'the Younger' (1762–1836), English dramatist, son of the preceding. He succeeded his father as manager of the Haymarket Theatre (1785); and from 1824 till his death held the post of examiner of plays. He was the author of a number of successful plays, mostly comedies, in which somewhat hackneyed sentiment is mingled with keen sallies of wit. Among the more popular were: *The Iron Chest* (1796); *The Heir at Law* (1797), which still holds the stage; *Broad Grins* (1802); *John Bull* (1803); *Love Laughs at Locksmiths* (1803). A volume of his *Dramatic Works* was published (1827); also *Random Records*, a desultory autobiography (1830).

Colman, NORMAN JAY (1827–1911), American legislator, was born near Richfield Springs, N. Y., and was graduated from the Louisville Law School (1851). In 1852 he established *Colman's Rural World* at St. Louis, and became an alderman of the city (1855–6). He served in the Missouri militia during the Civil War; was lieutenant-governor of the State (1875–7), and president of the State board of agriculture. He was U. S. Commissioner of Agriculture from 1885 to 1889, and on the organization of the U. S. Department of Agriculture was its first Secretary (Feb. 11 to March 4, 1889). The establishment of agricultural experimental stations in the United States was largely due to him.

Colman, SAMUEL (1832–1920), American painter, was born in Portland, Me., and removed with his parents to New York. His specialties are landscapes, many of them reminiscent of his travels, such as *Moonrise in Venice, Sunny Afternoon in the Harbor of Algiers, Ships of the Western Plains*, and *The Spanish Peaks, Colorado*. He was elected to the National Academy in 1860, and was a founder and the first president of the American Society of Painters in Water Colors.

Colmar. See KOLMAR.

Cöln, or KÖLN. See COLOGNE.

Colne, kōn *or* kōln, town, Lancashire, England, on the River Calder; 32 miles north of Manchester. Cotton and worsted goods are the leading manufactures, and there are also iron works and other industries.

Colne River, Essex, England, after a southeasterly course of 36 miles falls into the North Sea at Mersea Island.

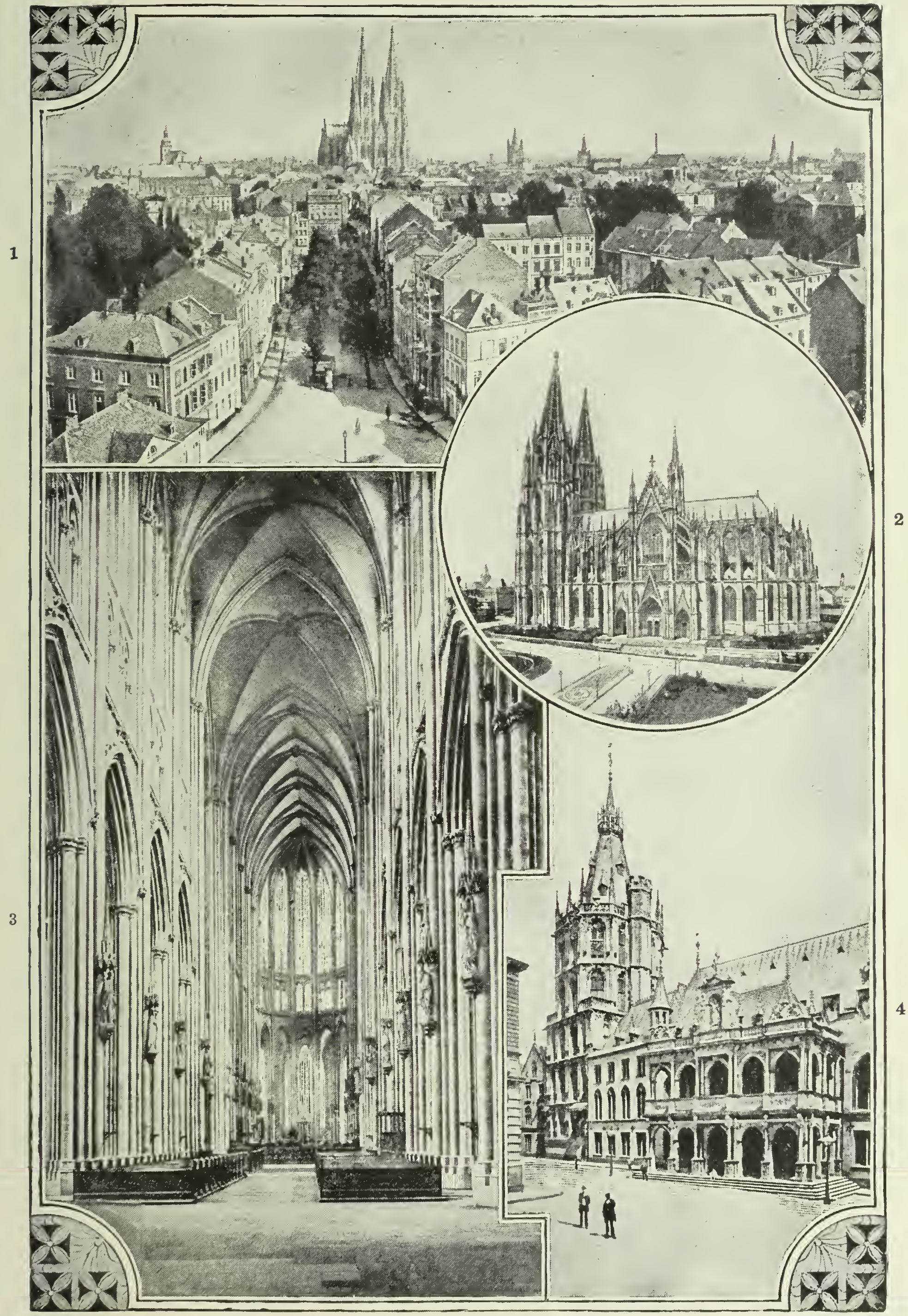
Colobus, kol'ō-bus, a genus of African monkeys whose members are remarkable for their silky hair and tufted tails. In several species there is a 'mantle' of long hair at the sides of the body. The thumb is absent or rudimentary. Examples are the guereza (*C. guereza*) of Abyssinia, and the Satan monkey (*C. satanas*), chiefly found in Fernando Po, Gulf of Guinea.

Colocynth, kol'ō-sinth (Greek *kolokynthis*), a well-known medicine, much used as a purgative, is the dried and powdered pulp of the *Colocynth Gourd, Coloquintida, Bitter Apple*, or *Bitter Cucumber*, a globose fruit about the size of an orange, of a uniform yellow color, with a smooth, thin, solid rind. The plant which produces it, *Cucumis* (or *Citrullus*) *Colocynthis*, is nearly allied to the cucumber. It is found very widely distributed, growing in immense quantities on the sand hillocks of Egypt and Nubia, India, Portugal, Spain, etc. The main supplies of the drug are obtained from Mogador, Spain, and Syria. The fruit is gathered when it begins to turn yellow, peeled, and dried quickly either in a stove or in the sun. It owes its properties to a bitter principle called *Colocynthin*, $C_{56}H_{84}O_{23}$, which is more or less abundantly present in the fruit of many of the gourd family. It is a curious fact, but to which there are many analogies, that the seeds of the colocynth plant, produced in the midst of its medicinal pulp, are perfectly bland, and they even form an important article of food in North Africa.

In medicine colocynth is generally administered in the form of pills, in which the extract is associated with aloes, scammony, and the extract of hyoscyamus; and in small doses is a safe and reliable purgative. Taken alone, its action is drastic, and is thus employed only in obstinate constipation. In large doses it is a poison.

Cologne, kō-lōn', or (German) KÖLN, kûln, a city in the Rhine province, Prussia, situated on the left bank of the River Rhine; 358 miles by rail southwest of Berlin, and 24 miles southeast of Düsseldorf. Although Koblenz is the official capital of the province, Cologne, by virtue of its history, the magnitude of its commerce, its position as a fortress of the first class (one of the chief defences of the empire on the western frontier), and its archiepiscopal see (Roman Catholic), is the most important town. In the heart of the city are many houses of the fifteenth and sixteenth centuries, and even earlier. The streets are narrow and crooked, but outside the central quarters there has been a remarkable transformation since the demolition of the old town walls in 1881–5. One of the most important features of the new city is the Ringstrasse, a fine boulevard, nowhere less than 60 feet in width, encircling the entire old town.

The principal object of inter-



VIEWS IN COLOGNE.

1. General view from the Rathhaus. 2. The Cathedral. 3. Nave of the Cathedral. 4. The Rathhaus.

est, as well as the greatest ornament of the city, is the magnificent Cathedral, or Dom, one of the purest specimens of Gothic architecture in the world. Its foundations were laid in the middle of the thirteenth century, and the choir was dedicated in 1322. The work was carried on slowly until the period of the Reformation, when it was discontinued, and even the parts already completed were allowed to fall into disrepair. At the beginning of the nineteenth century, however, the preservation of what was recognized as one of the chief architectural treasures of Europe was assured by a national subscription. The work of renovation was begun in 1823, and the edifice, completed according to the original plan, was opened in 1880, in the presence of Emperor William I and all the reigning German princes. The Cathedral, which is in the form of a cross, is 480 feet long and 282 feet wide; the height of the central aisle is 154 feet, and that of each of the towers 511 feet. The great bell weighs 543 hundred weight. The Cathedral contains the shrine of the Three Kings of Cologne (supposed to be the Three Wise Men who came from the East to adore the Infant Christ). Their bones are said to have been brought to Cologne by Frederick Barbarossa. In the choir the heart of Marie de' Medici is buried. The Cathedral was considerably damaged in the Second World War but remained structurally intact.

The Church of the Minorities, containing the tomb of the celebrated scholastic Duns Scotus, St. Maurice's Church, and the Church of the Jesuits are also good examples of Gothic architecture. Other important churches are: St. Martin's (1172); St. Maria in Capitolio, a cruciform basilica, dedicated in 1049; St. Cecily's (tenth century); St. Peter's (1524), containing Rubens' celebrated *Crucifixion of St. Peter;* the Apostles' Church (eleventh and twelfth centuries); St. Gereon's, possessing the relics of the 308 martyrs of the Theban legion; and St. Ursula's, where are preserved the bones of the 11,000 martyred virgins, companions of St. Ursula. The (municipal) Wallraf-Richartz Museum (1855–61) is especially noteworthy for its collections of pictures and Roman and mediaeval antiquities. In addition to the churches, the principal features of the old town are the Town Hall (thirteenth to nineteenth century); Gürzenich Hall (1441–52); house of the Templars; modern Post Office (1893); supreme law courts of the Rhineland province; the Zeughaus, or Arsenal; and the Citizens' Hospital.

In the newer parts of the city, principally on or near the circle of the former city walls, stand the Industrial Art Museum (1899–1900); the former city gates, which contain the natural history and historical collections; the Synagogue; and the fountain erected (1897) to commemorate Emperor William I. The Zoological and Botanical Gardens are on the north side of the city. The educational institutions include the Academy of Practical Medicine, the Univercity of Cologne (the third largest in Germany), the United School of Engineering, the Arts and Crafts School, and commercial and technical secondary schools. The city has acquired a high reputation for music. It was the cultural center of western Germany and a travel center.

After the First World War, Cologne retained its rank as the chief economic center of the Lower Rhineland. The only Produce Exchange in Prussia was organized here in 1919 and there is a Stock Exchange. Cologne is the chief western Germany livestock market and the center of the Rhine brown-coal industry and also of the aluminum, ultramine, sugar and tobacco industries. Trade in food products, grain and mill products, textiles, rubber, skins, leather and building materials is flourishing normally.

Manufacturing is an important industry; sugar, tobacco and cigars, and chocolate being among the city's products. The celebrated perfume known as Eau de Cologne (q. v.) or cologne water was manufactured here. Printing was a leading industry, and the *Kölnische Zeitung* is a famous newspaper with an enormous circulation. The city's airport was the center and junction of air lines connecting with all parts of the world. In 1929 a fourth bridge across the Rhine was completed, at that date the largest suspension bridge in Europe.

It was the fifth largest city in Germany. In 1900 the population was 370,685; in 1910, 516,167; 1925, 700,222; 1939, 768,426.

History.—The military Colonia (*Agrippinensis*), from which the city derives its name, was planted here by Agrippina, wife of the Roman Emperor Claudius, in the year 50 A.D. It became the capital of the Roman province of Lower Germany. In the middle of the fifth century the Franks became masters of the place; and in the ninth century it was twice cruelly devastated by the Northmen. From 1367 Cologne was one of the most influential members of the Hanseatic League. Aided by a native school of painters and architects, and by the founding of the University (1388), the city became (thirteenth to fifteenth century) one of the largest and most powerful in Europe. But from the sixteenth century it slowly decayed, the process finally culminating in the supression of the University, and the annexation of the city to the French republic (1797). The revival of Cologne dates from its incorporation with Prussia in 1815. A number of Allied air raids were carried out on the city during the First World War. In December 1918, it was occupied by the Allies and became headquarters of the British army of occupation until they evacuated it in 1926. In the final phase of the Second World War (in Europe, 1945), the city as a whole was ruinously damaged by air bombing and artillery shelling. The full extent of the damage was impossible to estimate at the time, but it was obvious that it would take years to restore the city to its normal importance as a commercial and cultural center. Consult L. Réau, *Cologne* (1908); H. Wieger, *Handbuch von Köln* (1925).

Colombes, kō-lônb', town, France, department Seine, near the River Seine; 3 miles northwest of Paris. It has manufacturing industries. In the castle, Henrietta Maria, queen of Charles I of England, died in 1669. Pop. (1936) 61,946.

Colombia, kō-lom'bi-ä, republic of South America, occupying the northwest corner of the continent. It is bounded on the north by the Caribbean Sea; on the south by Brazil, Peru, and Ecuador; on the east by Venezuela and Brazil; on the west by Ecuador, the Pacific Ocean, and Panama. The area is variously estimated at from 443,985 to over 450,000, a commonly accepted estimate being 447,536 square miles.

Topography.—The most striking physical characteristic of Colombia is the group of three great mountain ranges which traverse the country from north to south. These ranges, which are part of the Andes, are known as the Eastern, Central, and Western Cordilleras, and rise in places to heights of 15,000 and 16,000 feet. To the east of these ranges stretch vast *llanos* or plains, while between them are longitudinal valleys drained by rivers flowing into the Caribbean Sea, of which the chief are the Magdalena and its great tributary the Cauca, the Sinu, and the Atrato. These rivers in their lower courses divide into branches, and form islands and lagoons. On the east side of the Cordilleras the rivers flow for long distances through swampy llanos, to the Orinoco on the east, or the Amazon on the southeast.

Climate.—Owing to the peculiar topography of the country, the climate of Colombia is extremely varied. In general there is a wet and a dry season. Although it touches the Equator, there are portions perpetually covered with snow; while the seacoast, valleys, and swampy plains present a typically tropical aspect. In the low lands, the mean temperature is from 74° to 86° F. In the temperate zone, the annual mean varies from 62° to 72°, and the climate is healthy; while in the cold zone, the mean is below 60°. The valleys are hot—even hotter than the coast—and the llanos of the Orinoco and Amazon basins are particularly sultry. The rainfall is heavy on the coast, amounting to 100 inches in the northeast, and perhaps 200 inches in the Atrato valley and on the Pacific coast. On the higher land it is much less—at Bogotá, 45 inches.

Geology.—The oldest rocks are gneiss, schist, granite, and other eruptive rocks, which are overlaid with sandstones, slates, and limestones, with porphyries and porphyrites between. The three mountain ranges show great variation in character. The low mountains on the west coast are covered with Quaternary sandstones and marls, showing shells of extant species which are now found in the neighboring waters. The Western Cordillera itself seems to consist principally of sandstones and porphyritic rocks of the Cretaceous series. The Central Cordillera shows gneiss and other crystalline rocks, with sedimentary deposits of the Cretaceous age; while the Eastern range is composed almost entirely of Cretaceous rocks. In the Cauca valley, between the Western and Central Cordilleras, are red sandstones and coal seams which may belong to the Tertiary period. Coal beds, probably of the same period, are found elsewhere in the country. There are some volcanoes, but these are of comparatively little importance.

Flora and Fauna.—Owing to the wide range of temperature to be found within its borders, the fauna and flora of Colombia are exceptionally varied in character. The flora includes almost all varieties of vegetable life common to the tropic, semi-tropic, and temperate zones. Bananas, sugar cane, copaiba, ipecacuanha, and other medicinal plants; orchids, breadfruit, mahogany and other timber, india rubber, gums and resins, cocoa, maize, and tobacco are cultivated in the tropic zone. In the semi-tropic zone coffee of excellent quality is produced; the agaves yield fibers for the manufacture of ropes and bags, and juice for the preparation of pulque; and cinchona bark is obtained in the forests. European crops, such as wheat, barley, oats, alfalfa, and potatoes and other vegetables, are produced in the temperate regions. Perhaps the most characteristic of all Colombian flora are the palm trees, to be found in great variety throughout the republic. From them the natives obtain such varied products as vegetable ivory, wax, cocoanuts, palm wine, a kind of butter, and the fiber used in the manufacture of Panama hats.

The fauna is not less varied than the plant life. Among the quadrupeds are to be found the puma, jaguar, two species of bear, tapir, capybara, peccary, and several families of deer. The saurians include the large iguana, whose flesh is considered a great delicacy, and many brilliantly colored lizards. Almost every variety of bird life, from the great condor on the heights of the Cordilleras to the tiny humming bird in the tropical valleys, is found.

Mining.—Colombia is exceedingly rich in minerals. Gold, for which it has been famous since the Spanish conquest, is found in all departments, the principal mines being in Antioquia State, mostly alluvial. Colombia surpasses other South American countries in gold exported. Colombia leads the world in the production of emeralds. The Muzo emerald mine is government-owned, the Chivor is American-owned; the yearly output is about $250,000. Colombia ranks next to Russia in the export of platinum. Salt is a government monopoly leased to the Banco de la República (annual revenue about 1,500,000 pesos). Copper deposits are present in great variety and coal of high quality, especially near Cali. Oil is exported under the control of Americans, about 20,000,000 barrels being annually piped to the coast in normal times. Silver, iron, platinum, lead, mercury, cinnabar, manganese, limestone, sand and fireclay are mined, and sulphite, niter, garnets and asphalt of a very high grade have been found. There are valuable pearl fisheries which are a government monopoly.

Agriculture and Stock Raising.—Cultivation of the soil is the leading industry. Colombia ranks high as a producer of coffee, which is grown on the rugged hillsides at an elevation of 4,500 to 6,000 feet. Small farms here produce the choicest coffee. Colombia has a large banana production, which is controlled by the United Fruit Company. Mulberry trees yield two or more crops annually promising well for the silk industry. Sugar and tobacco production is extensive. The rubber tree grows wild and is gradually being cultivated. Cotton, cocoa, vegetable ivory, dyewoods, wheat, maize and plantains are valuable products. Cattle raising is extensive on the millions of acres of the southeast plains.

Transportation.—The interior departments, which are the most productive, are separated from each other and from the coast by mountains or swampy plains, which accounts for the fact that there are only 1,962 miles of railroad in operation. The Magdalena River in the east flows into the Caribbean Sea, and is navigable for river steamers for 930 miles, as far as Jiradot, carrying a comparatively heavy traffic. There is daily airplane service between Bogotá and the principal cities and from Barranquilla to Cristobal (Canal Zone). There is tri-weekly service between Barranquilla and New York. Colombia has wireless telephony and international cable service. There are 4,114 miles of motor highways. The longest overhead ropeway in the world connects Mariquita and Manizales.

Manufactures.—In Colombia manufacturing is a relatively unimportant industry. This condition is being modified, however, as fast as the increase of local and foreign capital will permit. The chief manufacturing centers are Barranquilla, Medellin, Cartagena and Bogotá. Some woolen and cotton stuff, leather, flour, shoes and iron are made to supply local needs. There are breweries and meat packing establishments. Panama hats are exported. Pottery and coarse earthenware have been produced since before the days of the Spaniards.

Commerce.—The commerce of Colombia has increased rapidly, but it varies greatly. Important items of export are coffee, petroleum, bananas, gold, and platinum. About 90 per cent of the coffee goes to the United States. Important imports are textiles, foodstuffs, metals, and agricultural and mining implements. Colombia is the only South American country with both Atlantic and Pacific coastlines.

Finance.—The monetary unit is the gold peso (par value 97.3 cents). There are gold coins of 2½, 5, and 10 pesos and silver coins of ½ peso and of 10 and 20 centavos. Nickel coins for 1, 2, and 5 centavos are legal tender, also notes representing gold pesos ranging from 1 to 1,000 pesos. Gold coins are no longer in circulation. Colombia has 23 commercial banks including 3 foreign banks. In 1923, the Banco de le República was inaugurated as a central bank. The emerald and salt mines and the pearl fisheries are government monopolies.

Population. — According to the census of 1942 the population of Colombia was 9,523,200, mainly whites and half-castes. Indians numbered 105,807. Immigration is almost negligible. The principal towns are Bogotá, the capital, 395,300; Barranquilla, 183,500; Cali, 121,300; Medellin, 198,100; Cartagena, 84,987; Manizales, 86,027.

Religion and Education.—The state religion is Roman Catholic, but there is toleration of religions not contrary to Christian morals or to the law.

Primary education is free, but not compulsory. In 1942 there were 8,562 elementary schools, 37 industrial schools, and 450 high schools. There are, also, many art and trade schools conducted by the Salesian fathers. National institutions for higher education include Bogotá University (founded in 1572) and the School of Mines at Medellin, Four departments maintain universities as follows: Antioquia, Bolivia, Cauca, Narino. There are a national library, museum and observatory at Bogotá.

Army and Navy.—Military service is compulsory between the ages of 21 and 30. The permanent army consists of infantry, cavalry, engineers, motorized troops, etc. There are several training schools for the Air Force. The Navy has 3 gunboats (sea-going), 2 modern destroyers, 3 patrol vessels (coastguard), 4 river gunboats, and several motor launches.

Government. — Colombia is divided into 14 departments, 3 intendencies, and 7 commissaries. The government is that of a centralized republic, and is carried on by a president, elected by direct vote, and a legislature of two houses—the House of Representatives elected by the people, one for every 50,000 people; the Senate elected indirectly by departmental assemblies (at least 3 for each department). The departments have their governors appointed. The constitution was promulgated in 1886, and somewhat modified, to increase the power of the president in 1905.

History.—Colombia was one of the first parts of the American continent to be discovered by the Spanish navigators. Three years before Columbus touched there (1502), Alonzo de Ojeda had visited several points along the coast. In 1508 Ojeda obtained a grant from the Spanish crown for the district between Cape Vela and the Gulf of Darien; while a fellow adventurer, Nicuessa, obtained the territory from the Gulf of Darien to Cape Gracias a Dios.

The two territories were consolidated, and in 1536–7 an expedition under Quesada penetrated the Magdalena valley as far as Bogotá, capital of the Indian tribes of the Muicas and Chibchas. The latter, the ruling tribe of the nation, possessed a distinct civilization and a form of government presenting some striking analogies to that of the Japanese. They were subdued by the Spaniards and practically exterminated.

During the sixteenth, seventeenth, and eighteenth centuries Colombia was noted almost exclusively as the source of a great stream of gold which flowed into the Spanish treasury. Although the exact amount mined during that period will never be accurately known, the figures of Vicente Restrepo, which are generally accepted as the most trustworthy, place it at $480,000,000.

The beginning of the nineteenth century was marked by a revolt against Spanish authority, extending practically throughout South America. In 1811 an insurrection broke out in Colombia, known at that time as the Presidency of New Granada, and including what has since become Venezuela and Ecuador. A bitter and prolonged struggle followed, the insurgents being under the leadership of Simon Bolivar (q. v.), the great national hero. Independence from Spanish rule was won, but in 1829 Venezuela seceded from the newly formed republic, followed in 1830 by Ecuador. The Republic of New Granada, consisting of eighteen semi-independent states, was formed (1831–2), a constitution promulgated, and the first president, Francis de Paul Santander, elected.

The following years were marked by gradual development of the country, hampered, however, by frequently recurring conflicts over state rights. Slavery was abolished in 1852. Important modifications in the constitution were effected in 1886, under the presidency of Rafael Nuñez. The federal system was abolished, the virtually independent states becoming departments under a powerful central government.

In 1891 a boundary dispute between Colombia and Venezuela was settled by arbitration, but in 1901 war broke out between the two countries. This conflict was followed by continuous civil war lasting until 1903. In that year a treaty between the United States and Colombia was drawn up at Washington by John Hay and Tomas Herran, concerning the cession to the United States of a portion of Panama for the construction of a canal. This treaty was signed by the plenipotentiaries of both countries and ratified by the United States Senate. The Colombian congress, however, refused to ratify it. At this juncture a revolution broke out (Nov. 3, 1903) in Panama, a district which had frequently been in armed conflict with the central government, and a republic was declared. On Nov. 7 the United States recognized the independence of the new republic, and the other powers soon followed the example. Colombia, however, refused to recognize Panama's independence, and regarded the circumstances attending its recognition by the United States as a breach of international law.

In 1904 General Rafael Reyes was elected president, and through various constitutional amendments became virtually dictator. In 1910 he was succeeded by Dr. Carlos E. Restrepo, whose term expired in August, 1914. He was followed by José Vicente Concha (1914–18), and he by Don Marco Fidel Suarez (1918–22).

In 1921 Colombia's grievance against the United States, arising out of the latter's recognition of Panama in 1903 (see above), was settled by the ratification of the Colombian Treaty by the U. S. Senate. The treaty provides for the payment to Colombia, by the U. S. Government, of $25,000,000, and for the granting to Colombia of special privileges in respect to the Panama Canal. Colombia recognized the independence of Panama, and was granted the same privileges for citizens and products entering the Canal Zone or passing through the Canal as those enjoyed by the United States.

Since the beginning of the 20th century Colombia made great advances in her economic development. The last boundary treaty was signed (with

Peru) in 1922. Among the many factors aiding Colombia's progress were the opening of the Panama Canal; payment by the United States of $25,000,000 Panama Canal indemnity of which $19,000,000 was used for roads; increased use of coffee, and of fuel oil; improvement of transportation; and reorganization of currency and finance. In 1923, the Kemmerer commission of experts from the United States advised adoption of the gold standard; creation of the Bank of the Republic, with the exclusive privilege of issuing bank notes; new laws on banking and negotiable instruments; and a new model for the budget. These recommendations were adopted. In 1923 a land bank was set up.

In 1932 trouble developed when Leticia (Colombia's Amazon River port) was seized by Peru in violation of the Salomón-Lozano Treaty of 1922, by which the small corridor of jungle land in which Leticia is situated was given to Colombia and a large territory was given to Peru. Colombia invoked the League of Nations which pronounced against Peru. Nevertheless Peru persisted in keeping Leticia and the corridor and 1933 found the two nations at war. Colombia suspended payment of her debt for the first time in more than a quarter century. Gold export was barred in September 1931. In 1931, Buenaventura, the principal port of Bolivia on the Pacific, was destroyed by fire. In 1932 a new judicial code was enacted. During the Second World War, there was considerable Nazi as well as Spanish Falangist propaganda, but the government consistently advocated a policy of American solidarity and a conservative cooperation with the United States. Colombia broke off diplomatic relations with the Axis powers on December 19, 1941, and on November 27, 1943, declared a state of belligerency to exist. In 1941 Colombia and Venezuela settled their 100-year-old border dispute, the treaty being signed on April 5.

Bibliography.—Consult Publications of the Bureau of American Republics; the monthly bulletin of the contraloria general de la república (Bogotá); *Annuario Estadistico de Colombia;* Publications of the Pan American Union; P. J. Eder, *Colombia* (1913); E. Posada, *Biblioteca de Historia National* (13 vols. 1914); N. Thomson, *Colombia* (1927); Parks, *Colombia and the United States, 1765–1934* (1935); Henao and Arrubla, *History of Colombia* (1938); Romoli, *Colombia* (1941).

Colombo, kō-lom'bō, capital of Ceylon, on the west side of the island at the mouth of the Kelani River. It has a large artificial harbor, completely protected from monsoons and hurricanes by breakwaters. The harbor area at low water is 660 acres, and there are a graving dock, slipway and coaling depot. The port is an important coaling station, a junction at which passengers change vessels in the great Eastern routes, and in 1930 the eleventh port in the world for tonnage and sixth among British ports. Victoria Bridge crosses the Kelani River here.

The Fort, or that part of Colombo on which the Dutch fortress stood, is the commercial center. Here are the government buildings, and mills for the manufacture of oils, fibers, desiccated cocoanut, and other articles of commerce. The chief exports are tea, the products of the cocoanut palm, plumbago, rubber and cacao.

The streets are broad and well laid out. Opposite the Post Office is the Jubilee Garden. In the Crowded 'Petah,' or 'black town,' dwell Veddahs, Burmese, Afghans, Sinhalese, Tamils, Eurasians and Malays. The residential part of the city lies by the seashore and in the Cinnamon Gardens, also called Victoria Park. There is an esplanade facing the sea. Colombo Lake, between the Fort and Victoria Park, formerly covered 416 acres. The shallower parts have been reclaimed and the lake has been connected with the harbor by means of sea-walls. There is a Dutch church and a Buddhist temple. Among educational institutions are: The University and Royal College (of the government); St. Joseph's College, (Roman Catholic); St. Thomas' College (Anglican); Ananda College (Buddhist); and Wesley College.

Colombo was discovered in 1505 by the Portuguese, who built stores, factories and fortifications. The Dutch took possession in 1656, greatly extending the fortifications, and were in turn superseded by the English in 1796. Pop. (1931) 284,155.

Colon, that portion of the large intestine which extends from the caecum to the rectum, which is the terminal portion of the intestinal canal. See Alimentary Canal; Digestion; Intestines.

Colon, kō-lon', or Aspinwall, town, republic of Panama, founded in 1850, on the west side of Manzanilla Island, on Limon Bay, an inlet of the Caribbean Sea. A breakwater erected by the Isthmian Canal Commission, from Limon Bay toward the canal entrance, renders the harbor safe. The water at the entrance is from 18 to 36 feet deep, and from 26 to 28 feet at the wharves. Much of the commerce between Atlantic and Pacific ports passes through the city.

The American town of Christobal, which is within the Canal Zone, adjoins Colon and is virtually a part of it. The names of the two cities form the Spanish name of Christopher Columbus. In the middle of the nineteenth century the port became of outstanding importance as compared with the other Caribbean ports of the Panama area, and its prestige was greatly enhanced by the completion of the Panama Canal. Much of General Gorgas' remarkable sanitary work was done here. The Hotel Washington, operated by the U. S. Govt., is a popular resort.

Since 1903 the United States has had jurisdiction over sanitation and quarantine, while the draining of swamps, a new sewage system, and the screening of houses against mosquitoes, have made the town one of the most healthful tropical cities in the world. Colon is the Atlantic terminus of the Panama Railroad (46 miles long), and of the Panama Canal (q. v.). It is a busy tourist city. Natives from very many countries here sell their wares. It is connected by cable with North and South American ports and with Europe. Pop. (1940) 44,393.

Colon, city, Matanzas province, Cuba; 52 miles by rail southeast of Matanzas. It has several large sugar refineries. Pop. (1931) 22,944.

Colon Bacillus. See Bacteria.

Colonel, kûr'nel, the military rank next below that of general officer, and next above that of lieutenant colonel. In the United States Army, each regiment of infantry and cavalry is commanded by a colonel, as well as the more important artillery districts. The grade is also held by officers of the staff corps, including the medical department. See Officer; Rank and Command.

Colonia, kō-lō'nē-ä, department of Uruguay, on the Plata, below the Uruguay River. The uplands are barren, but in the fertile valleys and plains there are numerous European colonies, engaged in agriculture and stock raising. Area, 2,193 square miles. Pop. (1941) 129,322.

Colonial Dames of America. (1.) A patriotic society organized in New York in 1890 and incorporated in 1891. Its objects are to preserve traditions and records of the Colonial period

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

COLOGNE—THE CATHEDRAL.

and the Revolution, to promote celebration of historic events, to diffuse information concerning American history, and to cultivate patriotism. The society has several state chapters. Membership is restricted to women one of whose ancestors lived in an American colony before 1776. (2.) A national patriotic society founded in 1892 and composed of delegates from state societies existing in the original thirteen states, twenty-one other states, and the District of Columbia. The membership of over 5,000 is composed of women one of whose ancestors lived in an American colony before 1750, and held office or rendered service to the nation prior to 1776. The objects of the society are the preservation of records, the restoration of historic buildings, and the diffusion of patriotism.

Colonial Forces. Troops raised for service in colonial possessions. The British consists of two classes: (1.) Forces raised in a colony at imperial expense. These are subject to military law, and enlist to serve anywhere. They comprise the W. India Regiment, Royal Malta Artillery, Hong-kong and Chinese Regiments, Asiatic Artillery, the W. African Regiment, the W. African Frontier Force, and the King's African Rifles. (2.) Forces raised and maintained by the colony. These are subject to military law only when actually serving with regulars, and then only so far as the colonial law has not provided for their discipline, etc., Colonial forces usually consist of a small permanent force of all arms (forming instructional schools), militia, volunteers, and armed police. The total strength is something over 100,000. Since 1870 the policy has been pursued of withdrawing the regular troops from the British colonies, leaving them to the care of the local forces. In the United States there are the Porto Rico Provisional Regiment of Infantry, the Philippine Scouts (8 battalions), and the Philippine Constabulary. The Porto Rico Regiment and the Philippine Scouts are under the direction of officers detailed from the U. S. Army.

Colonial Wars, SOCIETY OF, a patriotic society organized in 1892 to perpetuate the memory of those who in military, naval, or civil service assisted in the establishment and continuance of the American colonies, and to preserve records and documents of the period. It has seventeen state societies with a total of 3,086 members in 1905. Membership is confined to male descendants of ancestors who served as officers, soldiers, sailors, marines, or privateersmen, or in the British forces which participated with those of the colonies from the settlement of Jamestown to the battle of Lexington; or who held certain offices in any of the colonies between these dates. Membership is hereditary in the male line.

Colonies, LABOR. See LABOR COLONIES.

Colonization Society, the NATIONAL, a society in the U. S. organized in 1816 for the purpose of promoting the colonization of free negroes somewhere, preferably in Africa, outside of the U. S. Colonization for the negroes had been suggested during the colonial period; the American Colonization Society was founded at Princeton, N. J., late in 1816, and early in 1817 this society was reorganized on a national basis, at Washington, D. C., as the National Colonization Society of America. Among its members were originally many men who were subsequently Abolitionist leaders, and who abandoned the society on becoming convinced that instead of encouraging emancipation by providing a place to which emancipated slaves might be sent, it really was designed merely to relieve the South of the free negroes already there, and, on the whole, tended to foster rather than to discourage slavery. Among its presidents were James Madison and Henry Clay, and among its members, at one time or another, were James G. Birney, Benjamin Lundy, Gerrit Smith, Rufus King, and William Ellery Channing. A number of free negroes were at first sent to the British colony of Sierra Leone; Sherbroke Island was then tried and abandoned; and in 1821 the settlement was established which eventually (1847) developed into the republic of Liberia. For the attitude of Abolitionists with regard to the society, see William Jay, *Miscellaneous Writings on Slavery* (1853); Birney, *Letter on Colonization* (1834); and Garrison, *Thoughts on Colonization* (1832).

Colonna. (1.) PROSPERO (1452–1523), Italian *condottiere,* who offered his services to Charles VIII. of France when that monarch invaded Italy in 1494–5. But soon afterwards he went over to Spain, and helped the Spaniards to expel the French from Italy. Colonna, who was a very able general, entered afterwards the service of the Pope, and among other victories gained the battle of Vicenza (1513) against the Venetians, and the battle of Bicocca (1522) against the Franco-German army under Lautrec. See Sismondi's *Histoire des Républiques Italiennes au Moyen-Age* (new ed. 16 vols, 1826–33), an extract of which appeared in English in 1830. (2.) POMPEO (1479–1532), Italian cardinal, nephew of the above. After having been a soldier in his youth, he entered the church, and in 1517 was created a cardinal. He sided with the Emperor Charles V. against Pope Clement VII., and was deprived of his dignities, but regained them in 1527, and in 1529 he was appointed by Charles V. viceroy of Naples, and held the office until his death. Colonna was also a talented poet, and in his principal work, *De Laudibus Mulierum,* he celebrates the famous Italian poetess, Vittoria Colonna. See Martucelli's *Biografia degli Illustri del Regno di Napoli* (15 vols. 1814–30).

Colonna, GIOVANNI PAOLO (1640–95), Italian composer—chiefly of church music — born at Bologna. He was four times elected principal of the musical academy at Bologna. His works were printed at Bologna in 1681–94, but many still remain in MS. at Vienna and Bologna.

Colonna, VITTORIA (1492–1547), Italian poet, daughter of the famous *condottiere* Fabrizio Colonna; born on the family estate of Marino, and in 1509 married the Marquis of Pescara, who died of wounds received in the battle of Pavia (1525). Vittoria was one of the leading spirits among the reform party of the Roman Catholic Church. Her *Rime* (1538)—best modern editions those of P. E. Visconti (1840), and Saltini (1860)—are divided into two sections, the first inspired by her dead husband, the second by religious themes. She was a beautiful woman, of brilliant intellect, admired by many great men, and celebrated by Michael Angelo in poems alone sufficient to ensure her immortality. See biographies by Mrs. H. Roscoe (1868), Von Reumont (1881; Italian trans. 1883), and Hon. A. Lawley (1888). Her *Letters* have been edited by Ferrero and Müller (1889), and by Tordi (1892).

Colonna, CAPE (anc. *Sunium*), the most S. point of Attica, Greece. On its summit, 269 ft. above the sea, stand the ruins of a temple dedicated to Athene.

Colonna Palace. See ROME.

Colonne, EDOUARD (1838). French violinist and musical director, born at Bordeaux; studied at the Paris Conservatoire, and in 1874 began, and was henceforth conductor of, the concerts held in the Châtelet at Paris. He is chiefly noted for having popularized the music of Berlioz, and for producing the works of young French composers. He has frequently officiated in Russia and Germany. died 1910

Colonsay and **Oronsay,** two Inner Hebridean islands, Argyllshire, Scotland. St. Columbia founded a college on Colonsay

(8 m. by 3 m.), and landed at Oronsay (563), where there is a fine sculptured cross. The latter island measures 3 m. by 2 m. Total area of both islands, 11,070 ac. Pop. (1911) 273.

Colonus, ancient tnshp. in Attica, Greece, distant a little more than a mile from Athens, to the N.W. It was famous for a temple of Poseidon, a grove of the Eumenides, and as being the birthplace of Sophocles, who celebrates it in his drama the *Œdipus Coloneus*. See the introduction to Jebb's edition of the *Œdipus Coloneus* (1897); J. G. Frazer's *Pausanias* (1900); C. Wordsworth's *Athens and Attica* (1836).

Colony. The Greek colony, the Roman colony, the trading factories of the E. India Company, and the modern self-governing colony have little in common save the fact that they are all settlements or dependencies beyond the area of the parent state. The Greek colony was a politically independent community united to the mother state by ties of sentiment and religion only. The Roman colony, on the other hand, was little more than an administrative unit in the Roman empire, and was often military in origin. Most of the colonies of modern nations have been administered according to the Roman idea of possession and dominion, sometimes merely for empire, sometimes for trade. Even in the British empire to-day there are instances of the Roman colony. There are not, and have not been, however, any modern colonies closely corresponding to the Greek idea; though, to all intents and purposes, the self-governing colonies of the British empire are Greek colonies. They are not, indeed, independent political communities; but this is due to the fact that in modern politics the state corresponds generally to the nation, and to the fact that the sense of nationality is very strong.

Modern colonies have been founded chiefly for economic reasons. Other causes have contributed, such as religious discontent (*e.g.* New England), missionary enterprise (*e.g.* the Jesuits in Paraguay), or methods of punishment of crime (*e.g.* the original settlements in Australia); but in the main the economic motive has been the determining factor in the foundation of colonies. The different types of colony are simply the different forms of economic organization which physical and political circumstances have forced on the nations. The chief forms of economic organization are—(1) factories, (2) provinces, (3) plantations, (4) colonies proper.

The *factory* was the earliest and most obvious form of organization, and has been adopted by all nations. In this system trade with natives is the object sought. Portuguese colonies were simply royal factories or trading stations which were farmed out; and the Dutch, who seized the opportunity afforded by the absorption of Portugal by Spain in 1580 to appropriate many of the most profitable of the Portuguese trading stations, adopted also their methods, and developed and systematized them. The Dutch applied to their colonies the accepted methods of commerce, as these were then understood, even to the extent of limitation of output to maintain the price of colonial produce, as in the famous case of the spices (cloves, etc.). But the comparative failure of the Dutch colonial empire shows that the payment of dividends is not an adequate basis for a colonial policy. Within the British empire, Lagos, Hong-kong, and Singapore represent this type.

Provinces.—Circumstances have frequently caused, merely for the security of trade, the expansion of the factory into the province. British India has grown in this way, and Singapore is, at the present time, showing the same development in the Malay Peninsula. In this type, the natives are governed in order to provide that security without which trade cannot flourish, and in many cases are used for industrial employment, as to a large extent in Rhodesia and the Transvaal. The Spanish empire was mainly of this type, though the only form of industrial employment in which the Spaniards saw prospects of wealth was mining. The modern French colonial empire is also chiefly of this type, to which India, Fiji, and Burma correspond in the British empire. The insular possessions of the United States in the Philippines and Porto Rico represent colonies of this type.

Plantations are those colonies where the object is not settlement, but industrial occupation through the application of capital. When a region seized for a colony was inhabited by people in the primitive stages of industrial life, the natives were brought into service, and often reduced to slavery. When the climate has been suitable, colonies of this type have developed into 'colonies proper' of settlement after the natives have been exterminated or dispossessed. In some places efforts were made to keep up the supply of labor by importing slaves, or by transporting criminals and political offenders—*e.g.* the Carolinas and Australia. Since the suppression of the slave trade there has arisen a system of regulated voluntary migration of tropical laborers from East to West, known as the coolie system, by which Natal, the W. Indies, British Guiana, and the Transvaal are supplied with labor. The Kanaka system in Queensland is now abolished.

Colonies proper have acquired, in the 19th century, the interest which attached to the plantations of the 17th and 18th centuries. Colonial policy was directed largely by the interests of the W. Indies in the 18th century, but is now chiefly concerned with the self-governing colonies. Some of the plantation colonies have had, or have, self-government—*e.g.* Jamaica, Natal, and Queensland. England alone has developed colonies of this class, and these occur only in regions where the settlement of European labor has been possible. Colonies of this type are really reproductions of the parent state, and the problems of modern colonial policy are the problems of their relations, political and commercial, to the mother country. For a consideration of some of these problems and a history of the development of the English colonies, see BRITISH EMPIRE.

The *methods of colonization* have varied from the extreme of complete state regulation to an entire absence of it. State regulation has been found to be the most fruitless method, for it deprives the infant colony of the services of those enterprising and often lawless pioneers who are necessary for the proper foundation of a colony. German colonies have not prospered, because settlers are not attracted, and are indeed not welcomed, by resident officials. On the other hand, entirely unregulated settlement may be accompanied by abuses and oppression of native races that no civilized government could tolerate. Between these extremes there are many varieties, of which colonization by chartered companies is the chief. This is a method which, apparently, naturally comes into existence in times of expansion, as in the 17th, and the latter decades of the 19th, century; but it is not suited for consolidation and industrial development, and disappears as soon as the pioneering work is done. Neither the chartered company system nor the analogous proprietary system has, however, done much for the colonization of new settlements. Attempts were made, by the 18th century colonial policy of commercial restrictions, to keep the colonies from developing along lines likely to be hurtful to the mother country; but regulations for the development of a colony systematically along its own natural lines have been wanting. Emigration has been more or less encouraged, and labor has been supplied by transportation, etc.; but little has been done to settle the immigrants in such a way as to promote the development of the colonies till the grant of responsible government was made, and the colonies developed according to their own conceptions of their needs.

In England an attempt was made by Gilbert Wakefield to secure the adoption of a system of colonization by which capital and labor could be introduced into colonies in proprotions suitable to the proper development of the colony; but his efforts were rendered nugatory mainly by the grant of responsible government, which has proved the most satisfactory solution of the problems of colonization. See BRITISH EMPIRE.

As a result of Inter-Imperial Relations Committee meetings in London in 1926, a profound change was wrought in the relations between Great Britain and her colonial possessions. The title, 'British Empire' was abolished and the 'British Commonwealth of Nations' adopted. The self-governing Dominions were given the status of independent nations, applicable to Canada, Newfoundland, Australia, New Zealand and South Africa; all to be recognized as States equal with Great Britain. Hitherto, the governors-general in the overseas dominions had represented the British Government and were endowed with certain supervisory powers. Under the new dispensation those powers were revoked; the governors-general represent the King only, and exercise no more administrative functions than does the King in Great Britain. See BRITISH EMPIRE.

Consult Brougham, *An Inquiry into the Colonial Policy of the European Powers* (1903); Egerton, *British Colonial Policy* (1897); A. Milner, *The Nation and the Empire* (1913); A. E. Zimmern, *The Third British Empire* (1926); F. S. Joelson, *Germany's Claims to Colonies* (1939); G. H. T. Kimble, *The World's Open Spaces* (1939); L. J. Ragatz, *France's Vast Colonial Empire* (1939); S. B. Leacock, *The British Empire* (1940); B. Wood, *Peaceful Change and the Colonial Problem* (1940).

Colophon, one of the twelve ancient Ionian cities in Asia Minor; it lay about two miles from the coast, between Lebedus and Ephesus. It was the birthplace of the poet Mimnermus. There are ruins of numerous Greek tombs and temples.

Colophon, a postscript or inscription at the end of a book, adopted by early printers from the manuscript copyists, and continued until the introduction of title pages (about 1490). It generally contained the date and place of publication, and the name of the printer; sometimes, also, other particulars concerning the publication and character of the book. The first colophon printed was in a Psalter issued at Mainz in 1457. The word came into use about the middle of the eighteenth century. Consult Pollard's *Essay on Colophons* (1905).

Colophony, or ROSIN, is the residue left when the exudation from coniferous trees has been distilled to obtain oil or spirits of turpentine. Colophony consists chiefly of abietic anhydride, and is a very brittle, semi-transparent solid that varies in color from pale yellow to dark brown. It is insoluble in water, but dissolves in alcohol, chloroform, and similar solvents, and unites with alkalis to form soap-like salts. Colophony burns in air with a smoky flame, and when heated melts, afterward decomposing, and yielding a complicated mixture, known as rosin oil, as the principal product.

Rosin is used as a protective in soldering, and in the commoner varnishes, and as an ingredient of the cheaper soaps. Rosin oil is also used in soap making, as a medium for paints, and for the preparation of coarse lubricants, but is not entirely satisfactory in any of its applications.

Color, the quality of an object, determined by its molecular constitution, which causes it to produce a specific effect on the eye by the absorption, reflection, and transmission of rays of light of a certain wave length; or the sensation produced through stimulation of the optic nerve by such rays, or, less commonly, by mechanical pressure on the eyeball, electric excitation, or disease. From our experience as to the generally invariable color of an object viewed in daylight, we come to associate the color with the object, and think of it as a possession of the object. White clouds, green grass, red roses, etc., are illustrations in point. Each of these bodies will appear to be of the same color so long as it is illuminated by the same light. On the other hand, a self-luminous body like a flame will, when under the same conditions, give the same color. In short, the color of an object depends upon the light it emits or sends back to the eye; and if part or all of this light is reflected light, the color must depend upon the nature of the original light which fell upon it.

Colors are generally classified as *primary* and *secondary,* but there are three important interpretations of the former term: (1) the chief spectral colors (red, orange, yellow, green, blue, and violet); (2) spectral red, green, and violet (or blue), which cannot be produced by the union of any other spectral colors; (3) the pigments red, yellow, and blue. Colors are also described by their qualities of hue, due to the length of the ether waves that make the retinal impression; luminosity (shade, value, or brightness); and purity, or freedom from commingling waves of different wave lengths (see DISPERSION; SPECTRUM); and the simple reason why bodies exhibit so many different colors is that each absorbs in its own peculiar way certain of these component colors to a greater extent that it does others. White light robbed of green will appear red, and if robbed of red will appear green. A body of such molecular composition that it absorbs all rays equally will appear to be of the color of the light in which it is viewed; and, being viewed generally in sunlight (white), is associated with white. A red body, on the contrary, throws back light in which the red rays preponderate. In red light such a body will appear red; but in pure blue light it will appear black, or nearly so.

Very few natural objects give pure colors—a fact which must not be lost sight of in explaining color effects. For example, it is a familiar fact that a mixture of yellow and blue pigments produces green. This could not be if the pigments were pure colors to begin with; for the blue particles would absorb all but the blue and the yellow particles all but the yellow, and a ray of light passing through both would be robbed of all its rays. As a matter of fact, both sets of particles allow a good deal of green to pass as well as the color corresponding to their respective tints, so that the light which has passed through both is mainly green. If a blue and a yellow light fall simultaneously upon the eye, the resultant effect is not green at all, but is a kind of neutral pink, the particular tint depending upon the proportions of the two lights and the particular parts of the spectrum from which they are taken.

Complementary colors are any two which together make white. Such, for example, are red and blue-green, orange and greenish blue, yellow and blue, yellow-green and violet, pure green and rose. Indeed, to every tint in the spectrum of white light a complementary tint may be found. This consideration shows that white light is not always of the same composition. The only way to test the composition of any light is to form its spectrum, and separate the components so that they may be seen individually.

The apparent color of an object is also affected by the presence of other colors, and by the state of the eye of the observer. A red strip on a green ground will appear more distinctly red than the same strip on a red ground; while neutral tints in the immediate vicinity of strong colors assume to some extent colors complementary to these. The change in such cases of simultaneous contrast varies with the relative position in the spectrum of the two colors, being greatest when they are adjacent.

Again, when the eye has looked for some time steadily at a particular color, it will become fatigued as regards that color more than as regards any other. Consequently, if it is then directed upon a white object, it will see the form of the former object occupying part of the field, but with the complementary tint. The explanation generally given is that the relatively great fatigue of the eye for the real color of the object leaves the eye more sensitive to the other component colors of white light, and accordingly the complementary tint is seen. A great many curious experiments may be made along these lines, giving rise to the phenomena of contrast colors and after-images, some of which have not yet been fully explained. These effects depend, indeed, upon the physiology of sight, regarding which there are several different theories. (See VISION).

The normal eye is adapted to receive color impressions from waves varying from 395 (red) to 763 (violet) trillion vibrations per second; but infra-red and ultra-violet rays are known to exist, though beyond the limits of human color perception. The spot in the eye most sensitive to color is the central portion of the retina, the perception of difference in colors diminishing from this point through an intermediate region, where it is dichromatic, to the retinal periphery, where, in general, neutral tints only are observed ('twilight vision').

Prominent theories of color vision are those of Young (developed by Helmholtz) and of Hering. According to the former, specially adapted end organs in the eye respond to three distinct color sensations (red, green, and violet), and color blindness is accounted for by defect in one or more of these sets of nerve fibers. Hering's theory assumes the existence of three pairs of visual substances—white-black, red-green, and yellow-blue—which are being constantly disintegrated by the first component and rebuilt by the second. Though both theories have received authoritative support, neither satisfactorily explains all the phenomena of color vision.

Thus far we have explained the production of color in bodies as the result of a selective absorption on the part of the body; and this, doubtless, is what occurs in the vast majority of cases. But there are certain cases of color production which require a totally different line of explanation. Such, for example, are rainbows, halos, coronæ, colors of soap films, of insects' wings, of oil scum, and the beautiful color phenomena produced with polarized light. The rainbow is a refraction caustic; lunar coronæ are diffraction phenomena; and the color of soap films will be found discussed under the heading INTERFERENCE. See COLOR BLINDNESS; POLARIZATION OF LIGHT.

Consult F. N. Vanderwalker, *The Mixing of Colors and Paints* (1935); E. Podolsky, *The Doctor Prescribes Colors* (1938).

Colorado (popularly called the 'Centennial State'), a Western State of the United States, bounded on the north by Nebraska and Wyoming, on the east by Nebraska and Kansas, on the south by New Mexico and Oklahoma, and on the west by Utah. It is situated between 37° and 41° N., and 102° and 109° W., and covers an area of 103,948 square miles, of which 303 square miles are water.

TOPOGRAPHY AND HYDROGRAPHY.—Topographically, Colorado is divided into three natural sections—the mountains and included 'parks,' the foot-hills, and the plains. The last division occupies the eastern third of the State, and has an average elevation of nearly 6,000 feet. The foot-hills form a narrow belt between the plains and the great Rocky Mountain Front Range, which extends from north to south, near the center of the State.

The Colorado mountain ranges are noted for the great number of high peaks, 35 being above 14,000 feet, 50 between 13,000 and 14,000 feet, and over 100 others reaching nearly 13,000 feet. Mount Elbert (14,436) is the highest. Pike's Peak, near Colorado Springs, in the Front Range, is the best known and the most favorably situated for ascent by tourists. The so-called parks are on a grand scale. They are the systems of plateaus and high enclosed valleys or rolling country lying between the great mountain ranges of the western half of the State, and are known as North, South, Middle, Estes, and San Luis Parks.

The drainage of Colorado is westward into the Colorado River system for the western third of the State, and eastward into the Mississippi system for the eastern two-thirds. The principal rivers, in the order of their size, are the Colorado, Arkansas, South Platte, and Gunnison. The first two have cut impressive gorges through the mountain barriers, so that the canyon of the Colorado and the Royal Gorge of the Arkansas are, next to the Grand Canyon of the Colorado, the most stupendous of the Rocky Mountain region. The Arkansas River falls 7,000 feet in its 338 miles within the State; the Gunnison, 6,477 feet in 200 miles to its mouth on the Colorado; and the Colorado, 3,600 feet from that point to the Forks (224 miles). Streams are plentiful, except on the plains, and rapids and waterfalls are numerous, so that an immense aggregate of water power is available. Mineral springs abound, and many have important medicinal qualities.

Probably no other State exhibits such great diversity of scenic feature on so grand a scale as Colorado: its plains, its mountains, its parks, its canyons are types of their kind.

CLIMATE.—There is no rainy season. The atmosphere is dry, clear, invigorating. From 65 to 80 per cent of the days have sunshine; at Denver the average is 51 cloudy days in the year. The mean temperature at elevations from 4,000 to 6,000 feet ranges from 48° in winter to 54° in summer. Thunder storms are infrequent, and cyclones unknown. The rainfall varies from 15 to 40 inches. Snows are light on the plains and disappear quickly, but are heavy in the mountains. Colorado is esteemed as a natural sanitarium for victims of tuberculosis.

GEOLOGY.—The geology of Colorado is complex, and representatives of almost every age in the geologic scale, from the Archæan to the present, are found. The older formations occupy the axes of the great mountain folds, and consist of granites, gneisses, schists, quartzites, and related rocks. The plains area and much of the western margin show great development of Cretaceous and Tertiary strata with less structural irregularity. Folding, faulting, fissuring, and mineralization are characteristic of the mountain ranges, which are the seat of some of the most prosperous mining camps of the United States. One of these, Cripple Creek, occupies a Tertiary volcanic area where rich gold deposits follow the fissures in thin shoots. The Precambrian schists of the Gunnison gold belt are hornblendic, and seamed with diabase dykes.

Mining.—Colorado produces about forty minerals commercially. First in value comes coal, followed by molybdenum, gold, and silver; important also are lead, zinc, and copper. Most of the coal is bituminous, but there is some anthracite; the State ranks first in known coal reserves. It is estimated that Colorado has produced 15 per cent of all the gold which has been mined in the United States, including the Philippine Islands, and 20 per cent of all the silver. Gold was first mined in what is now Colorado in 1858. For many years the State ranked first in the output of gold, but in recent years it has been outranked by two or three other States. In the production of silver the State has recently ranked among the first four or five. Colorado is by far the leading producer of molybdenum in the United States, which in turn ranks first among the countries of the world. Nearly half the world's supply of radium has been furnished by a relatively small area of land in southwestern Colorado and extending into southeastern Utah. The State leads in the output of vanadium and is one of the chief sources of tungsten. Gas and oil have been produced on a small scale; rich discoveries of helium have been made in the State, and extensive deposits of oil shales have been reported.

Forestry.—The forests of Colorado are mainly coniferous, the principal commercial timber trees being yellow pine, lodgepole pine, Douglas fir, Engelmann spruce, and blue spruce. There are fourteen national forests entirely within the State and one partially inside its boundaries; they comprise 20 per cent of the State's area and embrace some 13,500,000 acres.

Big game is still to be found in the Colorado national forests, including deer, elk, black bear, mountain sheep, and antelope. There is also considerable small game, such as grouse, pheasant, sage hen, wild duck, and dove.

Agriculture.—The soils are mainly alluvial, and the river valleys are the chief seats of farming enterprise. Because of this distribution and the arid climatic conditions that prevail over two-thirds of the State, irrigation is largely practiced. Under this treatment the lands are very productive. The higher sections are watered sufficiently to grow grasses and forests in considerable luxuriance, and contain valuable pasture lands. Colorado ranks second among the States in irrigated area, with more than three million acres irrigated.

Among the irrigation projects constructed by and operated under the U. S. Reclamation Service in the State are the Grand Valley reclamation project, in Mesa County, from which water was first made available in 1915; the Uncompahgre project, in Montrose and Delta counties, from which water was first available in 1908; the Pine River project, on which construction in La Plata County began in 1938; and the Colorado-Big Thompson project, construction of which began in 1938. The last named is the largest government project ever proposed in Colorado, with the ultimate cost estimated at $44,000,000; its primary purpose is to divert water from the western slope of the Continental Divide to the eastern slope for irrigation, and the secondary purpose is to develop a supply of hydro-electric power.

The State's chief crops are sugar beets, wheat, hay, potatoes, beans, and corn. A great sugar-beet industry has been developed, with large refineries turning out hundreds of thousands of tons of beet sugar annually; such by-products as pulp, molasses, tops, etc., are valuable as feed for livestock.

Fruit raising is also carried on profitably, the long season of sunshine contributing to the production of fruit of the highest quality. Colorado ranks high in the output of cantaloupes; the Rocky Ford variety is well known. Apples, peaches, pears, cherries, and grapes are abundant.

Stock raising is one of the State's most important industries, particularly in the southern countries, favored with natural grasses rich in feeding qualities. About 70 per cent of the total area of the national forests in the State is used for the grazing of domestic stock.

Manufactures.—Based on the value of products, manufacturing has for many years ranked as the State's largest industry — ahead of agriculture and mining. Since many of the products of the latter two go into manufacturing, however, a fairer comparison may be made by considering the 'value added by manufacture.' On that basis agriculture in Colorado usually ranks ahead of manufacturing, while the latter outranks mining, although in some years the value added to products by manufacture has been greater than the value of all crops.

Colorado leads the States in the production of beet sugar. Wholesale slaughtering and meat packing, a manufacturing industry related to the stock-raising industry, usually takes second place in the State's list of factory values. Mining has given rise to the development of large ore-smelting and metal-refining industries. The State ranks high in the manufacture of mining machinery. Other important industries are railroad shop construction and repairs, rubber manufactures, bread and bakery products, flour and other grain-mill products, printing and publishing (newspapers and periodicals), butter, canning and preserving, and manufacture of explosives. Denver, Pueblo, and Colorado Springs are the chief industrial centers.

Transportation.—The State has about 5,000 miles of railway. The principal lines are the Atchison, Topeka, and Santa Fé, the Chicago, Burlington, and Quincy, the Chicago, Rock Island, and Pacific, the Colorado and Southern, the Denver and Rio Grande Western, the Denver and Salt Lake, the Missouri Pacific, the Rio Grande Southern, and the Union Pacific.

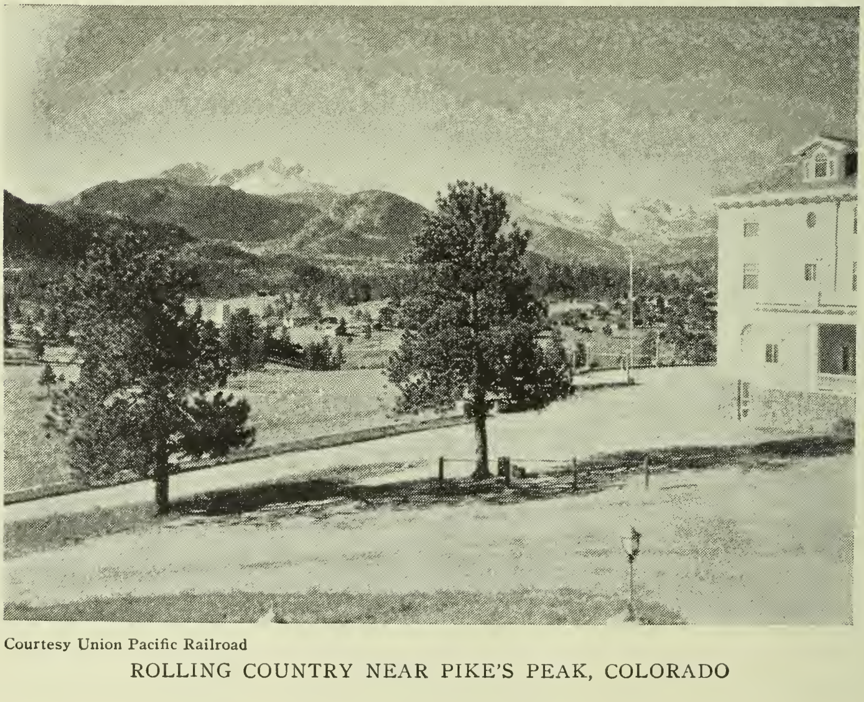
Much of the railroad mileage follows old trapper trails across the State. A recent engineering achievement is the 6.4-mile Moffat Tunnel, fifty miles west of Denver. Constructed at a cost of about $18,000,000 and formally opened in 1928, it eliminates heavy railroad grades over the Continental Divide and shortens the railway distance between Denver and the Pacific coast 176 miles. The Dotsero cut-off, completed in 1934, operates through the Moffat Tunnel and connects the Denver and Rio Grande Western with the Denver and Salt Lake Railroad.

Motor vehicles have become a common means of transportation in the State, including passenger cars, trucks, and motor buses. Air mail service was introduced in the State in 1926, and regular air passenger service has been established.

Population.—According to the 1940 census Colorado had a population of 1,123,296, an increase of 8.4 per cent over the 1930 figure (1,035,791). Urban residents (in towns and cities of

Courtesy C. & N. W. Ry. Co.

GATEWAY TO THE GARDEN OF THE GODS, COLORADO



Courtesy Union Pacific Railroad

ROLLING COUNTRY NEAR PIKE'S PEAK, COLORADO at least 2,500 inhabitants) accounted for 52.6 per cent of the 1940 population (compared with 50.2 per cent in 1930).

The population according to previous census reports was as follows: in 1860, 34,277; in 1870, 39,864; in 1880, 194,327; in 1890, 413,249; in 1900, 539,700; in 1910, 799,024; in 1920, 939,629.

The populations of the principal cities in 1940 were: Denver, 322,412; Pueblo, 52,162; Colorado Springs, 36,789; Greeley, 15,995; Trinidad, 13,223; Boulder, 12,958; Grand Junction, 12,479; Fort Collins, 12,251.

Education.—The executive power of the public school system is vested in a superintendent of public instruction and a board of education. Attendance is compulsory between the ages of eight and sixteen. The public schools are supported by the income from the public school fund. State, county, and district taxes also are levied.

Institutions of higher learning include the University of Colorado (q. v.) at Boulder; Colorado State College of Agriculture and Mechanic Arts (q. v.) at Fort Collins; School of Mines at Golden; Western State College at Gunnison; Adams State Teachers at Alamosa; College of Education at Greeley; Fort Lewis School at Hesperus; and State junior colleges at Grand Junction and Trinidad; these nine are publicly controlled, and the first seven listed are largely supported by legislative appropriations and State tax levies. There are also, in Denver, the University of Denver (q. v.), Colorado Woman's College, Regis College, Iliff School of Theology, and Westminster Law School; Colorado College (q. v.) in Colorado Springs; and Loretto Heights College (R. C.) in Loretto.

Charities and Correction.—The State institutions are under the control of a State board. They include the Home for Dependent and Neglected Children at Denver; the Industrial School for Boys at Golden; the Industrial School for Girls at Morrison; the School for the Deaf and Blind at Colorado Springs; the Insane Asylum at Pueblo; the Soldiers' and Sailors' Home at Monte Vista; the penitentiary at Canon City; reformatory, at Buena Vista; the Industrial Workshop for the Blind at Denver, and two Home and Training Schools for Mental Defectives at Ridge and Grand Junction.

Government.—The present constitution of Colorado was adopted in 1876, and a two-thirds vote of each house is required before an amendment may be submitted to the electorate for approval. A constitutional convention may be convened if the project is favored by a two-thirds vote of each house, and if a majority of the electorate concur. Equal suffrage has existed since 1893.

The executive power is vested in a governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general, and superintendent of public instruction, all of whom are elected biennially. The governor may veto any item of an appropriation bill, and, in case the legislative houses disagree as to date for adjournment, he may adjourn the legislature. The usual pardoning power is also vested in the governor.

The legislature, called the General Assembly, consists of a Senate of 35 members, elected for four years, half the members being chosen biennially, and a House of Representatives of 65 members, elected for two years.

The judicial power is vested in a Supreme Court, consisting of a chief justice and six associate justices, district courts, county courts, etc. The Senate, when sitting as a court of impeachment, also exercises judicial functions.

Counties with a population of less than 70,000 are governed by three commissioners, elected for four years, and those with a larger population by five commissioners. Colorado has four Representatives in the National Congress. Denver is the State capital.

Recent Legislation.—Important legislation recently enacted includes the following measures: the Severance tax upon the production of mineral products (1923); regulating the conservation, cutting, and sale of timber upon State lands; providing for research and investigation of the ores, minerals, oils, and oil shales of the State (1925); regulating the use of aircraft; creating a gas conservation commission; imposing an inheritance tax; an old age pension act (1927); establishing a wage-claim court in Colorado (1932); and an act providing for old-age pensions of $45 a month (1936).

History.—Colorado takes its name from the Spanish word meaning 'ruddy,' relating to the prevailing red rock of the country. The name was first applied to the Colorado River. The first historical exploration of the Colorado region was made by the Spanish Padre Francisco Escalente, who visited the Gunnison country in 1776. It is claimed that other Spaniards had preceded him, but no earlier settlement was made. The first American to arrive seems to have been James Pursley, a fur trader, who penetrated the mountain country in 1804. The region was later visited by American parties under Zebulon Pike (1806), Stephen H. Long (1820), and John C. Frémont (1842–4).

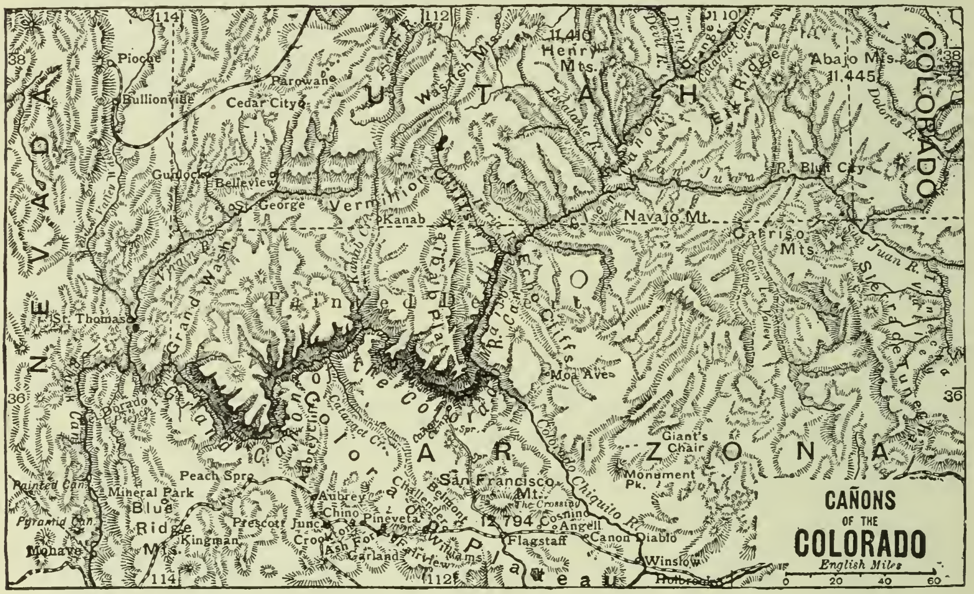
That section of the present State which lies north and east of the Arkansas River was a part of the great territory of Louisiana, and with it was ceded by France to Spain in 1762; ceded back to France in 1800; and purchased by the United States in 1803. The remainder of the State continued under Spanish dominion until the Mexican revolution (1821), when it became a part of Mexico. When Texas won its independence, in 1836, the eastern part of this Mexican territory became a part of Texas, and in 1845 a part of the United States. At the close of the Mexican War the western portion of Colorado was ceded by Mexico to the United States (1848).

The early settlers were harassed by the Indians, and in 1850 the population was small and widely scattered. The year 1853 was marked by the expedition of Captain Gunnison, and in 1854 the southern section of Western Colorado became part of Kansas, and the northern section a part of Nebraska. In 1858 gold prospecting was started; the success attending it led to considerable immigration; and two towns, Denver and Auraria, were platted. A provisional territorial government was drawn up at Auraria, but the fact that Nebraska, Utah, New Mexico, Kansas, and Dakota all claimed jurisdiction led to the abandonment of the project.

In 1859 the 'Pike's Peak or bust' migration left a population of 30,000 in the country, and a delegation was sent to Washington to secure the formation of a new Territory under the name Jefferson. Finally, in February, 1861, Congress organized the Territory from portions of Utah, New Mexico, Kansas, and Nebraska, under the name of Colorado; and in 1876 Colorado was admitted to statehood.

Indian uprisings on the part of the Cheyennes and Arapahoes occurred during the period 1864–70, which, together with the increasing scarcity of gold, retarded the growth of the Territory. In 1878, however, the mining industry received a new impetus by the discovery that the carbonates, which had been discarded by the gold miners, contained lead and silver in sufficient quantities to be of commercial value. This new industry attracted a large immigration, and the population increased from 194,327 in 1880 to 412,198 in 1890. The mining interests were furthered by the discovery of gold in Cripple Creek district about 1890.

In recent years the State has been the scene of frequent strikes on the part of the miners, and the military has often been called upon to restore order. A serious outbreak occurred in 1904, and resulted (June 6) in the blowing up of the railway station at Independence, in which fifteen non-union miners were killed and several injured. The action of the military and civil authorities in summarily deporting suspected persons from the State during the 1904 strike, and the suspension of the writ of habeas corpus by Governor Peabody, aroused criticism throughout the country. In 1913 another violent contest occurred, when the workers in the mines of the Colorado Fuel and Iron Company, in southern Colorado, struck. The State militia and Federal troops were called out and the tent colony organized by the strikers, who had been evicted from the company houses, was destroyed. A settlement was at last reached in December, 1914.



In 1907 Colorado passed a Pure Food law, and created a State Civil Service Commission, Insurance Commission, Railroad Commission, Board of Pharmacy, and Game and Fish Department. The Democratic National Convention was held in Denver in 1908. In 1909 the tunnel of the Gunnison River irrigation project was formally opened by President Taft. During 1910 there were several mine disasters, causing the death of over 200 men.

A flood in the Arkansas River Valley which overwhelmed the City of Pueblo in 1921 was the most frightful calamity in the history of the State. Ample precautions against its recurrence were completed by 1926, insuring the safety of the Arkansas River Valley. During the third decade of the twentieth century the Ku Klux Klan became active in the State politics and was an issue in the 1924–25 campaign, generally favoring Republican nominees. Many of its candidates were elected, including the governor and a United States senator. This organization soon lost its leadership.

In national politics Colorado was Republican from 1876 to 1888. It supported the Populist nominees in 1892, and the fusion (Democratic, Populist, and Silver Party) nominees in 1896 and 1900 on the free silver issue. In 1904, 1920, 1924, 1928, 1940 the State went Republican, in 1908, 1912, 1916, 1932, 1936, Democratic.

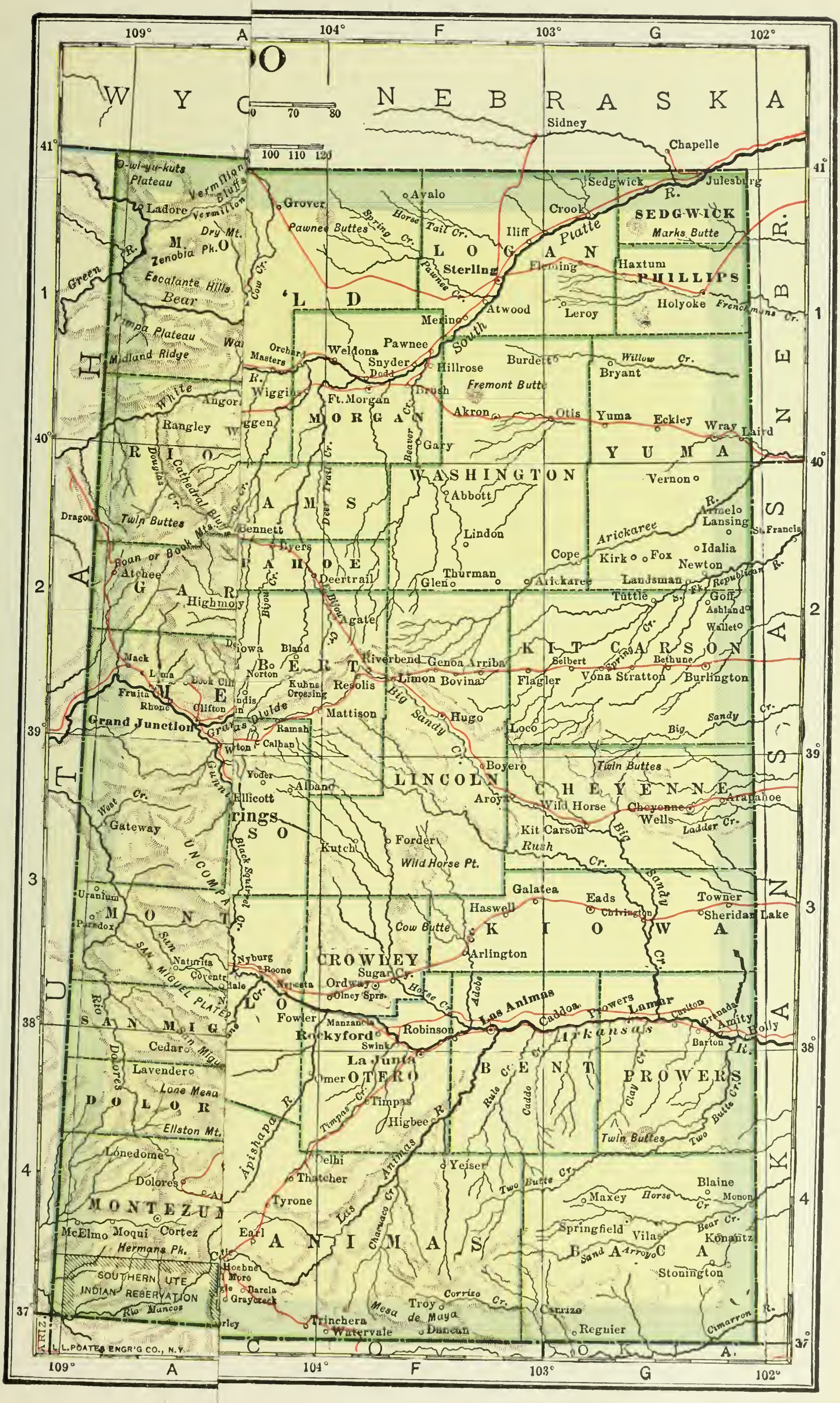
Bibliography.—Consult E. Parsons, *Guide-Book to Colorado* (1911); E. A. Mills, *Rocky Mountain Wonderland* (1915); M. L. Baggs, *Colorado, the Queen Jewel of the Rockies* (1918); K. L. Craig, *Craig's Brief History of Colorado* (1923); J. Henderson, *Colorado* (1927); F. C. Spencer, *Colorado's Story* (1930); A. H. Carhart, *Colorado* (1932); O. B. Peake, *The Cattle Range Industry* (1938); Federal Writers' Project, *Colorado; a Guide to the Highest State* (1941); *Year Book of the State of Colorado* (1918–); Reports of the various executive departments, state treasurer, etc., published in Denver.

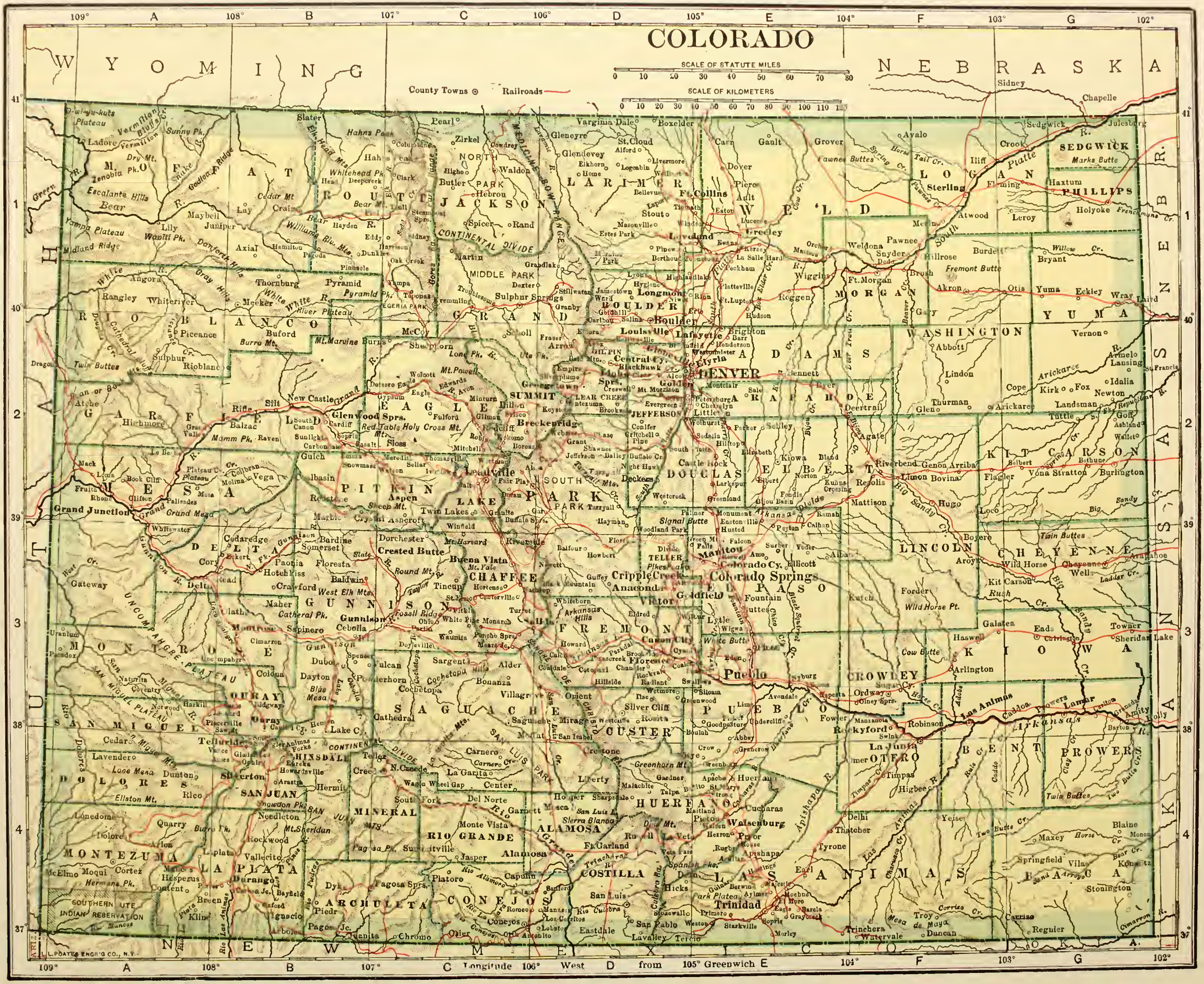
Colorado, town, Texas, county seat of Mitchell county, 250 miles s.w. of Dallas, on the Texas and Pacific Railroad. It has a frozen food locker plant, cheese plant, oil refinery, sand and gravel yard and asphalt plant. There are large salt wells in the vicinity, one of which, 936 feet deep, pierces 110 feet of rock salt. Pop. (1930) 4,671; (1940) 5,213.

Colorado Beetle. See POTATO BUG.

Colorado City, formerly a separate town, El Paso county, Colorado, now a part of Colorado Springs (q. v.). It is an industrial settlement, having reduction mills for Cripple Creek gold ore. It was the first capital of Colorado Territory.

Colorado College was founded in 1874 and is located in Colorado Springs, Colo. It is co-educational, non-sectarian, and offers courses leading to the degrees B.A. and M.A. It is a liberal arts college offering the usual academic subjects including courses in a department of music. Courses in art are given in the Colorado Springs Fine Arts Center, which is affiliated with the College.


109°
A
104°
F
103°
G
102°
W Y O
NEBRASKA
0 70 80
100 110 120
Sidney
Chapelle
Julesburg
41°
O-wi-yu-kuts Plateau
Vermilion Bluffs
Ladore
Vermilion
Dry Mt.
Zenobia Pk.
Green R.
Escalante Hills
Bear
Yampa Plateau
Midland Ridge
White R.
Angora
Rangley
RIO
Douglas Cr.
Cathedral Bluffs
Twin Buttes
Dragon
Book Mts.
Roan or Book Mts.
Atchee
GAR
Highmore
Mack
Loma
Book Cliffs
Fruita
Rhone
Clifton
MESA
Grand Junction
Grand Divide
Gunnison
West Cr.
Gateway
UNCOMPAHGRE
Uranium
Paradox
MONT
San Miguel
SAN MIGUEL PLATEAU
Naturita
Coventry
Rio Dolores
SAN MIGUEL
Cedar
Lavendero
Lone Mesa
DOLORES
Ellston Mt.
Lonedome
Dolores
MONTEZUMA
McElmo
Moqui
Cortez
Hermans Pk.
SOUTHERN UTE INDIAN RESERVATION
Rio Mancos
UTAH
ARIZ.
L. POATES ENGR'G CO., N.Y.
Grover
Pawnee Buttes
Cow Cr.
Spring Cr.
Avalo
Horse Tail Cr.
Pawnee Cr.
LOGAN
Sterling
Iliff
Crook
Sedgwick
SEDGWICK
Marks Butte
South Platte R.
Haxtum
Fleming
PHILLIPS
Holyoke
Frenchman Cr.
Atwood
Merino
Leroy
WELD
Orchard
Masters
Weldona
Pawnee
Snyder
Dodd
Hillrose
Brush
Burdett
Willow Cr.
Bryant
Fremont Butte
Wiggins
Ft. Morgan
MORGAN
Beaver Cr.
Gary
Akron
Otis
Yuma
Eckley
Wray
Laird
YUMA
Wiggen
ADAMS
Bennett
Byers
Deer Trail Cr.
ARAPAHOE
Deertrail
WASHINGTON
Abbott
Lindon
Thurman
Glen
Cope
Arickaree
Vernon
Arickaree R.
Armelo
Lansing
St. Francis
Kirk
Fox
Idalia
Newton
Landsman
Tuttle
S. Fk. Republican R.
Goff
Ashland
Wallet
Bijou Cr.
Agate
Iowa
Bland
ELBERT
Norton
Kuhns Crossing
Resolis
Riverbend
Genoa
Arriba
Limon
Bovina
KIT CARSON
Flagler
Seibert
Vona
Stratton
Bethune
Burlington
Spring Cr.
Big Sandy Cr.
Hugo
Mattison
Ramah
Calhan
Loco
Big Sandy Cr.
Yoder
Albano
Ellicott
Boyero
LINCOLN
Twin Buttes
CHEYENNE
Arapahoe
Aroya
Wild Horse
Cheyenne Wells
Ladder Cr.
Kit Carson
Rush Cr.
Colorado Springs
PASO
Black Squirrel Cr.
Kutch
Forder
Wild Horse Pt.
39°
Galatea
Eads
Chivington
Towner
Sheridan Lake
Haswell
KIOWA
Cow Butte
Arlington
Big Sandy Cr.
CROWLEY
Nyburg
Boone
Nepesta
Ordway
Sugar City
Olney Sprs.
Horse Cr.
Adobe Cr.
Las Animas
Caddoa
Powers
Lamar
Carlton
Granada
Amity
Holly
Arkansas R.
Fowler
Manzanola
Rockyford
Swink
Robinson
La Junta
OTERO
Timpas Cr.
Timpas
Higbee
Rule Cr.
Caddo Cr.
BENT
Clay Cr.
PROWERS
Barton
Two Butte Cr.
Twin Buttes
38°
Apishapa R.
Delhi
Thatcher
Tyrone
Earl
Las Animas R.
Chacuaco Cr.
LAS ANIMAS
Yeiser
Two Butte Cr.
Maxey
Horse Cr.
Blaine
Monon
Bear Cr.
Springfield
Vilas
Konantz
Sand Arroyo
BACA
Stonington
Hoehne
Moro
Barela
Graycreek
Trinchera
Watervale
Mesa de Maya
Dunean
Corrizo Cr.
Carrizo
Regnier
Cimarron R.
Barley
37°
OKLA.
KANSAS
NEB.
1
2
3
4



COLORADO

SCALE OF STATUTE MILES
0 10 20 30 40 50 60 70 80
SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80 90 100 110 120
County Towns ⊙
Railroads
WYOMING
NEBRASKA
UTAH
KANSAS
NEW MEXICO
OKLAHOMA
ARIZ.
109° A 108° B 107° C 106° D 105° E 104° F 103° G 102°
41°
40°
39°
38°
37°
1
2
3
4
Longitude 106° West from 105° Greenwich
L. L. POATES ENGR'G CO., N.Y.
MOFFAT
ROUTT
JACKSON
LARIMER
WELD
LOGAN
SEDGWICK
PHILLIPS
MORGAN
YUMA
RIO BLANCO
GRAND
BOULDER
GILPIN
CLEAR CREEK
ADAMS
WASHINGTON
GARFIELD
EAGLE
SUMMIT
JEFFERSON
ARAPAHOE
MESA
PITKIN
LAKE
PARK
DOUGLAS
ELBERT
KIT CARSON
DELTA
CHAFFEE
TELLER
EL PASO
LINCOLN
CHEYENNE
GUNNISON
FREMONT
MONTROSE
OURAY
SAGUACHE
CUSTER
PUEBLO
CROWLEY
KIOWA
SAN MIGUEL
HINSDALE
SAN JUAN
MINERAL
DOLORES
RIO GRANDE
ALAMOSA
HUERFANO
OTERO
BENT
PROWERS
MONTEZUMA
LA PLATA
ARCHULETA
CONEJOS
COSTILLA
LAS ANIMAS
BACA
SOUTHERN UTE INDIAN RESERVATION
DENVER
Boulder
Longmont
Ft. Collins
Loveland
Greeley
Sterling
Julesburg
Holyoke
Ft. Morgan
Akron
Wray
Brighton
Golden
Littleton
Georgetown
Central City
Idaho Sprs.
Breckenridge
Leadville
Aspen
Glenwood Sprs.
Grand Junction
Meeker
Hot Sulphur Springs
Castle Rock
Kiowa
Hugo
Cheyenne Wells
Burlington
Colorado Springs
Cripple Creek
Victor
Canon City
Buena Vista
Gunnison
Lake City
Delta
Montrose
Ouray
Telluride
Silverton
Durango
Cortez
Rico
Creede
Del Norte
Monte Vista
Saguache
Westcliffe
Pueblo
Walsenburg
Trinidad
La Junta
Las Animas
Lamar
Eads
Springfield
Ordway
San Luis
Conejos
Pagosa Sprs.
Alamosa
NORTH PARK
MIDDLE PARK
SOUTH PARK
SAN LUIS PARK
CONTINENTAL DIVIDE
Platte R.
Arkansas R.
Rio Grande
Grand R.
Gunnison R.
Dolores R.
Yampa Plateau
Uncompahgre Plateau
San Miguel Plateau
Mt. Harvard
Mt. Yale
Pikes Pk.
Holy Cross Mt.
Sangre de Cristo Mts.
San Juan Mts.
Spanish Pks.

Palisades, Colo...A 2
Palmer, Colo....E 2
Paonia, Colo.....B 3
Paradox, Colo....A 3
Parlin, Colo......C 3
Parkdale, Colo...D 3
Parker, Colo.....E 2
Pawnee, Colo....F 1
Pearl, Colo......C 1
Peckham, Colo...E 1
Petersburg, Colo..E 2
Peyton, Colo.....E 2
Piceance, Colo...A 2
Pictou, Colo.....E 4
Piedra, Colo.....B 4
Pierce, Colo.....E 1
Pine, Colo.......D 2
Pinewood, Colo..D 1
Pinnacle, Colo...B 1
Pinon, Colo......E 3
Pitkin, Colo.....C 3
Placerville, Colo.A 3
Plateau Cy., Colo.A 2
Platoro, Colo....C 4
Platteville, Colo..E 1
PoncboSprs., Colo.C 3
Pool, Colo.......B 1
Porter, Colo.....B 4
Powderborn, Colo.B 3
Primero, Colo....E 4
Prowers, Colo...G 3
Pryor, Colo......E 4
Pueblo, Colo.....E 3
Pyramid, Colo....B 1

Quarry, Colo.....A 4

Radiant, Colo....D 3
Ramab, Colo.....E 2
Rand, Colo......C 1
Rangely, Colo....A 1
Raven, Colo.....B 2
Read, Colo......B 3
Redcliff, Colo....C 2
Redstone, Colo...B 2
Regnier, Colo....G 4
Resolis, Colo.....F 2
Rhone, Colo......A 2
Rico, Colo.......A 4
Ridgway, Colo...B 4
Rifle, Colo.......B 2
Rinn, Colo......D 1
Rioblanco, Colo..B 2
Riverbend, Colo..F 2
Riverside, Colo...C 3
Robinson, Colo...C 2
Robinson, Colo...F 3
Rocky Ford, Colo.F 3
Rockvale, Colo...D 3
Rockwood, Colo..B. 4
Roggen, Colo....E 1
Rollinsville, Colo.D 2
Romeo, Colo.....D 4
Rosita, Colo.....D 3
Roswell, Colo....E 3
Rouse, Colo.....E 4
Rugby, Colo.....E 4
Russell, Colo.....D 4
Rye, Colo.......E 4

Saguache, Colo...C 3
Saint Cloud, Colo.D 1
Saint Elmo, Colo.C 3
St. Mary's, Colo..E 4
Salem, Colo......E 2
Salida, Colo.....D 3
Salina, Colo.....D 1
Sams, Colo......B 3
Sanford, Colo...D 4
San Isabel, Colo.D 3
San Luis, Colo..D 4
San Pablo, Colo.D 4
Sapinero, Colo...B 3
Sargents, Colo...C 3
Sawpit, Colo.....A 3
Scbley, Colo.....E 2
Scholl, Colo......C 2
Sedalia, Colo....E 2
Sedgwick, Colo...G 1
Seibert, Colo....G 2
Sellar, Colo......C 2
Sharpsdale, Colo..D 4
Shawnee, Colo...D 2
Sheephorn, Colo..C 2
Sheridan L., Colo.G 3
Sidney, Colo.....C 1
Siloam, Colo.....E 3
Silt, Colo........B 2
Silver Cliff, Colo.D 3
Silver Plume,Colo.D 2
Silverton, Colo...B 4
Slater, Colo.....B 1
Sloss, Colo......C 2
Smuggler, Colo...B 4
Sneffels, Colo....B 4
Snowmass, Colo..B 2
Snyder, Colo.....F 1
Somerset, Colo...B 3
Sopris, Colo.....B 2
South Canon, Colo.B 2
South Fork, Colo.C 4
S. Platte, Colo...D 2
Spencer, Colo....B 3
Spicer, Colo.....C 1
Springfield, Colo.G 4
Starkville, Colo..E 4
Steamboat Sprs., Colo. ....C 1
Sterling, Colo....F 1
Stillwater, Colo..D 1
Stonewall, Colo..D 4
Stonington, Colo.G 4
Stout, Colo......D 1
Stratton, Colo....G 2
Strong, Colo.....E 4
Sugar City, Colo.F 3
Sunlight, Colo...B 2
Sulphur, Colo....A 2
SulphurSprs.,Colo.C 1
Summitville, Colo.C 4
Surber, Colo.....E 3
Swallows, Colo...E 3
Swink, Colo.....F 3

Talpa, Colo......D 4
Tarryall, Colo....D 2
Teller, Colo.....C 4
Telluride, Colo...B 4
Tercio, Colo.....E 4
Texas Cr., Colo..D 3
Thatcher, Colo...E 4
Thomasville, Colo.C 2
Thornburg, Colo.B 1
Thurman, Colo...F 2
Timnath, Colo...E 1
Timpas, Colo....F 4
Tincup, Colo.....C 3
Toponas, Colo....C 1
Towner, Colo....G 3
Trinchera, Colo..E 4
Trinidad, Colo...E 4
Troublesome, Colo.C 1
Troy, Colo.......F 4
Trull, Colo......C 1
Turret, Colo.....C 3
Tuttle, Colo.....G 2
Twin Lakes, Colo.C 2
Tyrone, Colo.....E 4

Uncompahgre,ColoB 3
Undercliffe, Colo.E 3
Uranium, Colo...A 3

Vallecito, Colo...B 4
Vance, Colo.....B 4
Vega, Colo......B 2
Vernon, Colo....G 2
Veta Pass, Colo..D 4
Victor, Colo.....D 3
Vilas, Colo......G 4
Villagrove, Colo..D 3
VirginiaDale,Colo.D 1
Vona, Colo......G 2
Vulcan, Colo.....B 3

Wagon Wheel Gap, Colo......C 4
Walden, Colo....C 1
Wallet, Colo......G 3
Walsen, Colo.....E 4
Walsenburg, Colo.E 4
Walfhurst, Colo.D 2
Ward, Colo.....D 1
Watervale, Colo..F 4
Watson, Colo....C 2
Waunita, Colo...C 3
Webster, Colo....D 2
Weldona, Colo...F 1
Wellington, Colo.D 1
Westcliffe, Colo..D 3
Westcreek, Colo.D 2
Westminster, Colo.D 2
Weston, Colo....E 4
Wetmore, Colo...D 3
Whitehorn, Colo.D 3
Whitepine, Colo..C 3
Whiteriver, Colo.A 1
Whitewater, Colo.A 3
Wiggins, Colo....E 1
Wigwam, Colo....E 3
Wilbur, Colo....D 3
Wild Horse, Colo.F 3
Windsor, Colo....E 1
Winfield, Colo...C 2
Wolcott, Colo....C 2
WoodlandPk,Colo.D 3
Wortman, Colo...C 2
Wray, Colo......G 1

Yampa, Colo....C 1
Yeiser, Colo.....F 4
Yoder, Colo.....E 3
Yuma, Colo......G 1

Zirkel, Colo......C 1

INDEX OF COLORADO

COLORADO

Abbott, Colo.....F 2
Aguilar, Colo....E 4
Agate, Colo......F 2
Akron, Colo.....F 1
Alamosa, Colo...D 4
Albano, Colo.....E 3
Alcott, Colo.....D 2
Alder, Colo......C 3
Alford, Colo.....D 1
Alma, Colo......C 2
Altman, Colo....D 3
Ames, Colo......B 4
Amity, Colo.....G 3
Amo, Colo.......E 3
Anaconda, Colo..D 3
Angora, Colo....A 1
AnimasForks,Colo.B 4
Antonito, Colo...C 4
Apache, Colo....E 4
Apex, Colo......D 2
Apishapa, Colo...E 4
Arapahoe, Colo...G 3
Arboles, Colo....B 4
Arickaree, Colo..F 2
Arlington, Colo..F 3
Arloa, Colo......A 4
Armel, Colo.....G 2
Aroya, Colo.....F 3
Arriba, Colo.....F 2
Arrow, Colo.....D 2
Ashcroft, Colo...C 2
Ashland, Colo....G 3
Aspen, Colo.....C 2
Atchee, Colo.....A 2
Atwood, Colo....F 1
Ault, Colo.......E 1
Avalo, Colo......F 1
Avastra, Colo....B 4
Avon, Colo......C 2
Avondale, Colo...E 3
Axial, Colo......B 1
Aylmer, Colo....E 4

Bailey, Colo.....D 2
Bald Mtn., Colo.D 2
Baldwin, Colo....B 3
Balfour, Colo....D 3
Balzac, Colo.....B 2
Bardine, Colo....B 3
Badito, Colo.....D 4
Barela, Colo.....E 4
Barr, Colo.......E 2
Barton, Colo.....G 3
Basalt, Colo.....B 2
Bayfield, Colo....B 4
Beaver, Colo.....E 3
Bellvue, Colo.....D 1
Bennett, Colo....E 2
Berthoud, Colo...D 1
Berwind, Colo...E 4
Bethune, Colo....G 2
Beulah, Colo.....E 3
Bijou Basin,Colo..E 2
Blackhawk, Colo.D 2
Black Mtn., Colo.D 3
Blaine, Colo.....G 4
Bland, Colo......E 2
Bonanza, Colo...C 3
Book Cliff, Colo..A 2
Boone, Colo.....E 3
Boreas, Colo....D 2
Boulder, Colo....D 1
Bovina, Colo.....F 2
Boxelder, Colo...D 1
Boyero, Colo.....F 3
Breckenridge,Colo.C 2
Breen, Colo......A 4
Brighton, Colo...E 2
Brookside, Colo..D 3
Brookvale, Colo..D 2
Broomfield, Colo.D 2
Brush, Colo......F 1
Bryant, Colo.....G 1
Buena Vista, Colo.C 3
Buffalo Cr., Colo.D 2
Buffalo Sprs., Col.D 2
Buford, Colo.....B 2
Burdett, Colo....G 1
Burlington, Colo.G 2
Burns, Colo.....C 2
Butler, Colo.....C 1
Buttes, Colo.....E 3
Byers, Colo......E 2
Caddoa, Colo.....G 3
Calcite, Colo.....D 3
Calhan, Colo.....E 2
Canon City, Colo.D 3
Capitol City, Colo.B 3
Capulin, Colo....C 4
Carbondale, Colo.B 2
Carbon Jc., Colo..B 4
Cardiff, Colo.....B 2
Caribou, Colo....D 1
Carlton, Colo....G 3
Carnero, Colo....C 4
Carr, Colo.......E 1
Carrizo, Colo.....F 4
Castle Rock, Colo.E 2
Cathedral, Colo..B 3
Cebolla, Colo.....B 3
Cedar, Colo.....A 4
Cedaredge, Colo..B 3
Center, Colo.....C 4
Centerville, Colo.C 3
CentralCity, Colo.D 2
Chase, Colo......D 2
Chandler, Colo...D 3
Cherrelyn, Colo..E 2
Cheyenne Wells, Colo. ....G 3
Chivington, Colo.G 3
Chromo, Colo....C 4
Cimarron, Colo..B 3
Clark, Colo......C 1
Clifton, Colo....A 2
Coalbasin, Colo...B 2
Coalcreek, Colo...D 3
Coaldale, Colo...D 3
Cochetopa, Colo..C 3
Collbran, Colo...B 2
Colona, Colo.....B 4
Colorado Cy., Col.E 3
Colorado Sps,Colo.E 3
Columbine, Colo..C 1
Como, Colo......D 2
Conejos, Colo....C 4
Conifer, Colo....D 2
Content, Colo....A 4
Cope, Colo.......G 2
Cortez, Colo.....A 4
Cory, Colo.......B 3
Cotopaxi, Colo...D 3
Coventry, Colo...A 3
Cowdrey, Colo...C 1
Craig, Colo......B 1
Crawford, Colo...B 3
Creede, Colo.....C 4
CrestedButte,Colo.C 3
Crestone, Colo...D 4
Creswell, Colo...D 2
Cripple Cr., Colo.D 3
Critchell, Colo...D 2
Crook, Colo.....G 1
Crow, Colo......E 4
Crystal, Colo.....B 2
Cucharas, Colo...E 4
Cyanide, Colo....D 3

Dayton, Colo.....B 3
Dean, Colo.......B 4
Deckers, Colo....D 2
Deepcreek, Colo..B 1
Deertrail, Colo...E 2
De Beque, Colo..A 2
Del Norte, Colo..C 4
Delhi, Colo......E 4
Delta, Colo......A 3
Denver, Colo.....E 2
Dexter, Colo.....C 1
Dillon, Colo.....C 2
Divide, Colo.....D 3
Dodd, Colo......F 1
Dolores, Colo....A 4
Doran, Colo.....D 2
Dorchester, Colo..C 3
Dorsero, Colo....C 2
Dover, Colo.....E 1
Doyleville, Colo..C 3
Dubois, Colo.....B 3
Duncan, Colo....F 4
Dunkley, Colo....B 1
Dunton, Colo....A 4
Durango, Colo...B 4
Dyke, Colo.......B 4

Eads, Colo......G 3
Eagle, Colo......C 2
Earl, Colo.......E 4
Eastonville, Colo.E 2
Eastdale, Colo...D 4
Eaton, Colo......E 1
Eckert, Colo.....B 3
Eckley, Colo.....G 1
Eddy, Colo......C 1
Eden, Colo......E 3
Edwards, Colo...C 2
Elbert, Colo.....E 2
Eldora, Colo.....D 1
Eldred, Colo.....D 3
Elizabeth, Colo...E 2
Elk Head, Colo..B 1
Elkhorn, Colo....D 1
Ellicott, Colo....E 3
El Moro, Colo...E 4
Elyria, Colo......E 2
Empire, Colo....D 2
Emma, Colo.....B 2
Erie, Colo.......D 1
Estes Park, Colo.D 1
Eureka, Colo....B 4
Evans, Colo.....E 1
Evergreen, Colo..D 2

Fair Play, Colo..C 2
Falcon, Colo.....E 3
Fisher, Colo.....E 3
Flagler, Colo.....F 2
Fleming, Colo....G 1
Florence, Colo...D 3
Floresta, Colo....B 3
Florissant, Colo...D 3
Fondis, Colo.....E 2
Forder, Colo.....F 3
Fort Collins, Colo.D 1
Ft. Garland, Colo.D 4
Ft. Lupton, Colo.E 1
Ft. Morgan, Colo.F 1
Fountain, Colo...E 3
Fox, Colo.......G 2
Fowler, Colo.....E 4
Fraser, Colo.....D 2
Frisco, Colo.....C 2
Fruita, Colo......A 2
Fulford, Colo....C 2

Galatea, Colo.....F 3
Gardner, Colo....D 4
Garnett, Colo....D 4
Garo, Colo......D 2
Gary, Colo.......F 1
Gateway, Colo...A 3
Gault, Colo......E 1
Genoa, Colo......F 2
Georgetown, Colo.D 2
Gilman, Colo.....C 2
Gladstone, Colo..B 4
Glen, Colo.......F 2
Glendevey, Colo..D 1
Gleneyre, Colo...D 1
Glenw'dSprs.,Colo.B 2
Globeville, Colo..E 2
Goff, Colo.......G 3
Golden, Colo.....D 2
Goldfield, Colo...D 3
Goldhill, Colo....D [illegible]
Goodpasture, Colo.E 3
Granada, Colo....G 3
Granby, Colo....D 1
Grand Jct., Colo.A 2
Grandlake, Colo..D 1
Grand Val., Colo.A 2
Graneros, Colo...E 4
Granite, Colo....C 2
Grant, Colo......D 2
Graycreek, Colo..E 4
Greeley, Colo....E 1
Greenhorn, Colo.E 4
Greenland, Colo..E 2
Green.MtnF.,Colo.D 3
Greenwood, Colo.D 3
Grover, Colo.....E 1
Gulch, Colo......B 2
Guffey, Colo.....D 3
Gulnare, Colo....E 4
Gunnison, Colo...C 3
Gypsum, Colo....C 2

Hahns Peak, Colo.C 1
Hamilton, Colo...B 1
Hardin, Colo.....E 1
Harrison, Colo...C 1
Haskil, Colo.....A 3
Hastings, Colo...E 4
Haswell, Colo....F 3
Haxtum, Colo...G 1
Hayden, Colo....B 1
Hayman, Colo...D 2
Hebron, Colo....C 1
Henderson, Colo.E 2
Henson, Colo....B 3
Hermit, Colo.....B 4
Hesperus, Colo...A 4
Hezron, Colo....E 4
Hicks, Colo......D 4
Higbee, Colo.....F 4
Highland L., Colo.D 1
Highmore, Colo..A 2
Higho, Colo......C 1
Hillrose, Colo....F 1
Hillside, Colo....D 3
Hill Top, Colo...C 2
Hoehne, Colo....E 4
Holly, Colo......G 3
Holyoke, Colo....G 1
Home, Colo......D 1
Hooper, Colo....D 4
Hortense, Colo...C 3
Hotchkiss, Colo..B 3
Howard, Colo....D 3
Howardsville,Colo.B 4
Howbert, Colo...D 3
Hudson, Colo....E 1
Huerfano, Colo...E 4
Hugo, Colo......F 2
Husted, Colo.....E 2
Hygiene, Colo....D 1

Idaho Sprs., Colo.D 2
Idalia, Colo......G 2
Ignacio, Colo.....B 4
Iliff, Colo........F 1
Ilse, Colo.......D 3
Iola, Colo.......B 3
Ivanhoe, Colo....C 2

Jamestown, Colo.D 1
Jasper, Colo.....C 4
Jefferson, Colo...D 2
Johnstown, Colo..E 1
Juanita, Colo....B 4
Julesburg, Colo..G 1
Juniper, Colo....B 1

Kersey, Colo.....E 1
Keystone, Colo..D 2
Kiowa, Colo.....E 2
Kirk, Colo.......G 2
Kit Carson, Colo.G 3
Kline, Colo......A 4
Kokomo, Colo....C 2
Konantz, Colo....G 4
Kremmling, Colo.C 1
KuhnsCross'gColo.E 2
Kutch, Colo......F 3

Las Animas, Colo.F 3
La Garita, Colo..C 4
La Jara, Colo....D 4
La Junta, Colo...F 4
La Salle, Colo...E 1
La Veta, Colo...D 4
Ladore, Colo....A 1
Lafayette, Colo..D 2
Laird, Colo......G 1
Lake City, Colo..B 3
Lamar, Colo.....G 3
Landsman, Colo..G 2
Lansing, Colo...G 2
Laplata, Colo....A 4
Laporte, Colo....D 1
Larkspur, Colo...E 2
Lavalley, Colo...D 4
Lay, Colo.......B 1
Leadville, Colo...C 2
Leonard, Colo...A 3
Leroy, Colo.....G 1
Liberty, Colo....D 4
Lily, Colo........A 1
Lime, Colo.......E 3
Limon, Colo,....F 2
Lindon, Colo.....F 2
Littleton, Colo...D 2
Livermore, Colo..D 1
Lobatos, Colo....D 4
Loco, Colo.......F 2
Logcabin, Colo...D 1
Loma, Colo......A 2
Lonedome, Colo...A 4
Longmont, Colo..D 1
Loretto, Colo....D 2
Los Cerritos, Colo.D 4
Louisville, Colo..D 2
Loveland, Colo...D 1
Lucerne, Colo....E 1
Lyons, Colo.....D 1
Lytle, Colo......E 3

Mack, Colo......A 2
Maher, Colo.....B 3
Maitland, Colo...E 4
Majestic, Colo...E 4
Malachite, Colo..D 4
Malta, Colo......C 2
Manassa, Colo...D 4
Manitou, Colo...E 3
Manzanola, Colo.F 4
Marble, Colo....B 2
Martin, Colo.....C 1
Masonville, Colo.D 1
Masters, Colo....E 1
Mattison, Colo...F 2
Maxey, Colo.....G 4
Maybell, Colo....A 1
McCoy, Colo.....C 2
McElmo, Colo....A 4
Mears Jc., Colo..C 3
Meeker, Colo....B 1
Meredith, Colo...C 2
Merino, Colo.....F 1
Mesa, Colo......A 2
Minturn, Colo....C 2
Mirage, Colo....D 3
Mitchell, Colo....C 2
Moffat, Colo.....D 3
Molina, Colo.....B 2
Monarch, Colo...C 3
Monon, Colo.....G 4
Montclair, Colo..E 2
Monte Vista, Colo.C 4
Montezuma, Colo.D 2
Montrose, Colo...B 3
Monument, Colo.E 2
Moqui, Colo.....A 4
Moraine Pk, Colo.D 1
Morley, Colo.....E 4
Mosca, Colo.....D 4
Mt.Morrison,Colo.D 2

Nathrop, Colo....C 3
Naturita, Colo...A 3
Needleton, Colo..B 4
Nepesta, Colo....E 3
New Castle, Colo.B 2
Newett, Colo....D 3
Newton, Colo....G 2
Night Hawk,Colo.D 2
Niwot, Colo.....D 1
N. Creede, Colo..C 4
Norton, Colo.....E 2
Norwood, Colo...A 3
Nyburg, Colo.....E 3

Oak Creek, Colo.C 1
Ohio, Colo.......C 3
Olathe, Colo.....B 3
OlneySprs, Colo..F 3
Omer, Colo......E 4
Ophir, Colo......B 4
Orchard, Colo....E 1
Ordway, Colo....F 3
Orient, Colo.....B 3
Orth, Colo.......C 4
Osier, Colo......C 4
Otis, Colo.......G 1
Ouray, Colo.....B 4
Oxford, Colo....B 4

Pagoda, Colo....B 1
Pagosa Jct., Colo.B 4
PagosaSprs., Colo.C 4

INDEX OF COLORADO

Palisades, Colo...A
Palmer, Colo....E
Paonia, Colo.....B
Paradox, Colo....A
Parlin, Colo......C
Parkdale, Colo...D
Parker, Colo.....E
Pawnee, Colo....F
Pearl, Colo......C
Peckham, Colo...E
Petersburg, Colo..E
Peyton, Colo.....E
Piceance, Colo...A
Pictou, Colo.....E
Piedra, Colo.....B
Pierce, Colo.....E
Pine, Colo.......D
Pinewood, Colo..D
Pinnacle, Colo...B
Pinon, Colo......E
Pitkin, Colo.....C
Placerville, Colo.A
Plateau Cy., Colo.A
Platoro, Colo....C
Platteville, Colo..E
PonchoSprs., Colo.C
Pool, Colo.......B
Porter, Colo.....B
Powderhorn, Colo.B
Primero, Colo....E
Prowers, Colo...G
Pryor, Colo......E
Pueblo, Colo.....E
Pyramid, Colo....B

Quarry, Colo.....A

Radiant, Colo....D
Ramah, Colo.....E
Rand, Colo......C
Rangely, Colo....A
Raven, Colo.....B
Read, Colo......B
Redcliff, Colo....C
Redstone, Colo...B
Regnier, Colo....G
Resolis, Colo.....F
Rhone, Colo.....A
Rico, Colo.......A
Ridgway, Colo...B
Rifle, Colo.......B
Rinn, Colo......D
Rioblanco, Colo..B
Riverbend, Colo..F
Riverside, Colo...C
Robinson, Colo...C
Robinson, Colo...F
Rocky Ford, Colo.F
Rockvale, Colo...D
Rockwood, Colo..B
Roggen, Colo....E
Rollinsville, Colo.D
Romeo, Colo.....D
Rosita, Colo.....D
Roswell, Colo....E
Rouse. Colo.....E
Rugby, Colo.....E
Russell, Colo.....D
Rye, Colo.......E

Saguache, Colo...C
Saint Cloud, Colo.D
Saint Elmo, Colo.C
St. Mary's, Colo..E
Salem, Colo......E
Salida, Colo.....D
Salina, Colo.....D
Sams, Colo......B
Sanford, Colo...D
San Isabel, Colo.D
San Luis, Colo..D
San Pablo, Colo.D
Sapinero, Colo...B
Sargents, Colo...C
Sawpit, Colo.....A
Schley, Colo.....E
Scholl, Colo......C
Sedalia, Colo....E
Sedgwick, Colo...G
Seibert, Colo....G
Sellar, Colo......C
Sharpsdale, Colo..D

Caddoa, Colo.....G 3
Calcite, Colo.....D 3
Calhan, Colo.....E 2
Canon City, Colo.D 3
Capitol City, Colo.B 3
Capulin, Colo....C 4
Carbondale, Colo.B 2
Carbon Jc., Colo..B 4
Cardiff, Colo.....B 2
Caribou, Colo....D 1
Carlton, Colo....G 3
Carnero, Colo....C 4
Carr, Colo.......E 1
Carrizo, Colo....F 4
Castle Rock, Colo.E 2
Cathedral, Colo..B 3
Cebolla, Colo.....B 3
Cedar, Colo.....A 4
Cedaredge, Colo..B 3
Center, Colo.....C 4
Centerville, Colo.C 3
CentralCity, Colo.D 2
Chase, Colo......D 2
Chandler, Colo...D 3
Cherrelyn, Colo..E 2
Cheyenne Wells,
Colo. ....G 3
Chivington, Colo.G 3
Chromo, Colo....C 4
Cimarron, Colo..B 3
Clark, Colo......C 1
Clifton, Colo....A 2
Coalbasin, Colo...B 2
Coalcreek, Colo...D 3
Coaldale, Colo...D 3
Cochetopa, Colo..C 3
Collbran, Colo...B 2
Colona, Colo.....B 4
Colorado Cy., Col.E 3
Colorado Sps,Colo.E 3
Columbine, Colo..C 1
Como, Colo......D 2
Conejos, Colo....C 4
Conifer, Colo....D 2
Content, Colo....A 4
Cope, Colo.......G 2
Cortez, Colo.....A 4
Cory, Colo.......B 3
Cotopaxi, Colo...D 3
Coventry, Colo...A 3
Cowdrey, Colo...C 1
Craig, Colo......B 1
Crawford, Colo...B 3
Creede, Colo.....C 4
CrestedButte,Colo.C 3
Crestone, Colo...D 4
Creswell, Colo...D 2
Cripple Cr., Colo.D 3
Critchell, Colo...D 2
Crook, Colo.....G 1
Crow, Colo......E 4
Crystal, Colo.....B 2
Cucharas, Colo...E 4
Cyanide, Colo....D 3

Dayton, Colo.....B 3
Dean, Colo.......D 4
Deckers, Colo....D 2
Deepcreek, Colo..B 1
Deertrail, Colo...E 2
De Beque, Colo..A 2
Del Norte, Colo..C 4
Delhi, Colo......E 4
Delta, Colo......A 3
Denver, Colo.....E 2
Dexter, Colo.....C 1
Dillon, Colo.....C 2
Divide, Colo.....D 3
Dodd, Colo......F 1
Dolores, Colo....A 4
Doran, Colo.....D 2
Dorchester, Colo..C 3
Dorsero, Colo....C 2
Dover, Colo.....E 1
Doyleville, Colo..C 3
Dubois, Colo.....B 3
Duncan, Colo....F 4
Dunkley, Colo....B 1
Dunton, Colo....A 4
Durango, Colo....B 4
Dyke, Colo.......B 4

Eads, Colo......G 3

Eagle, Colo......C 2
Earl, Colo.......E 4
Eastonville, Colo.E 2
Eastdale, Colo...D 4
Eaton, Colo......E 1
Eckert, Colo.....B 3
Eckley, Colo.....G 1
Eddy, Colo......C 1
Eden, Colo......E 3
Edwards, Colo...C 2
Elbert, Colo.....E 2
Eldora, Colo.....D 1
Eldred, Colo.....D 3
Elizabeth, Colo...E 2
Elk Head, Colo..B 1
Elkhorn, Colo....D 1
Ellicott, Colo....E 3
El Moro, Colo...E 4
Elyria, Colo......E 2
Empire, Colo....D 2
Emma, Colo.....B 2
Erie, Colo.......D 1
Estes Park, Colo.D 1
Eureka, Colo....B 4
Evans, Colo.....E 1
Evergreen, Colo..D 2

Fair Play, Colo..C 2
Falcon, Colo.....E 3
Fisher, Colo.....E 3
Flagler, Colo.....F 2
Fleming, Colo....G 1
Florence, Colo...D 3
Floresta, Colo....B 3
Florissant, Colo...D 3
Fondis, Colo.....E 2
Forder. Colo.....F 3
Fort Collins, Colo.D 1
Ft. Garland, Colo.D 4
Ft. Lupton, Colo.E 1
Ft. Morgan, Colo.F 1
Fountain, Colo...E 3
Fox, Colo.......G 2
Fowler, Colo.....E 4
Fraser, Colo.....D 2
Frisco, Colo.....C 2
Fruita, Colo.....A 2
Fulford. Colo....C 2

Galatea, Colo.....F 3
Gardner, Colo....D 4
Garnett, Colo....D 4
Garo, Colo......D 2
Gary, Colo.......F 1
Gateway, Colo...A 3
Gault, Colo......E 1
Genoa, Colo......F 2
Georgetown, Colo.D 2
Gilman, Colo.....C 2
Gladstone, Colo..B 4
Glen, Colo.......F 2
Glendevey, Colo..D 1
Gleneyre, Colo...D 1
Glenw'dSprs.,Colo.B 2
Globeville, Colo..E 2
Goff, Colo.......G 3
Golden, Colo.....D 2
Goldfield, Colo...D 3
Goldhill, Colo....D
Goodpasture, Colo.E 3
Granada, Colo....G 3
Granby, Colo....D 1
Grand Jct., Colo.A 2
Grandlake, Colo..D 1
Grand Val., Colo.A 2
Graneros, Colo...E 4
Granite, Colo....C 2
Grant, Colo......D 2
Graycreek, Colo..E 4
Greeley, Colo....E 1
Greenhorn, Colo.E 4
Greenland, Colo..E 2
Green.MtnF.,Colo.D 3
Greenwood, Colo.D 3
Grover, Colo.....E 1
Gulch, Colo......B 2
Guffey, Colo.....D 3
Gulnare, Colo....E 4
Gunnison, Colo...C 3
Gypsum, Colo....C 2

Hahns Peak, Colo.C 1

Hamilton, Colo...B 1
Hardin, Colo.....E 1
Harrison, Colo...C 1
Haskil, Colo.....A 3
Hastings, Colo...E 4
Haswell, Colo....F 3
Haxtum, Colo...G 1
Hayden, Colo....B 1
Hayman, Colo...D 2
Hebron, Colo....C 1
Henderson, Colo.E 2
Henson, Colo....B 3
Hermit, Colo.....B 4
Hesperus, Colo...A 4
Hezron, Colo....E 4
Hicks, Colo......D 4
Higbee, Colo.....F 4
Highland L., Colo.D 1
Highmore, Colo..A 2
Higho, Colo......C 1
Hillrose, Colo....F 1
Hillside, Colo....D 3
Hill Top, Colo...C 2
Hoehne, Colo....E 4
Holly, Colo......G 3
Holyoke, Colo....G 1
Home, Colo......D 1
Hooper, Colo....D 4
Hortense, Colo...C 3
Hotchkiss, Colo..B 3
Howard, Colo....D 3
Howardsville,Colo.B 4
Howbert, Colo...D 3
Hudson, Colo....E 1
Huerfano, Colo...E 4
Hugo, Colo......F 2
Husted, Colo.....E 2
Hygiene, Colo....D 1

Idaho Sprs., Colo.D 2
Idalia, Colo......G 2
Ignacio, Colo.....B 4
Iliff, Colo........F 1
Ilse, Colo.......D 3
Iola, Colo.......B 3
Ivanhoe, Colo....C 2

Jamestown, Colo.D 1
Jasper, Colo.....C 4
Jefferson, Colo...D 2
Johnstown, Colo..E 1
Juanita, Colo....B 4
Julesburg, Colo..G 1
Juniper, Colo....B 1

Kersey, Colo.....E 1
Keystone, Colo..D 2
Kiowa, Colo.....E 2
Kirk, Colo.......G 2
Kit Carson, Colo.G 3
Kline, Colo......A 4
Kokomo, Colo....C 2
Konantz, Colo....G 4
Kremmling, Colo.C 1
KuhnsCross'gColo.E 2
Kutch, Colo......F 3

Las Animas, Colo.F 3
La Garita, Colo..C 4
La Jara, Colo....D 4
La Junta, Colo...F 4
La Salle, Colo...E 1
La Veta, Colo...D 4
Ladore, Colo....A 1
Lafayette, Colo..D 2
Laird, Colo......G 1
Lake City, Colo..B 3
Lamar, Colo.....G 3
Landsman, Colo..G 2
Lansing, Colo...G 2
Laplata, Colo....A 4
Laporte, Colo....D 1
Larkspur, Colo...E 2
Lavalley, Colo...D 4
Lay, Colo.......B 1
Leadville, Colo...C 2
Leonard, Colo...A 3
Leroy, Colo.....G 1
Liberty, Colo....D 4
Lily, Colo.......A 1
Lime, Colo.......E 3

Limon, Colo.....F 2
Lindon, Colo.....F 2
Littleton, Colo...D 2
Livermore, Colo..D 1
Lobatos, Colo....D 4
Loco, Colo.......F 2
Logcabin, Colo...D 1
Loma, Colo......A 2
Lonedome, Colo...A 4
Longmont, Colo..D 1
Loretto, Colo....D 2
Los Cerritos, Colo.D 4
Louisville, Colo..D 2
Loveland, Colo...D 1
Lucerne, Colo....E 1
Lyons, Colo.....D 1
Lytle, Colo......E 3

Mack, Colo......A 2
Maher, Colo.....B 3
Maitland, Colo...E 4
Majestic, Colo...E 4
Malachite, Colo..D 4
Malta, Colo......C 2
Manassa, Colo...D 4
Manitou, Colo...E 3
Manzanola, Colo.F 4
Marble, Colo....B 2
Martin, Colo.....C 1
Masonville, Colo.D 1
Masters, Colo....E 1
Mattison, Colo...F 2
Maxey, Colo.....G 4
Maybell, Colo....A 1
McCoy, Colo.....C 2
McElmo, Colo....A 4
Mears Jc., Colo..C 3
Meeker, Colo....B 1
Meredith, Colo...C 2
Merino, Colo.....F 1
Mesa, Colo......A 2
Minturn, Colo....C 2
Mirage, Colo....D 3
Mitchell, Colo....C 2
Moffat, Colo.....D 3
Molina, Colo.....B 2
Monarch, Colo...C 3
Monon, Colo.....G 4
Montclair, Colo..E 2
Monte Vista, Colo.C 4
Montezuma, Colo.D 2
Montrose, Colo...B 3
Monument, Colo.E 2
Moqui, Colo.....A 4
Moraine Pk, Colo.D 1
Morley, Colo.....E 4
Mosca, Colo.....D 4
Mt.Morrison,Colo.D 2

Nathrop, Colo....C 3
Naturita, Colo...A 3
Needleton, Colo..B 4
Nepesta, Colo....E 3
New Castle, Colo.B 2
Newett, Colo....D 3
Newton, Colo....G 2
Night Hawk,Colo.D 2
Niwot, Colo.....D 1
N. Creede, Colo..C 4
Norton, Colo.....E 2
Norwood, Colo...A 3
Nyburg, Colo.....E 3

Oak Creek, Colo.C 1
Ohio, Colo.......C 3
Olathe, Colo.....B 3
OlneySprs, Colo..F 3
Omer, Colo......E 4
Ophir, Colo......B 4
Orchard, Colo....E 1
Ordway, Colo....F 3
Orient, Colo.....B 3
Orth, Colo.......C 4
Osier, Colo......C 4
Otis, Colo.......G 1
Ouray, Colo.....B 4
Oxford, Colo....B 4

Pagoda, Colo....B 1
Pagosa Jct., Colo.B 4
PagosaSprs., Colo.C 4

Colorado Desert, a region in southeastern California, extending from San Jacinto Peak to the Gulf of California, and reaching to the Peninsula Mountains on the west. The rainfall ranges from 3 inches in the south to a maximum of 25 inches in the northwest. The climate is intensely hot in summer, averaging 90° F., and sometimes reaching 125° in the shade. The desert varies from a few feet above to 278 feet below sea level. It was once a part of the Gulf of California, being cut off from the main body by the vast deposits of the Colorado River.

At the northern end of the desert is the Indio region, or Coachella Valley, and, in the south, the Imperial Valley, reclaimed by means of irrigation from the Colorado River. The alluvial land is exceptionally fertile. East of the Imperial Valley are sand dunes (6 to 7 miles wide and 40 to 50 miles long), and to the west is a sandy beach showing the boundary of the ancient lake.

Between the Imperial and the Coachella Valley is the lowest part of the old lake bottom, the Salton Sink, which until recently was a marsh containing extensive salt deposits, and mud volcanoes. In the flood seasons of 1905 to 1907, however, the Colorado found its way by means of the Imperial irrigation canal to its ancient course, did considerable damage to the Imperial Valley, and transformed the Salton Sink into the Salton Sea, with an area of 443 square miles and a depth of 67.5 feet (maximum), the surface being 206 feet below sea level. Subsequent evaporation reduced the depth to about 30 feet and the area to less than 300 square miles. See COLORADO RIVER.

Colorado Plateau, Great, an elevated tableland in the northern part of Arizona, having an altitude between 6,500 and 8,000 feet. It occupies the northeastern third of the State, and breaks off to the south in an immense line of cliffs hundreds of miles in length, known as the Mogollon Escarpment.

Colorado River, a river in the southwestern United States, rising in Rocky Mountain Park, Colorado, flows southwest to its junction with the Green River, which rises in the Wind River Mountains of Wyoming, and flows nearly south for 800 miles to join the Colorado. From this point the Colorado flows southwest into Arizona, then generally westward in a winding course to the northwestern corner of that State, turns south, and forms the boundary line between Arizona on the east and Nevada and California on the west. A few miles below Yuma it enters Mexican territory, through which it flows to its mouth at the head of the Gulf of California. The Colorado River is 1,700 miles long, with a total drainage basin of 244,000 square miles. Only 80 miles of its length is in Mexico.

The principal branches of the Colorado River are the Green, Gunnison, Dolores, San Juan, Little Colorado, Virgin, Gila and Williams. All these streams have their sources in high mountains, but their courses are in the main through arid plateaus, in which they have cut deep canyons. For more than a thousand miles the river has cut a deep narrow gorge, and where streams join it this is broken into canyons. The famous Grand Canyon, the longest of these, extends from the mouth of the Paria to the Grand Wash, some 280 miles, and affords a scene of extraordinary beauty and grandeur. (See GRAND CANYON). Boulder Canyon and Black Canyon, merging into each other, are about 40 miles from Las Vegas, Nevada. Where the Colorado forms a boundary between California and Arizona it cuts through volcanic rocks a number of black yawning canyons, between which is a narrow flood plain with cottonwood groves and a chaparral of mesquite. This desert valley has been so redeemed by irrigation that it is now one of the most prosperous agricultural regions in the country.

Below Yuma, the river has often overflowed its banks on the west, inundating large areas lying below sea level. Where it crosses the international boundary into Mexico, it flows along the top of the rim of a great bowl, which extends up into California for a distance of more than 100 miles. The river is kept out of this bowl by levees which turn it south into the Pacific Ocean, but water is carried from it by canal, which runs through Mexico into the Imperial Valley. In order to prevent the occurrence of floods and their attendant destruction, the U. S. Government authorized the construction of a huge impounding dam at Black Canyon in Arizona and Nevada, creating a lake 115 miles in length having an area of 145,000 acres—the greatest artificial reservoir in the world—and in many places more than 500 feet deep, transforming stretches of arid desert in Arizona and Nevada into a garden, rendering the Colorado navigable even at low water as far as Grand Wash, and most of the time 40 miles up toward Toroweap, and creating more electric energy than Niagara and Muscle Shoals combined. Included in the project is the all-American canal, to carry water from Laguna Dam to Imperial and Coachella Valleys, thus ending the menace of international controversy with Mexico and furnishing water for the irrigation of 1,000,000 acres.

As early as 1540 the Colorado was visited by de Alarcon, a member of the Coronado expedition; and in 1542 Don Lopez de Cárdenas discovered the Grand Canyon. This remained unexplored, however, for over 300 years, until 1869, when Major Powell and his party explored it. Since that time several others have accomplished the hazardous feat.

Colorado River, one of the largest rivers of Texas, rising in the Llano Estacado, in the western part of the State, and flowing in a general southeasterly direction to the Gulf of Mexico. Its principal branches are the Concho San Saba, Llano, and Pedernales Rivers. The drainage area is 41,220 square miles, including a part of New Mexico. Of the total length (715 miles) the lower part only (350 miles), traversing the flat country between Austin and the Gulf, is navigable, and is utilized for purposes of power and irrigation.

Colorado Springs, city, Colorado, county seat of El Paso county, near the center of the State, on the Atchison, Topeka, and Santa Fé, the Denver and Rio Grande, and the Chicago, Rock Island, and Pacific Railroads; 74 miles south of Denver. Situated near the eastern base of Pike's Peak, at an altitude of 6,038 feet, it commands superb scenery, and is the principal health resort of Colorado. The climate is dry and equable, and Manitou Springs in the neighborhood enjoy high repute. Reservoirs on Pike's Peak, at an elevation of 11,000 feet, supply the city with water. It is the seat of Colorado College (q. v.), of the State School for the deaf, dumb, and blind, the National Sanatorium of the Modern Woodsmen of America, the Union Printers' Home and the National Methodist Sanatorium. Near the city are Cheyenne Canyons, the Cave of the Winds, Grand Caverns, Seven Falls, Monument Park, and the famous 'Garden of the Gods' (q. v.). Industries include smelters and reduction mills. It was founded in 1870 by Gen. W. J. Palmer, president of the Denver and Rio Grande Railway and chartered as a city in 1872.

City manager form of government was adopted in 1919. There is a municipal airport. Pop. (1930) 33,237; (1940) 36,789.

Colorado State College of Agriculture and Mechanic Arts, a coeducational State institution at Fort Collins, Colo., established in 1876 as a land-grant college (receiving an endowment of 90,000 acres) and opened in 1879. It offers courses in agriculture, engineering, arts and sciences, home economics, forestry, veterinary medicine and music. There is a graduate school, an extension division, and an experiment station.

Colorado, University of, a coeducational State institution at Boulder, Colo., incorporated in 1861, and opened in 1877 with two departments, preparatory and collegiate. The preparatory department was discontinued in 1907 and the University consists of the College of Arts and Sciences including the specialized departments of Home Economics, Education, Fine Arts, Journalism and Physical Education; a Graduate School, Medical School, College of Pharmacy, Law School, School of Business, College of Engineering, an Extension Division, and Summer Quarter. It grants degrees of B.A., B.S. (H.EC.), B.F.A., P.E., and B.S. (M.T.) from the College of Arts and Sciences; B.M. and B. MUS. ED. from the College of Music; B.S. (C.E.), B.S. (E.E.), B.S. (M.E.), B.S. (CH.E.), and B.S. (ARCH.E.) from the College of Engineering; PH.D., C.E., E.E., M.E., CH.E., M.A., M.S., ED.D., M.MUS., M. MUS. ED., M.F.A., ARCH.E., M.ED. from the Graduate School; M.D. from the School of Medicine; B.N. from the School of Nursing; LL.B. from the School of Law; B.S. (PHAR.) from the College of Pharmacy; and B.S. (BUS.) from the School of Business. The campus covers 160 acres and there are 18 acres in Denver for the Medical School. The A.S.U.C. Lodge (7,700 feet elevation), on Kossler's Lake, 5 miles from the Campus, and University Camp, near the foot of the Continental Divide, about 28 miles from Boulder, are centers for winter sports, and the latter is a base for recreational activities and field courses in geology and biology during the summer. The University is supported by a fractional mill tax, by special appropriations and by tuition and fees.

Coloration, Protective. See COLORS OF ANIMALS.

Color Blindness (ACHROMATOPSY), the inability to distinguish certain colors or shades of color. *Total color blindness,* in which there is no perception of colors as such, but only of gradations of light and shade, is rare. The most common form is that in which some bright colors, different in different cases, are confused with each other, though other colors are correctly perceived. This is known as *complete partial color blindness* to distinguish it from a third form (*incomplete partial color blindness*), in which bright colors are recognized, but more delicate shades are confused.

Color blindness may be congenital (*i.e.*, present from birth) or acquired. It is said frequently to be transmitted from grandfather to grandson, and is more common in males than in females, in the proportion of over three to one.

Congenital color blindness is attributed by Dr. Edridge-Green to one or more of the following conditions: absorption of certain rays by the eye; nonexcitability of the visual substance or optic nerve fibers by light rays of a certain wave length (shortening of the spectrum); imperfection of the color-perceiving apparatus. The first is not, as a rule, sufficient in itself to cause color blindness. Shortening of the spectrum, on the other hand (commonly at the red end), is of great practical importance, since it prevents perception of the extreme red rays, which, being most penetrating, are necessary for distance vision. The third condition is in accord with the Hering theory in locating the imperfection in the brain; while the Young-Helmholtz and other theories attribute the defect to the retina.

Acquired color blindness may be caused by a diseased brain or by a diseased or wounded optic nerve; but it appears to be unconnected with defects of sight and with retinal diseases generally. It may result from the excessive use of drugs (quinine, ergot, arsenic, etc.), tobacco, or alcohol; and from various diseases (neuritis, tabes, hysteria, and epilepsy). It is sometimes temporary, but even in such cases is usually recurrent in increasingly acute forms.

The color blind have been further classified (irrespective of spectrum length) as monochromatic (seeing gray only), dichromatic (generally blue and yellow) and trichromatic (red, green, and violet, with numerous variations). Abnormal trichromates, however, who see only these three, without intermediate variations, are classed as color blind. The average eye distinguishes six spectral colors; an acute sense of color distinguishes seven.

Color blindness, affecting one eye or both, has no known remedy. It must, however, be distinguished from mere ignorance of color names.

A case of color blindness was mentioned in 1684, and others in 1777 and 1779; but the most famous early instance—from which the defect was known as Daltonism—was that of the chemist Dalton, who in 1794 described his own case. Investigations during the nineteenth century established the importance of color blindness, especially in the mercantile marine and railway service; and various tests were devised for applicants for such positions. Tests for three colors are now required by law in some countries, and are in many other cases voluntarily applied by employers; but the official tests are considered by many to be inadequate. Holmgren's test, often supplemented by examination with specially adapted lanterns, consists of the matching of wools selected from over one hundred shades.

Colored M. E. Church. See AFRICAN CHURCHES.

Colorimeter, kul-*e*r-im'*e*-t*e*r, an instrument for estimating the strength or quality of a substance by comparing its color with that of a standard. There are several forms—the color being varied by altering the depth of a colored solution, the number of tinted glasses, or the width of opening on color screens, until a match is obtained. Mill's colorimeter is an example of the first class. Lovibond's of the second, and Ives' of the third.

Color Sergeant. Each infantry and cavalry regiment in the U. S. Army has two color sergeants, the senior of whom carries the national color, the junior the regimental color.

Colors, Military, the flags or standards carried by military organizations. In the United States army colors are classified as *flags, colors, standards,* and *guidons.*

(1) *Flags.*—The U. S. national flag is used in various sizes at all posts and all government buildings, and is carried by all infantry and cavalry regiments, battalions or squadrons, or other troops marching in these formations. The President's flag is *blue;* that of the Secretary of War, *scarlet;* that of the Assistant Secretary of War, *white.* The flag of the Geneva Convention (a red cross on a white ground), together with the national flag, is used over hospitals in time of war.

(2) *Colors.*—The colors of the President are of *scarlet* silk, as are

also those of the secretary of war; while those of the assistant secretary of war are of *white* silk, each having a different characteristic design. Each regiment of infantry and cavalry, each battalion of engineers, and the artillery corps have, in addition to the national flag, a distinctive regimental or battalion color.

(3) *Standards.* Cavalry regiments have each a standard, which is simply the national flag of silk with the official designation of the regiment engraved on a silver band on the lance by which the standard is carried.

(4) *Guidons.* Each troop of cavalry, battery of field artillery, and mounted section of engineers carries a guidon, appropriately marked with the designation of the organization.

See Army Regulations; U. S. Army.

Colors of Animals. As a rule, animals are remarkable for their beauty and variety of tint, as contrasted with the relative uniformity of plants apart from their flowers. Not infrequently the color of the animal harmonizes with that of its surroundings. Thus, the camel and lion have much the sandy color of the open deserts in which they live; the Arctic fox, polar bear, Alpine hare, and ermine are, temporarily or permanently, the color of the surrounding snow; the stripes of tiger and zebra conceal their bodies in the checkered light and shade of the jungle of forest; the speckled flat-fish, such as flounder and plaice, glide almost invisibly along the sandy bottom; and so on. On the other hand, many animals stand out from their surroundings by their vivid contrasting colors, as, for example, the black and orange salamander, the fire-toad (*Bombinator*) of the Continent, the yellow and black banded wasp and hornet, the black and white striped skunk, and so on. Again, while in not a few animals the females may be soberly colored, the males flash out in all the colors of the rainbow, as witness the male humming-birds, male birds of paradise, and many others.

Much of the modern keen interest in the colors of animals has centred about these three points—the frequent resemblance of color to surroundings, the striking dissimilarity between the two in certain special cases, and the occurrence in the males of some animals of a glory of coloring altogether absent in the females. In regard to the first and second of these cases, two other points should be mentioned. The resemblance between organism and surroundings is in some cases not merely general, but is very detailed in nature. The leaf-butterfly (*Kallima*), for example, is exceedingly like a withered leaf as regards the under surface of its wings, while the upper surface is brightly colored; in the stick insects (phasmids), and in the leaf insects of the same family, the resemblances respectively to pieces of stick and leaves of trees are often striking. Again in many cases where animals are vividly colored they possess some noxious property—*e.g.* hornet, skunk, and so on. But certain other animals, apparently quite harmless, exhibit tints resembling those of such noxious animals: for example, certain flies of the genera Eristalis and Volucella resemble wasps, etc., in their coloring.

In consequence of the frequent occurrence in animals of types of coloration showing some one of the peculiarities described above, it has been suggested that all these types are justified by their usefulness to the animal concerned, and owe their origin, in each particular case, to the action of natural selection. Thus it is believed that when an animal resembles its surroundings, the resemblance either protects the animal against possible foes, or enables it to steal unperceived upon its prey. On the first assumption the term 'protective coloration' is applied to such forms of resemblance. Again, where the vivid colors of the animal make it exceptionally conspicuous, it has been suggested that, as such bright-colored animals are usually inedible or hurtful, the colors enable their potential enemies to learn quickly to avoid them—to associate brilliant colors with what to avoid. To such tints the name of 'warning colors' is therefore given by many naturalists. Where, as in the case of Volucella and Eristalis, the colors are present, while the hurtful qualities are absent, it is believed that there is unconscious 'mimicry' of forms with warning colors. Finally, the bright colors of many males, as contrasted with the more sober females, were ascribed by Darwin to sexual selection—to the persistent choice by the females of the more decorative males. Under Mimicry, Warning Coloration, as well as Evolution, Selection, and so on, further details will be found. It should be added that the views of the earlier writers on these subjects have been much modified by observation and criticism.

In regard to the physical causation of the colors of animals much still remains to be discovered. In many cases, especially in the simpler forms of animal life, the colors of the parts are due to the presence of pigments or dyestuffs, which impart their own color to the skin or organs. In other cases, especially in such animals as butterflies, many beetles, and some birds, the gorgeous display of color is often due, not to specific pigments, but to the structure of the parts—*e.g.* the feathers of birds, the scales of Lepidoptera. Perhaps the most important of the pigments giving rise to surface coloration are the lipochromes—pigments of yellow, orange, or red color—which are frequent in Crustacea, many birds, fish, amphibians, reptiles, to say nothing of smaller groups of animals. In certain butterflies (Pieridæ) pigments occur which are derivatives of uric acid—a typical nitrogenous waste product. In some caterpillars and other insects, probably also in several other animals, green pigments are present which seem to be derivatives of the chlorophyll of the food. In perhaps the majority of animals there are pigments of a dark brown or black color, which would appear to be in origin products of destructive metabolism. On the whole, however, it must be said that the physiology of color is in a somewhat backward state, relatively little being known either of the pigments or of the structural colors.

See Bateson's *Materials for the Study of Variation* (1894); F. E. Beddard's *Animal Coloration* (1892); Eimer's *Organic Evolution as the Result of the Inheritance of Acquired Characters*, trans. by J. T. Cunningham (1890); M. I. Newbigin's *Color in Nature* (1898); E. B. Poulton's *The Colors of Animals*, International Scientific Series (1890); A. R. Wallace's *Darwinism* (1889).

Colossæ, tn. in ancient Phrygia, in the S.W. of Asia Minor, not far from Laodicea; its ruins lie near Khonas. It is chiefly remembered for the epistle addressed to its church by St. Paul. See Sir C. Wilson's *Asia Minor* (1895).

Colosseum, The (sometimes less correctly spelt Coliseum), is the largest Roman amphitheatre known. It stands in Rome, on the site of Nero's palace. It was begun by Vespasian in 72 A.D., and finished by Domitian in 82 A.D.; but a fourth story was added by Severus Alexander (d. 235 A.D.) and Gordianus (d. 238 A.D.). It was capable of seating 50,000 spectators, and afforded room for 20,000 to stand. Externally the building has four stories, the three lower with arcades; the first is of Etruscan architecture, the second Ionic, the third and fourth are Corinthian. Its height is 157 ft. The seats were of marble; the exterior of the building and the chief corridors of travertine stone; the inner walls of tufa and concrete, with which all corridors, staircases, and substructures were vaulted. Underneath the arena were dens for wild animals, and appliances for raising them into the arena. The Colosseum was chiefly destroyed in the 15th century, when it was used simply as a quarry for marble and other building material, until Pope Benedict XIV. (1740–58) intervened and saved it from complete destruction. See J. H. Middleton's *Remains of Ancient Rome* (1892); R. A. Lanciani's *Ruins and Excavations of Ancient Rome* (1897); and W. J. Anderson and R. P. Spiers's *Architecture of Greece and Rome* (1902).

Colossians, The Epistle to the, was probably written by Paul during his imprisonment in Rome (*c.* 63 A.D.). The author, while able to congratulate the Christians of Colossæ on their faith and love (1:7 *f.*), feels it necessary to warn them against certain false doctrinal and practical tendencies which seem to have been at work in their midst—*viz.* unchastened speculation, the worship of angels, and asceticism. These errors he (2:9,14, 19) endeavors to combat. The latter portion of the epistle is occupied with exhortations and personal greetings. The authenticity of Colossians has frequently been denied, but the tendency now is to return to the traditional view regarding its authorship. For the connection between Colossians and Ephesians, see Ephesians. There are commentaries and introductions by Lightfoot (1886), T. K. Abbot (Int. Crit. Com. 1897), H. C. G. Moule (1900), Maclaren (Expositor's Bible, 1893).

Colossus, a word used by the ancient Greeks, and after them the Romans, to designate statues of more than life size, but particularly those of gigantic proportions. The name is applied in a special sense to the famous Colossus of Rhodes, representing the god Apollo, the work of Chares of Lindus, which was about 100 ft. in height. It took twelve years to erect (292 to 280 B.C.), and cost 300 talents. This money was obtained by the sale of the engines of war left by Demetrius Poliorcetes after his unsuccessful siege of Rhodes. The statue stood at the entrance of the harbor, but not with one leg on either side, as is often said. An earthquake cast it to the ground in 224 B.C., and it remained lying so until, in 672 A.D., Moawyia, general of the Caliph Othman IV., sold it to a Jew of Edessa, who removed its material on 900 camels.

Colotomy, the operation of opening into the colon, or lower portion of the intestine, usually for stricture.

Colpachi Bark. The botanical source of this bark is probably *Croton Pseudochina* (Euphorbiaceæ), which inhabits S. America. Externally it consists of a loose, thin, grayish, papery, subserous layer, and when this is removed the bark shows transverse pits like the lines of a file. Its fracture is very short, and it tastes like cascarilla bark, for which it is sometimes used.

Colquhoun, Archibald Ross (1848), British traveller and writer, born off the Cape of Good Hope. He explored from Canton to Bhamo in connection with a railway between Burma and China (1881–2), visiting China again in 1896, and in 1898–9, when he travelled from north to south, also in Mongolia and Siberia. He was administrator of Mashonaland (1890–1), and examined the Nicaragua and Panama Canal routes in 1895. He has published, among other works, across *Chrysê* (2 vols. 1883), *English Policy in the Far East* (1885), *Report on Railway Communication between India and China* (1885; joint author), *China in Transformation* (1898), *Overland to China* (1900), *Renascence of S. Africa* (1900), *The Key of the Pacific* (1895), *Russia against India* (1900). died 1914.

Colquhoun, John (1805–85), Scottish writer on sport, born in Edinburgh. A keen sportsman, he published *The Moor and the Loch* (1840; 7th ed. 1893), *Salmon Casts and Stray Shots* (1858), and *Sporting Days* (1866). He died at Edinburgh. See Sir W. Fraser's *Chiefs of Colquhoun* (1869).

Colquhoun, Patrick (1745–1820), provost of Glasgow, born at Dumbarton. He came to the U. S. in 1761, and lived for several years as a successful merchant in Virginia. Returning to Glasgow, he became the founder of the Glasgow Chamber of Commerce. He wrote many pamphlets, and published *Treatise on the Police of the Metropolis* (1795; 7th ed. 1806), and *Population, Wealth, Power, and Resources of the British Empire* (1814).

Colquitt, Alfred Holt (1824–94), American soldier and senator, was born in Walton co., Ga., and graduated (1844) at Princeton. He was admitted to the bar of Georgia in 1845, and began practice at Macon. He served in the Mexican War, was a member of Congress from Georgia, 1853–5, and in 1860 was a delegate to the Georgia Secession Convention. In the Confederate army he rose from captain to major-general, and took part in all the campaigns in Virginia. He was governor of Georgia, 1877–83, and U. S. senator from that state from 1883 until his death.

Colt, Samuel (1814–62), American inventor, was born in Hartford, Conn. He perfected an early model of the revolver associated with his name, made out of wood while he was a boy at sea. He took out his first patent in 1835, and the same year formed a company at Paterson, N. J., for the manufacture of his revolvers. They were used with success in the Florida War (1837), but, the demand falling off, the company was obliged to suspend. The Mexican War created a new demand, and Mr. Colt established temporary quarters near New Haven, Conn. Other markets for the revolvers were opened, they were regularly adopted for use in the U. S. army, and in 1852 Col. Colt acquired 250 acres of land near Hartford, Conn., where he built the well-known plant for manufacturing fire-arms, ammunition, and machinery. He laid the first successful submarine cable, in New York harbor, 1843, the core being protected by lead pipes, gutta percha not then having been discovered. See Revolver.

Colton, Walter (1797–1851), American author, was born in Rutland, Vt., and graduated (1822) at Yale. He studied and taught theology at Andover, and was professor of moral philosophy and belles-lettres at Middletown Academy, Conn. In 1831 he was appointed a chaplain in the navy, and in 1846 he was made alcalde of Monterey, Cal., where he established the *Californian*, the first newspaper published in California. He communicated the first announcement of the discovery of gold to the Philadelphia *North American.* Mr. Colton returned to the East in 1849, and resided at Philadelphia. Some of his books of travel are *Ship and Shore in Madeira, Lisbon, and the Mediterranean* (1835), *Three Years in California* (1850), and the posthumous *Literary Remains* (1851), edited, with a memoir, by Henry T. Cheever.

Columba, a small constellation formed, about the end of the 16th century, from some outlying stars of Canis Major. It was regarded as the messenger dove from Noah's ark, figured by the adjacent Argo Navis. The 'antiapex' of the sun's way lies in Columba.

Columba, St., also known as St. Colm and St. Columcille (521–597), Irish missionary, is stated to have been born at Gartan in Donegal, of Irish blood royal. Educated for the church, he founded many monasteries, including Derry (546) and Durrow (*c.* 550). Accused of causing the sanguinary battle of Culdrevny (561) between his kindred, the Dalriad Scots, and Diarmid, king of eastern Ireland and excommunicated by an Irish ecclesiastical synod, he became (563) an exile, and, with twelve followers, found his way to Hy, or Iona, off the west coast of Argyllshire, Scotland. There he founded a monastery, and began his life mission as 'the Apostle of the Highlands.' For one hundred and fifty years his church on Iona was the national church of Scotland. While connected with the church of Ireland, in various points of doctrine and ceremonial it was opposed to Rome, to which it owed no allegiance. It was a missionary church, and its organization was essentially monastic.

Columba was a great preacher, and was credited with miraculous powers. His ministrations were extended to all the Pictish dominions, and to the northern and western islands of Scotland, and everywhere he established monasteries. Tradition states that he died kneeling before the altar of his church in Iona, and that he was buried within the monastery; but in after years part of his relics was removed to Kells in Meath, and part to Dunkeld. The main authority for his life is St. Adamnan, who was abbot of Iona (679–704). Consult Smith, *Life of St. Columba;* Cooke, *St. Columba;* Metcalf, *Ancient Lives of Scottish Saints.*

Colum'ban, or COLUMBANUS (543–615), Irish missionary monk, sometimes called the Younger Columba, was born in Leinster. Having studied under St. Comgall, in the monastery of Bangor, on the coast of Down, he went, in his fortieth year, to France, accompanied by twelve companions and there founded successively the monasteries of Anegray, Luxeuil, and Fontaine, in the Vosges. His adherence to the Irish rule for calculating Easter involved him in controversy with the French bishops in 602; and the courage with which he rebuked the vices of the Burgundian court led to his expulsion, at the instigation of Brunhilda, the king's grandmother. After various travels he passed into Lombardy, and in 612 founded the famous monastery of Bobbio. His *Life* (Eng. trans. by D. C. Munro) was written within a century after his death by Jonas, one of his successors in the abbacy of Bobbio. Consult Montalembert, *Monks of the West.*

Col'umba'rium (Latin), Latin term for a dove cote or pigeon house, applied figuratively to the niches or pigeon holes in a particular kind of Roman sepulchral chamber in which the urns (*ollæ*) containing the ashes of dead bodies burned were deposited. The names of the persons were inscribed underneath.

Colum'bia (from Christopher Columbus), a poetic name for the United States.

Columbia, city, Mississippi, county seat of Marion county, on the Pearl River, and the Gulf and Ship Island, the Fernwood, Columbia and Gulf, and the New Orleans Great Northern Railroads; 80 miles S.E. of Jackson. It is in the midst of a lumber district. Pop. (1930) 4,833; (1940) 6,064.

Columbia, city, Missouri, county seat of Boone county, on the Wabash and the Missouri, and the Kansas and Texas Railroads; 120 miles N.W. of St. Louis. It is the seat of the University of Missouri (q. v.), the State Agricultural College, Christian College (Christian) and Stephens College (Baptist), both for women, a U. S. Government weather station, the Parker Memorial Hospital, the Boone County Hospital and the State Cancer Hospital. Elevators, lumber, flour, packing products, skis, archery equipment, dresses and airplane propellers are manufactured. Pop. (1930) 14,967; (1940) 18,399.

Columbia, borough, Pennsylvania, Lancaster county, on the Susquehanna River, and on the Philadelphia and Reading, and the Philadelphia Railroads; 27 miles S.E. of Harrisburg. The Lincoln Highway passes through the city, and a railroad bridge across the river, a mile wide at this point, connects with Wrightsville. Manufacturing establishments include rolling mills and manufactures of engines and boilers, laundry machinery, stoves, carriages, hardware novelties, wagons, automobile bodies, umbrellas, cut glass, clothing, silk and lace, brushes, and flour. The town was settled by English Quakers in 1788 and was incorporated in 1814. Pop. (1930) 11,349; (1940) 11,547.

Columbia, city, South Carolina, capital of the State and county seat of Richland county, on the Congaree River, just below the junction of the Broad and Saluda Rivers, and on the Atlantic Coast Line, the Southern, the Seaboard Air Line, and the Columbia, Newberry and Laurens Railroads; 120 miles N.W. of Charleston. It is situated on the high bank of the river, at the head of steam navigation. The principal buildings are the State House, City Hall, Court House, State Hospital (for insane), State Penitentiary, and Federal Building. Noteworthy also are the county hospital, public library, and the Baptist church in which the ordinance of secession was passed. The city is the seat of the University of South Carolina (1805), Columbia Bible College, Columbia College, Southern Lutheran Theological Seminary, and Benedict College and Allen University for colored students.

Industrial establishments include cotton mills, fertilizer plants, sash and door factories, quarries, brick works, lumber mills, iron works, foundries and machine shops. Sand, gravel, calcium, marl, porous phosphate, limestone, granite, shale and clay are found in the Columbia area. The city was settled about 1700, and became the State capital in 1786. At the time of its occupation by General Sherman's army (Feb. 17, 1865), it suffered severely from fire. The commission form of government was adopted in 1910. Pop. (1930) 51,581; (1940) 62,396.

Columbia, city, Tennessee, county seat of Maury county, on the Duck River, and on the Louisville and Nashville, and the Nashville, Chattanooga and St. Louis Railroads; 50 miles S.W. of Nashville. It is the seat of a U. S. arsenal, a military academy, and the Columbia Institute for Young Ladies. The town is a shipping point for grain, livestock, and phosphate, and has cotton, corn, flour, and lumber mills, machine shops, marble works, and a pump factory. It was settled in 1811 and first incorporated in 1822. Pop. (1930) 7,882; (1940) 10,579.

Columbia, British. See BRITISH COLUMBIA.

Columbia City, city, Indiana, county seat of Whitley county, on the Pennsylvania Railroad; 100 miles N.E. of Indianapolis. It has manufactures of furniture, a woolen mill and lumber and live-stock interests. Pop. (1930) 3,805; (1940) 4,219.

Columbiad, a heavy gun invented by Colonel Bomford, which combined the features of howitzer, mortar, and gun. It first appeared early in the nineteenth century, and was used until after the Civil War.

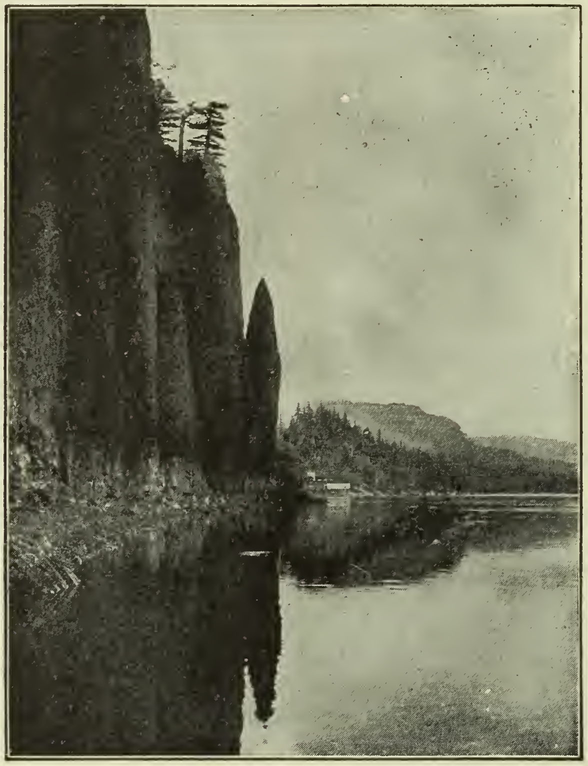
Columbia, District of. See WASHINGTON.

Columbian Exposition. See WORLD'S COLUMBIAN EXPOSITION.

Columbian University, former name of GEORGE WASHINGTON UNIVERSITY (q. v.).

Columbia River, or OREGON RIVER, one of the largest and most important rivers of North America, rises in the Kootenay district of British Columbia, on the western slope of the Rocky Mountains, in about 50° N. lat.

It has a very irregular course, generally southwest, through British Columbia and the State of Washington; forms the northern boundary of Oregon for about 350 miles; and enters the Pacific Ocean by an estuary 35 miles long and from 3 to 8 wide. On the left bank it receives the Clark Fork River (Pend Oreille), which rises in the Rocky Mountains of Montana, and joins it near the northern boundary line of Washington. Farther down it is joined by the Spokane and Okanagon Rivers, and near the southern boundary line by the Snake. Tributaries from the south are the John Day, Des Chutes, and Willamette Rivers. East of the Cascade Range the region drained by the Columbia is arid or semiarid. West of that range the rainfall is ample, and the country densely forested and well inhabited. The length of the Columbia is 1,400 miles; of Clark Fork (with the Missoula), 700 miles; of Snake River, 940 miles. The total drainage area is estimated at 300,000 square miles.



Cape Horn, on the Columbia River

The course of the Columbia is broken by falls and rapids at many points, notably at Spokane Rapids, Rock Island and Priest Rapids, and Celilo Falls and the Dalles. Owing to the vast amount of silt deposited as an effective bar at the mouth of the river, constant labor is entailed in clearing and deepening the channel, but the construction of a great jetty 2½ miles long has provided a good harbor. Sea-going ships steam 100 miles up from its mouth, and 10 miles up its great tributary, the Willamette, to Portland. It is open to steamboat navigation to the Cascades (160 miles), and goods are carried past the obstruction for 6 miles by channel; the next reach, of 50 miles, extends to Dalles, where another channel of 14 miles has been constructed past the Great Dalles channel, and the Dalles-Celilo canal (q. v.), 8½ miles long, allows the passage of light-draught vessels as far as Priest Rapids; immediately above this are two sections, of 185 and 250 miles respectively, navigable for steamboats. The flood discharge at the Dalles is estimated at 1,000,000 second-feet. To harness the power of the Columbia waterfalls, the Federal government undertook the building of Grand Coulee dam (q. v.) in Washington, and of Bonneville dam (q. v.) in Oregon. Its mouth is the only deep-water harbor between Cape Flattery and San Francisco (700 miles).

The river is rich in fish, notably salmon, which annually ascend the river and its tributaries in vast schools, bass, sturgeon, smelt, and trout. The greatest belt of timber in the United States clothes the country from the eastern base of the Cascade Mountains through Oregon and Washington to the Pacific Ocean. Fir of several kinds, spruce, and cedar grow west of the summit, while pine is the principal species to the east.

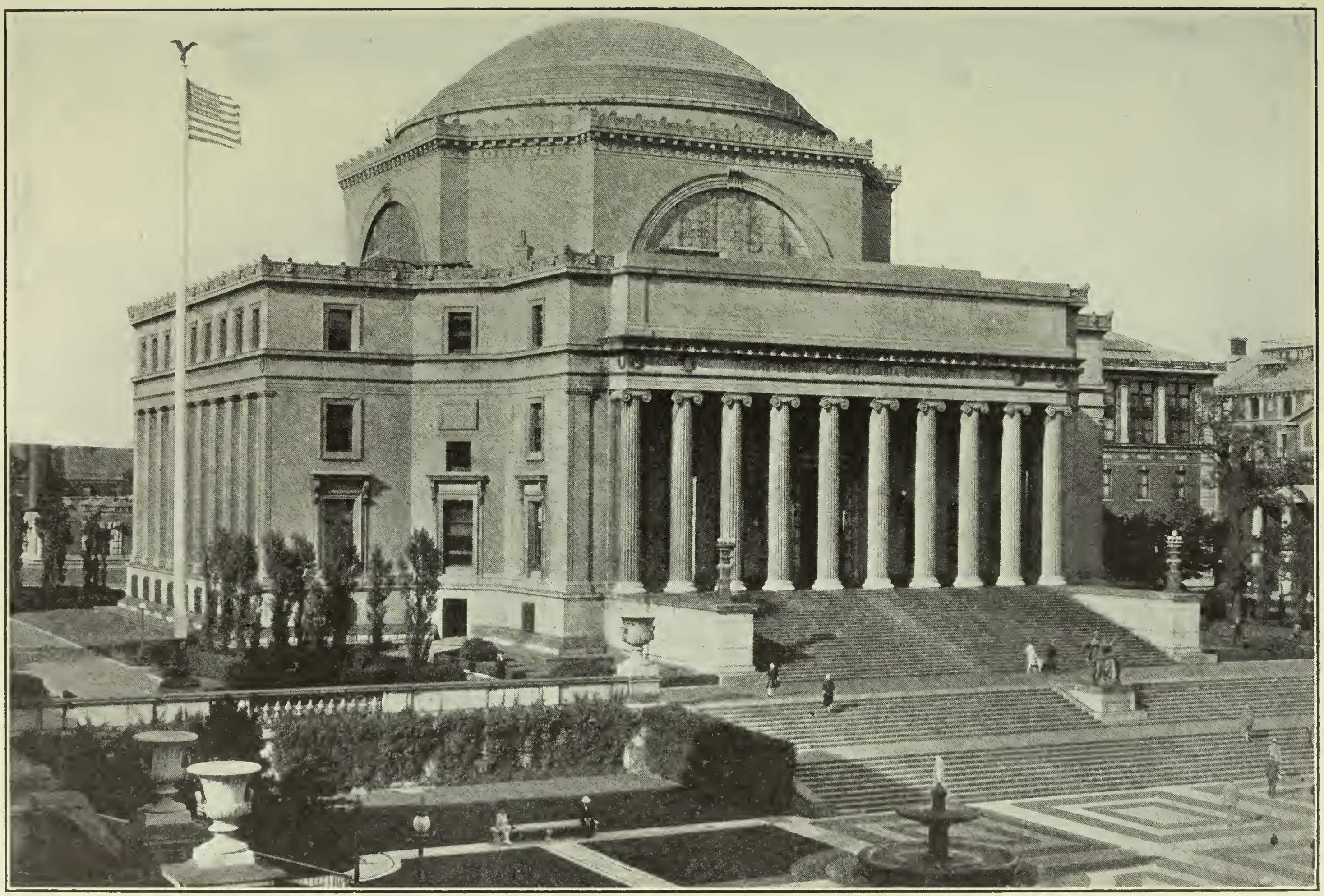
The longest settled and most densely populated part of the Columbia watershed is the Willamette Valley. Many thriving progressive cities and towns have grown up here, chief among them being Portland and Vancouver.

Consult W. D. Lyman's *The Columbia River: Its History, Myths, Scenery, and Commerce.*

Columbia River Highway, a paved boulevard, 42 miles long, leading from Portland, Oregon, east to Hood River, traversing the picturesque Columbia River valley. With connecting roads east and west, it forms a highway over 200 miles long. It was formally dedicated to the public in June 1917.

Columbia University, an institution of higher learning in New York City, and one of the leading universities of the United States. It was established by royal letters patent in 1754 as King's College, and in 1755 the new college was given a parcel of land at the present Murray Street and West Broadway by the trustees of Trinity Church. The College was closed during the American Revolution (1776–84), and was then reopened as Columbia College, the control being vested in the newly created Regents of the University of the State of New York. In 1787 a statute was passed, confirming the charter of 1754 for Columbia College in the City of New York. This remained the legal corporate title until 1912, when by order of the State supreme court it was changed to Columbia University in the City of New York.

The first college building, at what is now Park Place and Church Street, was completed in 1760; and in 1767 the Medical Department was founded. In 1857 the College was removed to Madison Avenue and Forty-Seventh Street; in 1858 the Law School was established; and in 1864 the School of Mines was opened. At the end of forty years (1897) the College was again removed to its present site on Morningside Heights, where the first five of a group of buildings had been erected. In 1900, Barnard College (q. v.) for women and Teachers College (q. v.), and



LOW MEMORIAL LIBRARY, COLUMBIA UNIVERSITY in 1904 the New York College of Pharmacy, became part of the University's educational system. The Faculty of Fine Arts, with schools of Architecture, Music and Design, was established in 1906, and in 1912 the School of Journalism, endowed by Joseph Pulitzer, was opened. In 1914 the School of Architecture was made a separate School. Seth Low Junior College, located in Brooklyn, was established in 1928 and that same year St. Stephen's College in Annandale-on-Hudson became affiliated with Columbia University.

© *Ewing Galloway, N. Y.*

Earl Hall, Columbia University

The educational work of the University is divided among the following faculties and schools: Columbia College, Barnard College and Bard College (formerly St. Stephen's College), undergraduate colleges, with courses leading to the degrees of B.A. and B.S. The Graduate and Professional Schools comprise the School of Law, with courses leading to the degree of LL.B., LL.M. or JUR.SC.D.; College of Physicians and Surgeons, with courses leading to the degree of M.D., MED.SC.D., D.P.H., and M.S. in public health; courses in nursing leading to the degree of B.S. or to the diploma in nursing; New York Post-Graduate Medical School with courses for the general practitioner and for the specialist; School of Engineering, with courses leading to the degrees of B.S., M.S., M.E., E.M., MET.E., C.E., E.E., MECH.E., and CH.E.; Teachers College (q. v.), with courses leading to degrees of B.S., A.M. and M.S., and professional diplomas; Advanced School of Education granting the degrees of ED.D. and PH.D.; School of Architecture, with courses leading to the degree of B.ARCH. and M.S.; College of Pharmacy, with courses leading to the degrees of B.S. and M.S.; the School of Journalism, with courses in letters, science, and practical journalism leading to the degree of M.S.; Graduate Faculties of Political Science, School of Philosophy, School of Pure Science, with advanced courses leading to the degrees of A.M. and PH.D.; School of Business, with courses leading to the degrees of B.S. or M.S.; School of Library Service, with courses leading to the degrees of B.S. or M.S.; School of Dental and Oral Surgery, with courses leading to the degree of D.D.S., and courses in Dental Hygiene with courses leading to a certificate; courses in Optometry with courses leading to the degree of B.S. and the New York School of Social Work with courses leading to the degree of M.S.

Those who cannot attend as students in the above schools of the University are offered opportunities in the Summer Session and in University Extension.

The buildings of Columbia University occupy an attractive site of 78 acres on Morningside Heights, and are grouped around Low Memorial Library (more than 1,884,000 bound volumes), one of the most beautiful buildings in America. They include: St. Paul's Chapel, South Hall (the University Library), Hamilton Hall (Columbia College), Fayerweather Hall (political science), Havemeyer Hall (chemistry), Schermerhorn Hall (natural sciences), Kent Hall (law), School of Engineering, School of Mines, School of Journalism, School of Business, Philosophy Hall, Avery Hall (Avery Library and School of Architecture), Pupin Physics Laboratories, University Hall (gymnasium), Earl Hall (religious life) and the Residence Halls. The College of Physicians and Surgeons and the School of Dental and Oral Surgery are located at the Medical Center, Broadway and 168th Street. In 1932 a register was published giving the names of more than 100,000 students who had attended degree-awarding schools, starting with the first class which entered King's College in 1754 and concluding with graduates who received degrees in February 1932. The number of names on the faculty roll in 1941, including Barnard College, Teachers College, College of Pharmacy, Bard College, New York Post-Graduate Medical School, Summer Session and University Extension, was 3,289. The students numbered 30,197.

University publications include *The Political Science Quarterly, Columbia Law Review,* and various student periodicals, such as *The Spectator* (daily), *The Jester, Morningside,* and *Varsity.*

The presidents of the University have been: Samuel Johnson (1754); Myles Cooper (1763); William Samuel Johnson (1787); Charles H. Wharton (1801); Benjamin Moore (1801); William Harris (1811); William A. Duer (1830); Nathaniel F.

Moore (1842); Charles King (1849); Frederick A. P. Barnard (1864); Seth Low (1890); Nicholas Murray Butler (1902–).

Consult *History of Columbia University, 1754–1905* (Columbia University Press, 1904); Slosson, *Great American Universities; Official Guide to Columbia University;* Keppel, *Columbia.*

Col'umbine, one of the characters in pantomime, the daughter of Pantaloon and the sweetheart of Harlequin. See PANTOMIME.

Columbine (*Aquilegia*), a genus of Ranunculaceæ, with five colored sepals, which soon fall off, and five petals each terminating below in a horn-shaped nectary. The name (from Latin *columba,* 'a dove') is derived from the resemblance of the flower to a cluster of doves. The garden columbines of our ancestors were all varieties of the European blue or white species, *Aquilegia vulgaris.* Columbines thrive in any well-drained soil, provided it is not too heavy, and may be raised from seed, which, however, often takes a long time to germinate. Among the best of the cultivated species are the curiously colored red and orange *A. Skinneri;* the tall golden *A. chrysantha;* the Rocky Mountain Columbine, *A. cœrulea,* with its quaint green 'horns of honey'; the common native, rock-loving columbine, *A. canadensis,* with red and yellow petals and sepals; the dwarf blue *A. pyrenaica;* and the hybrid *A. Stuarti,* with large lilac and creamy flowers.

Columbine (*Aquilegia vulgaris*).

Col'umbite, a mineral containing iron and manganese, closely allied chemically to the mineral tantalite (see TANTALUM). Columbite is iron black, grayish, or brownish in color, with a bluish iridescence. It is found in many of the Eastern States of the United States, in the Black Hills of South Dakota, and in California and Colorado; also in Germany, Italy, and the Ural district. Its only economic value is for the preparation of salts of niobium and tantalum.

Columbium. See NIOBIUM.

Columbus, city, GEORGIA, county seat of Muscogee county, on the Chattahoochee River, and on the Central of Georgia, the Seaboard Air Line, and the Southern Railroads; 115 miles S.W. of Atlanta by highway and 126 miles by rail. Steamboats ascend the Chattahoochee to this point, where the river has a fall of 365 feet in 36 miles, developing about 70,000 horse power. The city is the second largest cotton manufacturing city in the south. Cottonseed oil, sugar, foundry and machine shop products,' agricultural implements, caskets, store fixtures, fertilizers, narrow fabrics, and ice are also manufactured. Columbus has a fine public school system and an industrial school and conservatory of music. Nine miles from the city, on a 155,000 acre tract, is Fort Benning, greatest U. S. Infantry School, also a flying field, and parachute Unit Training School. Most of the Army officers are trained here. Columbus was laid out in 1827. In the Civil War it was a supply depot, and was captured by Federals in the last battle, April 16, 1865. Pop. (1930) 43,131; (1940) 53,280.

Columbus, city, Indiana, county seat of Bartholomew county, on the East Fork of the White River, and the Cleveland, Cincinnati, Chicago, and St. Louis, and the Pennsylvania Railroads; 40 miles S.E. of Indianapolis. The manufactures include high grade mahogany furniture, agricultural implements, wood-split pulleys, flour, leather, gasoline engines, tools, iron, bronze and brass castings, hardware specialties, ornamental iron work, street and park lighting posts, structural steel work, men's work shirts, and heating and light plants. The town was settled in 1821. Pop. (1930) 9,935; (1940) 11,738.

Columbus, city, Kansas, county seat of Cherokee county, on the St. Louis and San Francisco, Missouri - Kansas - Oklahoma and Northeast Oklahoma Railroads. Columbus has the largest Community High School in Kansas. Coal, lead, zinc ore and other minerals are mined in its trade territory. The $21,000,000 Jayhawk Ordnance Works, manufacturers of ammonium nitrate, is located eleven miles S.E. of the city. It is situated in an ideal dairy and diversified farming territory. Pop. (1930) 3,235; (1940) 3,402.

Columbus, city, Mississippi, county seat of Lowndes county, on the Tombigbee River, and on the Gulf, Mobile and Ohio, the Southern, Columbus and Greenville, and the Frisco Railroads; 135 miles N.E. of Jackson. The city is the seat of the Mississippi State College for Women and the U. S. Advanced Twin-Engine Flying School, and has three hospitals. It has a garment plant, cotton and lumber mills, foundries and machine shops. There are several large gravel pits with trade in cotton, hay and cattle. Pop. (1930) 10,743; (1940) 13,457.

Columbus, city, Nebraska, county seat of Platte county, on the Union Pacific and the Chicago-Burlington and Quincy Railroads; 90 miles by rail N.W. of Omaha. Here is the important Loup River Public Power District which generates electricity for consumers throughout the State. It manufactures wooden sole shoes. Pop. (1930) 6,898; (1940) 7,632.

Columbus, city, Ohio, capital of the State and county seat of Franklin county, is situated on the Scioto River, whose confluence with the Olentangy is near the center of the city; on the Baltimore and Ohio, the New York Central, the Chesapeake and Ohio, the Norfolk and Western, and the Pennsylvania Railroads; 120 miles N.E. of Cincinnati, and 135 miles S.W. of Cleveland. The city is served by two transcontinental air lines, and the largest of its three airports is municipally owned and operated. The city is built on rolling ground, at a height of about 750 feet, and covers a total area of 40 square miles. The average annual temperature is 52.4° F.; the average annual rainfall is 40 inches.

The streets of the city are regularly laid out, and center around Capitol Square, a park of ten acres surrounding the Capitol Building. From this square diverge High Street, the main business thoroughfare, running north and south, and Broad Street, both a business and residential avenue, running east and west. East and west through the city runs the old National Road (q. v.) from Cumberland.

The U. S. Military Post (Fort Hayes) is the center of a park open to the public; the Ohio State Fair Grounds, covering

Courtesy Columbus Chamber of Commerce

THE CIVIC CENTER, COLUMBUS, OHIO

Courtesy Columbus Chamber of Commerce

ANOTHER VIEW OF THE CIVIC CENTER AT COLUMBUS, OHIO

100 acres, are located to the north of the city. At the main entrance to the Capitol grounds stands the McKinley Memorial, and near the west corner of the Capitol building is a group of statues of Grant, Sherman, Sheridan, Chase, Stanton, Garfield, and Hayes, called 'Ohio's Jewels.' There is a model water works system, including two storage dams and a purification and softening plant. There are over 500 miles of sewers and about 430 miles of paved streets.

Important public buildings, besides the State Capitol, are the new City Hall (old one destroyed by fire, Jan. 1921), State Office Building and the Federal Building. Educational institutions include the Ohio State University (q. v.); Capital University (Evangelical Lutheran); Columbus Academy (for boys); Columbus Art School; and St. Joseph's and St. Mary's Academies and the Pontifical College Josephinum (Roman Catholic). There are several fine libraries, notably the Ohio State University Library, Columbus Public Library, Ohio State Library, Public School Library, Columbus Law Library, and Supreme Court Law Library, housing about 1,500,000 volumes. Other cultural institutions include a gallery of fine arts, an archæological and historical museum and a municipal zoo. Among charitable and penal institutions are the Columbus State Hospital for the Insane, State Penitentiary, State schools for the blind, deaf, and feebleminded, and county and municipal hospitals, asylums, day nurseries, and a children's home, infirmary, and tuberculosis hospital.

Industry and Commerce.—Situated near the large coal and natural gas resources of Hocking Valley, and in the midst of a rich stock-raising and agricultural district, Columbus has important commerce and manufactures. The leading industries are iron and steel products (especially mining machinery and steel railroad cars), agricultural implements, airplanes, shoes, flour, caskets, glass and teeth. There is a large trade in coal from mines in the neighborhood.

Government.—Columbus has a modified federal type of government, with a mayor and a council of seven members elected for four-year terms. The council's legislative power is subject to initiative and referendum; the mayor, auditor, and city attorney are elected at large on a non-partisan ballot; and all elected officials are subject to recall.

Population.—The population of Columbus is (1940) 306,087. The city has had a steady growth as shown by the census figures: in 1830, 2,435; in 1850, 17,882; in 1870, 31,274; in 1890, 88,150; in 1900, 125,560; in 1910, 181,511; (1920) 237,031; (1930) 290,465.

History.—The first white settlement in the vicinity was made in 1797 by Lucas Sullivant and others at Franklinton, on the west side of the Scioto River. In 1812 the present site was chosen for the capital of Ohio, and given the name of Columbus. In 1816 Columbus was made a borough; in 1834 it received a city charter; and in 1870 Franklinton was annexed. The city was visited by pestilence in 1823–4, by cholera in 1832 and 1849, and by a severe flood in 1913 (see UNITED STATES, *History*).

Columbus, city, Columbia county, Wisconsin, on the Crawfish River, and the Chicago, Milwaukee, and St. Paul Railroad; 63 miles N.W. of Milwaukee. It is situated in an agricultural district, and has a large pea cannery, flour mills and large dry milk plant. Pop. (1930) 2,514; (1940) 2,760.

Columbus, a glacier, crossing the international boundary (between Alaska and Yukon) near lat. 60° 24′ N., extends westward and touches the northern slope of Mount St. Elias, which has an altitude of 18,008 feet.

Columbus, BARTOLOMEO (?1445–1515), brother of Christopher Columbus, was born in Genoa. He possibly accompanied Bartolomeo Diaz on his voyage to the Cape of Good Hope (1486–7), and in 1489 he was sent by his brother to seek help from Henry VII of England and from Charles VIII of France, but failed in his purpose. Later he commanded the auxiliary fleet despatched after Columbus sailed on his second voyage. As his brother's vicegerent he governed Hispaniola (1496–1502) with vigor and success, and founded Santo Domingo.

Columbus, CHRISTOPHER (1446–1506), in Italian CRISTOFORO COLOMBO, and in Spanish CRISTOBAL COLON, the discoverer of the New World called America, was born in the neighborhood of Genoa, and went to sea at the age of fourteen. The Mediterranean was the chief scene of his early activity; and the turning point of his life came in 1470, when he was wrecked during a sea fight with some Venetian galleys off the coast of Portugal. He settled at Lisbon, and during the next few years made many voyages to Madeira and the Azores, and in 1477 one to the Northern seas. Gradually there grew up in his mind the conviction that it was possible to reach India by sailing westward. This idea seems to have taken shape as early as 1474. After making a vain appeal to the senate of his native State, Genoa, he turned to the king of Portugal, but without result; then to Henry VII of England, and to the dukes of Medina Sidonia and Medina Celi, who advised him to appeal to Isabella of Castile. But it was not till after seven years of heartbreaking delays that Columbus' proposals were accepted by the Spanish rulers (April 17, 1492).

On Aug. 3 Columbus set sail

Columbus' Ship, the 'Santa Maria.'

(Photo from the model at Chicago Exhibition, 1893.)

STATUE OF COLUMBUS AT GENOA, HIS BIRTHPLACE

Vol. III.—Page 256

from Huelva, with one small ship, the *Santa Maria,* and two caravels, the *Pinta,* in command of Martin Alonzo Pinzon (q. v.), and the *Niña,* the whole expedition including only 120 men. The little fleet first made the Canary Islands, whence it sailed westward on September 6 on the real voyage of discovery. Columbus' companions, however, were not inspired by his hope, and throughout the voyage symptoms of mutiny were frequent. A variation of the magnetic needle reduced the men almost to a state of terror, and only by pleading and cajoling was their leader able to induce them to continue their way westward. Land was sighted on October 12, and the expedition disembarked, taking possession, in the name of their Catholic Majesties of Castile and Leon, of a small island in the Bahamas, called by the natives Guanahani but named by Columbus San Salvador—probably what is now known as Watling Island. Cuba was discovered on October 28, and the Island of Haiti, to which Columbus gave the name Hispaniola, a little more than a month later. On Jan. 4, 1493, the *Santa Maria* having been wrecked, the party embarked on the two caravels and set sail for Europe, and after a stormy voyage during which the two vessels were separated, Columbus cast anchor at Palos, March 15, 1493.

Upon his arrival at the Spanish court, Columbus was received with great honors, and a second expedition of seventeen vessels and 1,500 men was immediately fitted out and placed at his command. This sailed on September 24, 1493, and reached the island of Dominica in the West Indies on November 3rd. After two years spent in exploration of the newly-discovered islands, including the island of Jamaica, discovered May 14, 1494, and an attempt at colonization, Columbus returned to Spain, reaching Cadiz in June 1496. A new fleet of six vessels was fitted out, and on May 30, 1498, the explorer set forth upon his third voyage, which resulted in the discovery of Trinidad, and of the mainland of South America (Aug. 1, 1498), and from which he returned (1500) in irons by the authority of Bobadilla, newly-appointed royal governor of Hispaniola. He was, however, speedily restored to favor, by the king and queen, and having been granted a fourth fleet with which to pursue his explorations, he embarked in 1502 on his last voyage (1502–4), during which he explored the south shore of the Gulf of Mexico.

Broken in health, Columbus returned to Spain in 1504, and two years later (May 20, 1506) he died at Valladolid. There he was buried, but his bones were later removed to Seville (1513), then to Santo Domingo, in Hispaniola (1536), to the Cathedral in Havana (1796), and again, after the Spanish-American war of 1898–9, to Seville.

A man of ardent impulses and strongly poetical imagination, Columbus was hardly of the stuff of which leaders are made; consequently he failed to control the turbulent and adventurous spirits among his followers. Although an honestly and earnestly religious and truly conscientious man, he was not seldom guilty of acts which subsequently brought him many compunctions of conscience. Irritable and impetuous, he was, nevertheless, magnanimous and benevolent. His conduct in the capture and sale of slaves, though justified by the jurists and divines of the time, was indignantly condemned by the queen, and can be explained only by the desire of Columbus and the crown to obtain some revenue from his new discoveries, and by the expectation that while detained in slavery the natives might become christianized.

Columbus' eldest son, Diego (about 1480–1526), was the heir to his honors, merits, and misfortunes. The great discoverer left also a natural son, Don Fernando (1488–1539), who wrote an important life of his father, preserved only in an Italian translation.

It is doubtful if any of the portraits of Columbus are authentic. Las Casas says: 'He had a figure that was above medium height, a countenance long and imposing, an aquiline nose, clear blue eyes, a light complexion tinged with red, beard and hair blonde in youth, but early turned to white.'

Bibliography.—The great critical study of Columbus' life and family is by Harrisse (Eng. trans. by Winsor). Consult also the *Life* of his son Fernando, biographies by Washington Irving, Sir A. Phelps, Markham, and Adams; J. Winsor's *Narrative and Critical History of America* (vol. ii); the English translation of his *Letters* by Major W. C. Ford, and of his *Journal* by Markham; Vignaud's *Toscanelli and Columbus;* and the Pulitzer Prize winner of 1942, Morison's *Admiral of the Ocean Sea.*

Columbus Day, October 12, a day set apart by most of the states of the United States to commemorate the discovery of America by Columbus (q. v.) on Oct. 12, 1492. It was first observed in Colorado and in 1918 had been adopted by Alabama, Arizona, Arkansas, California, Connecticut, Colorado, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

Columbus, Knights of, a fraternal Roman Catholic beneficiary organization established in February, 1882, in New Haven, Conn., and incorporated under the Connecticut laws, March 29 of the same year. The society is secret but has no oath, and is degree-conferring, having four degrees of ceremonial, representing charity, unity, fraternity, and patriotism. Membership is limited to Roman Catholic men. Insurance members are received between the ages of eighteen and fifty, and associate, or non-insured, members from twenty-one upwards. The system of insurance is based upon the Fraternal-American Table of Mortality and is recognized by Insurance Commissioners as being founded on a sound, safe, and scientific basis. (See FRATERNAL INSURANCE.)

In addition to its insurance features, the order is devoted to the promotion and protection of Catholic interests and the interests of Catholic men and women; and aims to propagate Catholic doctrine from the platform and by literature. It has endowed a Chair of American History at the Catholic University of America, and maintains fifty perpetual free scholarships at the same institution. The observance of Columbus Day (q. v.) is due largely to the concerted efforts of the members.

Branches of the Knights of Columbus exist in every state and territory of the continental United States, as well as in the Canadian provinces, Newfoundland, Cuba, the Canal Zone, Panama, the Philippine Islands, Mexico, and Puerto Rico. The official organ is the *Columbiad.* Headquarters are at New Haven, Conn.

War Work.—Upon the entrance of America into the First World War in 1917, the Knights of Columbus instituted an extensive war work, on lines similar to that of the Young Men's Christian Association (q. v.), a great war fund being raised by public subscription for that purpose. Special features were: the erection and equipment of recreational buildings and auditoriums at the various army camps and cantonments; the establishment of recreation centers at the Regular Army expansion camps, at training stations, and in the war zone; maintenance of volunteer priests, in addition to the Roman Catholic chaplains assigned by the Government, to work with the soldiers and sailors abroad; and the establishment and maintenance of an information bureau in France to keep the fighting men and their families in touch with each other. While the work is designed primarily for Roman Catholics, and Catholic services are held regularly, the recreational facilities are free to all, irrespective of creed or religious affiliation.

In January, 1918, the Supreme Council took action whereby any who were insurance members at the time the United States entered the war, and who entered the army or the navy, would be free from obligation to pay extra premiums on their policies.

Columella, kol-ū-mel′*a*, Lucius Junius Moderatus, Latin writer, was a native of Gades in Spain. He appears to have lived at Rome, and was contemporary with Seneca (1st century A.D.). He has left by far the fullest ancient treatise on agriculture, *De Re Rustica;* and also a supplementary treatise on trees, *De Arboribus.* His style is easy and copious to excess; but his work appears to be based on other authorities rather than founded on personal observation. Consult Barberet's *De Columellae Vita et Scriptis.*

Column, in architecture a cylindrical or polygonal post of wood or stone employed for the support of an entablature or other superstructure, and consisting usually of a base, which may, however, be lacking as in certain Egyptian columns, a shaft, and a capital. The column is presumably derived from the primitive use of the stems of trees in a similar position. It was first developed by the Egyptians, was employed to a limited extent in Assyria and Persia, and became a characteristic feature of Greek and Roman architecture.

The varieties of *Egyptian column* are numerous, the common type being one or another form of the plant world. Thus, in the earliest type of lotus column the shaft represents the bound reeds or lotus stalks, with the unopened bud of the flower forming the capital, while the base is a low plinth. A type more widely known, supposed to be the prototype of the Doric order, is found at the tomb of Beni-Hassan, in Middle Egypt, dating back to the twelfth dynasty, one thousand years anterior to the earliest Greek examples. It is circular in plan, channelled, and sturdy in proportion, with a slightly decorated capital.

Greek columns of the different orders, while they differ from one another in proportions, mouldings, and ornaments, yet retain essentially the main form throughout. The Doric style in its earliest and rudest form, of which the temple at Corinth is an example, resembles in its details more or less the fully-developed Parthenon column, slightly tapering, fluted, with narrow fillets and a simple unadorned capital. There is no base. The Ionic column rises from a base composed of mouldings. It is of more slender proportions, the capital is more richly decorated, the flutings in the shaft are more numerous, and the fillets broader. A refined example is that of the Erechtheum at Athens. The Corinthian column is slender and fluted. The capital springs from a bell-shaped ornament of great enrichment, conventionally treated, the decorations rising over the capital, the abacus curved and graceful. The monument to Lysicrates at Athens shows a beautiful example of this type of column.

Roman columns represent a further development of the Greek, the Roman Doric, Roman Ionic, and Roman Corinthian closely resembling their Greek prototypes. Classical and semi-classical columns continued to be used in the architecture of the early Middle Ages, but were later replaced by the clustered piers and shafts of the Romanesque and Gothic orders. They were revived and variously modified during the Renaissance, and form a conspicuous feature of modern architecture.

The ***Monumental*** or ***Memorial Column*** is essentially similar in form to the architectural column, consisting of base, shaft, and capital, but carrying no heavy superstructure. It is erected independently and may support a statue, bust, vase, or other emblematic object. Among the various types are the carolitic column, with foliated shaft; the cable or rudented, decorated in various ways, about one third of the flutings of the shaft being filled with cables or astragals; and spiral, rustic, and twisted forms.

Monumental columns were known in the east many hundreds of years before Christ, they are found also in archaic Greece, and are especially characteristic of the Roman period either in commemoration of a military or naval triumph or as a statue to some great civil or military leader. Famous monumental columns are the Antonine column of Rome, 136 feet; the Alexander at Petrograd, 121 feet; the Colonne Vendôme, Paris, 116 feet; the Duke of York's, London, 95 feet.

See Architecture, especially the section on *Classic Orders.* Consult Longfellow's *The Column and the Arch.*

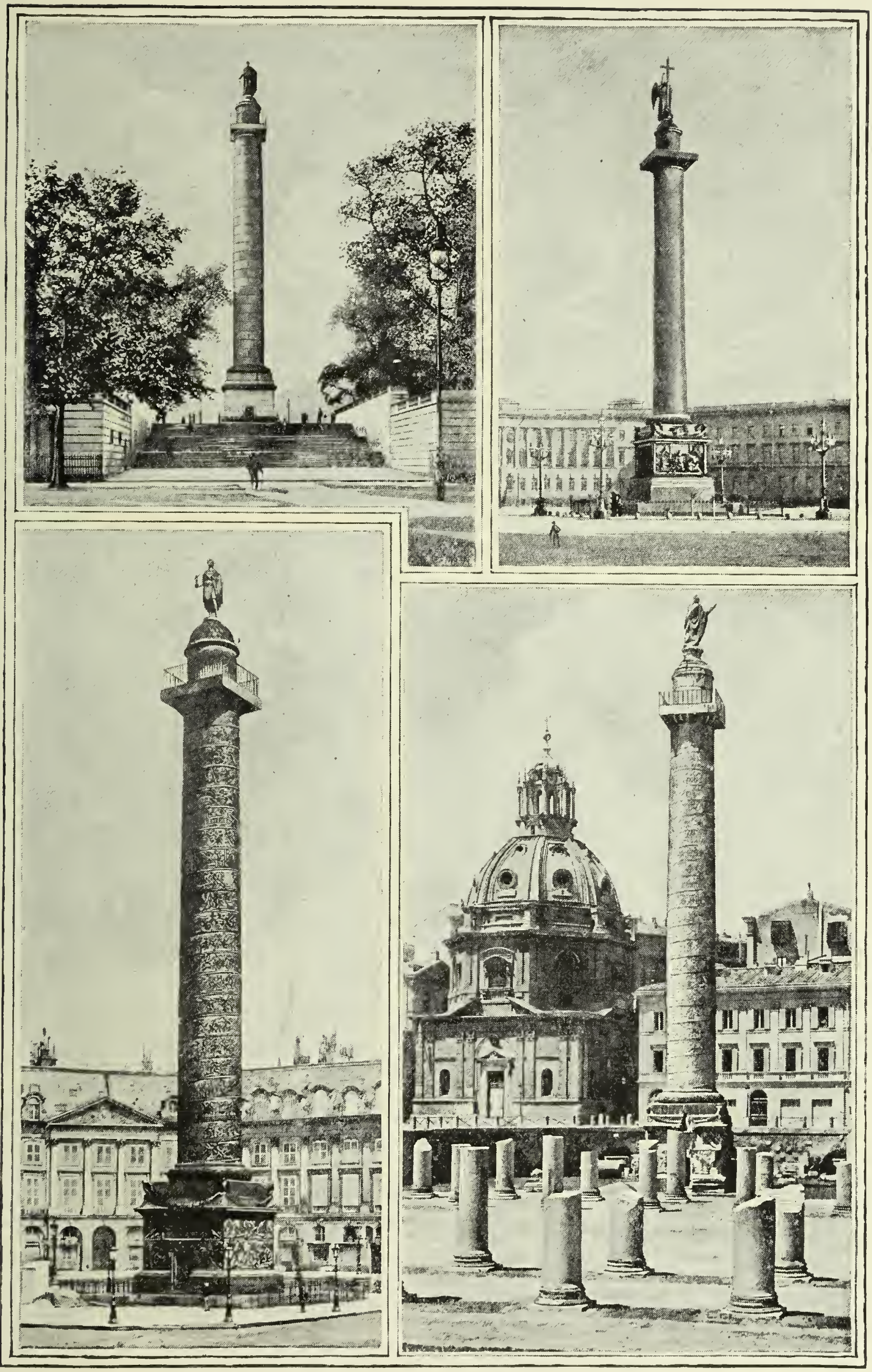
Column, a military formation in which the elements are placed one behind another, as distinguished from a line formation in which the elements are abreast of each other. Previous to the introduction of the breech-loading rifle, and the consequent increase in the advantages of a wide front of fire, most European nations fought in column, and especially the French, who, under the first Napoleon, sometimes formed very heavy columns of infantry by ranging many battalions in line, one behind the other. The term is variously used. In nautical parlance, the term column indicates a number of ships following one another in line.

A body of troops, an army corps or division, is sometimes referred to as a column, such as 'Soult's column,' 'an artillery column,' etc. Within armies, columns are frequently identified by the services they perform, *e.g.,* supply column, ammunition column, medical column, although the trend in later years is to substitute the word 'train' for 'column' when used in this sense.

Columna Rostrata, kō-lum′-*na* ros-trā′*ta*, a triumphal pillar erected in the Forum at Rome to commemorate the victory of Duilius over the Carthaginians off Mylae (now Milazzo, on the north coast of Sicily) in 260 B.C. It was so called because it was decorated with the rams or beaks (*rostra*) of the captured vessels.

Colures, ko-lūrz′, in astronomy, great circles of the sphere drawn from the celestial pole through the solstices and equinoxes, thus dividing the equator and ecliptic each into four equal parts. The former is called the solstitial, the latter the equinoctial colure, or zero hour-circle.

Col′ville, Sir Henry Edward (1852–1907), British army officer, was born in Kirby Mallory, Leicestershire. After serving in the Sudan and in other parts of Africa where he won a solid reputation as an intelligence officer, in 1899 he went to Cape Colony as commanding officer of a brigade of Guards during the Boer War. His failure to relieve Broadwood's column at Sanna's Post (Mar. 31, 1900) and Spragg's force at Lindley (May 31, 1900) caused his recall to England in July, 1900. Lord Roberts subsequently appointed



SOME FAMOUS MONUMENTAL COLUMNS.

1. Duke of York's Column, London. 2. The Alexander Column, St. Petersburg. 3. La Colonne Vendôme, Paris. 4. Trajan's Column, Rome.

him to the command of the Ninth Division, and in that capacity he was actively engaged in the operations which culminated at Paardeberg (Feb. 27, 1900). In 1901 he was put on the retired list. He wrote several works, including the official *History of the Sudan Campaign* (1886), *The Work of the Ninth Division* (1901), and *The Allies, England and Japan* (1907).

Col'vin, Sir Sidney (1845–1927), English literary and art critic, was born in Norwood, Surrey. After his graduation from Cambridge University, he became Slade professor of fine art (1873–85) at that institution, until appointed keeper of prints and drawings, British Museum, a position he occupied until 1912. He was knighted in 1911. His published works include *Life of Walter Savage Landor* (1881) and *Life of Keats* (1887), in Morley's English Men of Letters; *Selections from Landor* (1882) in Golden Treasury Series; *Letters of Keats* (1887); *Stevenson's Works* (Edin. ed.); *Letters of Robert Stevenson, etc.* (1894–7) and many fine critical articles for various periodicals. He was a well known correspondent of Stevenson, and wrote the article on that author in the *Dictionary of National Biography.*

Colza, zol'z*a*, or Rape Oil, an oil obtained from the seed of several species of Brassica, cultivated chiefly in Europe and in India, by crushing, followed by pressing, or extraction with a solvent. The oil in a fresh state is of a brownish-yellow color, and almost tasteless and odorless, but quickly becomes rancid on exposure to air. It is chiefly used for illuminating and lubricating purposes, and, to a less extent, for making soap. It was at one time employed in the illuminating apparatus of lighthouses.

Coma, kō'm*a* (Gr. 'lethargy'), a state of absolute insensibility, without movement or volition, differing from sleep in respect to the difficulty or impossibility of rousing the comatose person. Coma is frequent at the end of a long, severe illness, and the sufferer gradually drifts from coma to death. It is also found in cases where, either from cerebral disease, such as apoplexy or epilepsy, or from any accident causing cerebral haemorrhage or displacement of cranial bones, there is extra pressure on the brain.

Coma Berenices, ber-i-nī'sēz, a small constellation north of Virgo, supposed to represent the yellow *chevelure* of Berenice, wife of Ptolemy Euergetes. Although referred to by Eratosthenes (276–196 B.C.), it was first definitely located on the sphere by Tycho Brahé in 1602. The brightest of its component stars, of 4.4 magnitude, catalogued by Flamsteed as 42 Comae, is a binary, revolving in twenty-six years; and 35 Comae has a companion in slower circulation. The stars of this constellation are set so close together as to form almost a loose cluster; and Dr. Chase completed a triangulation of thirty-two of them with the Yale heliometer in 1892. The north pole of the Milky Way is situated near the sixth magnitude star 30 Comae Berenices.

Comacchio, ko-mäk'ki-ō, town, Italy, in the province of Ferrara, on the inner side of the tongue of land which separates the lagoon of Comacchio from the Adriatic, 27 miles east of Ferrara. It is built on 13 islands connected by bridges. It is famous for its eels and also produces salt. Pop. 8,503.

Comanche, city, Texas, county seat of Comanche County, on the Fort Worth and Rio Grande, and the St. Louis-Southwestern railroads; 110 miles southwest of Fort Worth. Cotton manufacture is the leading industry. Pop. (1930) 2,435; (1940) 3,209.

Comanches, kō-män'chez, a tribe of North American Indians, a main branch of the Shoshonean family, who appear to have dwelt originally in the Snake River valley. Later they migrated to the Middle Loup River, and early in the 18th century were found in the upper Kansas district. In more recent times they ranged chiefly about the headwaters of the upper Red River, the Arkansas, and the Rio Grande. But all were later gathered into the Kiowa, Comanche, and Wichita Reservation, Indian Territory, until in 1901 that region, now part of Oklahoma, was thrown open to white settlers. The Comanches were typical prairie Indians, fine horsemen, fierce, restless, and intrepid, a terror especially to the white settlers on both sides of the Rio Grande, by whom they were called the 'Tartars of the Desert.' They are now settled in west Oklahoma, and number about 1,600.

Comayagua, kō-mä-yä'gwä, town, Honduras, capital of the department of Honduras, and until 1880 the capital of the republic. It is beautifully situated in a plain at about equal distances from the Atlantic and Pacific Oceans. A road connects it with Tegucigalpa, nearly 60 miles to the southeast. It was destroyed by Guatemala in 1827. Pop. (1945) 4,758.

Comb (in poultry), the name given to the fleshy appendage on the crown of the head which is characteristic of the members of the genus *Gallus,* the genus to which the domesticated fowl belongs. The wattles seen in tragopans and in other members of the game-bird tribe are analogous structures. In the different breeds of poultry the size and shape of the comb are of great importance to the fancier, and are distinguished by various names. Thus, a 'rose' comb is low and covers the head like a cap, tapering backward, as in Hamburg fowls, Wyandottes, and some bantams; an 'antlered' comb has many projections, suggesting a deer's antlers—*e.g.,* Polish fowls; the 'pea' comb is divided into the three bluntly serrated parts set side by side, as displayed by the Brahmas; a 'leaf' comb, seen on Houdan cocks, is set crosswise the crown, and is roughly triangular; and a thicker strawberry-like variety of this, characteristic of Malay and Sumatra fowls, is called a 'strawberry' comb.

Comb, a toothed instrument to dress the hair; used also by women to keep their hair in position when dressed. Combs are made of thin plates, plain or curved, or wood, horn, tortoise-shell, ivory, bone, metal, or vulcanite, cut on one or both sides with long teeth.

The comb is probably of Egyptian origin; both wooden and ivory combs, toothed on one or both sides, have been found in ancient Egyptian, Greek, and Roman tombs.

Highly decorated combs are prominent among the curios of old Japan and in the sixteenth, seventeenth and eighteenth centuries combs were among the most elaborate articles of adornment in France, Germany, England and Italy. In ancient times the comb undoubtedly had some religious significance since pagan temples often contained combs for ceremonial use, and in the early church there were ritualistic directions for arranging the abbots' hair in the sacristy.

There are many famous collections of combs, notably that in the Kensington Museum, London.

The founder of the comb industry in the United States was Enoch Noyes, who lived in West Newbury, Mass. Early tradition says that he cut his first combs from horn with a jackknife and the date is given as 1759. Associated with him later was William Cleland, a German comb maker, who taught Noyes the European way of making combs and gave him tools. These early tools comprised the 'guillotine,' which removed the wrinkles and flaws from the cooled strips of horn or tortoise shell; the quarnet, resembling a mason's trowel; the gauge-leaf saw, consisting of two saws set in a wooden frame with a thin strip of plate between them; the carlet, a tool about ten inches long with teeth on both sides, which cut away the teeth at the ends; and the 'graille' which smoothed the sides of the teeth, and was long used for the highest grade of dressing combs.

Since those early days there has been a great development in the comb industry and at present the process is entirely one of machinery. Horn stock is pressed and clarified after being soaked a few minutes in hot oil; this is done by presses designed for the purpose, various types being employed. If the horn is to be made into raw horn dressing combs, the horn plates are sawed into strips of proper width on a shaping saw machine, the ends sawed the proper length on a squaring saw machine, and then run through a horn planer to make them an equal thickness. The teeth are then sawed in cutting machines especially designed for the purpose, the sides of the comb near the points are beveled, the ends are trimmed on an ending up machine and the teeth are further shaped and pointed on a burr spindle, capable of 9,000 revolutions a minute. And finally the combs are rubbed and polished on wheels made of old woolen carpet, cut in circular pieces and mounted on a spindle. Leominster, Mass., is the leading city of the United States in the comb making industry.

Combaconum, kom-b*a*-kō'-num, or Kumbhakonam, town, India, in Tanjore district, Madras Presidency, 22 miles northeast of Tanjore. It was formerly the capital of the Chola kingdom, and a town of pilgrimage. It has a government college, and is an important center of Hindu learning. Pop. 62,317.

Combat, Trial by. See Battle, Trial by.

Combe. See Cirque.

Combe, George (1788–1858), Scottish lawyer and phrenologist, was born in Edinburgh. He attended the lectures of Spurzheim in Paris (1817), adopted his views, and wrote *Essays on Phrenology* (1819). He founded the *Phrenological Society* in 1820 and three years later started the *Phrenological Journal.* He made a tour through the United States (1838–40), during which time he delivered lectures and made the acquaintance of many well known Americans, Dr. Channing and Horace Mann among the number. On his return, he published *Notes on the United States of North America* (3 vols., 1841). His *Constitution of Man* (1828) is his best known work.

Combe, William (1741–1823), English author, was born in Bristol. He traveled in France and Italy, but being extravagant in his habits, squandered his means and became successively a soldier, a waiter at Swansea, a teacher of elocution, a cook at Douay College, and a private in the French army. He wrote many sketches, satires, and magazine articles but is best remembered by his *Three Tours of Doctor Syntax* (1812–21), written in verse and abounding in humor.

Combermere, kum'b*e*r-mēr, Stapleton Cotton, First Viscount (1773–1865), English soldier, was born in Denbighshire. He served for some years in India, and in South Africa and in 1808 went to the Peninsula, two years later being placed in command of the cavalry of the allied forces in Spain, and distinguishing himself at Salamanca. He was created Baron Combermere in 1814, and viscount in 1827. He was commander of the forces in the West Indies (1817–20), commander in chief in Ireland (1822–5), and in India (1825–30). He was made a field marshal in 1855.

Combes, kôṅb, Justin Louis Emile (1835–1921), French statesman, was born in Roquecourbe (Tarn). He was educated at the seminary of Castres, and afterwards at the Carmelites' College in Paris; studied philosophy and obtained the degree of doctor of letters at Rennes, his thesis being the *Psychologie de St. Thomas Aquinas.* He later studied medicine in Paris and set up as a doctor in Pons. He was elected mayor of the town (1875), and in 1885 was chosen a senator for his department (Charente-Inférieure). He was vice president of the Chamber from 1893–5 and became minister of public instruction in 1895–6, when he introduced many measures for the reorganization of primary and secondary education. On the retirement of Waldeck-Rousseau he became prime minister (June, 1902). His policy of vigorous hostility to the Catholic Church led to the suppression and expatriation of many great religious orders. His ministry fell in January, 1905, when he was succeeded as premier by M. Rouvier.

Combin, koṅ-baṅ', Grand, or Graffeneire, the culminating point (14,164 feet) of a grand isolated mountain group midway between the Mont Blanc and Monte Rosa ranges, and southeast of the Great St. Bernard. The vast glacier of Corbassière flows north from it towards the Val de Bagnes. It is wholly in the Swiss canton of Valais. Its ascent is not particularly difficult. In 1857 the first ascent of the more westerly (14,108 feet) of its twin summits was made by some natives of the Val de Bagnes, but the eastern point (accessible from the western summit in a quarter of an hour by gentle snow slopes) was first reached in 1860 by Sainte-Claire Deville, the French geologist.

Combinations. See Permutations.

Combinations, Business, and Mergers, the union or merging of two or more organizations for increased productivity and efficiency.

In trade the process of combination has gone on from ancient days. Individual traders, using one camel or one 'sampan' (boat) each, soon discovered that they were at a disadvantage. Bandits overcame them too easily, and there was too limited a scope. As a result, in a short time, there were *caravans* which were the precise primitive counterparts of a U. S. Steel Corporation or General Motors Corporation; consolidations of many units, and subdivision of labor within one big unit. The 'fleet' of trading ships, such as the Phoenicians used so effectively, illustrates the same principle. There were even consolidations of *both* fleets and caravans into one unit, thus extending their trade routes as far as England. Carthage carried consolidation still further, creating monopolies on silver, tin and amber, quite in the modern manner.

The war-loving Romans and Alexander ruined the trade structure of the world, and for many centuries trade was carried on by individual trading. Then slowly organization and consolidation developed in Venice, until the 'Rialto' became the world trade center with organization on a large scale. A series of greater consolidations soon followed—*i.e.,* the Dutch East India Company, the Hanseatic League, the Union of Utrecht, and similar organizations. The great merchandise fairs of the Middle Ages were also in effect trade combinations, with their own credit and money systems, and even their own laws. Later came the Hudson Bay Company and other vast enterprises reaching many thousands of miles from their base.

Europe, before America was discovered, had, therefore, progressed considerably toward trade combinations but America had to proceed all the way from primitive pioneer conditions in the seventeenth and eighteenth centuries to about the year 1875 before there began to appear anything suggesting the consolidation which was already known abroad.

American Development of Trade Combinations.—Once America started, however, to use the large-scale tool of consolidation, she used it with vigor, and it is at the present time in the prime of its development. The early attempts at combination, of which the famous Standard Oil Company is an outstanding illustration, were attended by such abuses and political corruption that it became necessary for the U. S. Government to intervene and the Sherman Anti-Trust Law and, later, other governmental regulations, were enacted which have resulted to the satisfaction of the public and of business. From the start there had been confusion between natural or beneficial monopoly and dangerous monopoly on the one hand, and between all monopoly and mere consolidation and large-scale enterprise on the other hand. The telephone systems are beneficial monopolies, and patent rights are government-granted monopolies; whereas an attempt to own 65 per cent of all the bread-baking companies in the United States would be regarded as a dangerous monopoly.

Combinations and mergers, however, are increasing at a tremendous rate, especially during marked prosperity periods. A dozen or twenty moderate-sized consolidations prior to 1900 were sufficient to cause great popular excitement, whereas the current rate of formation of consolidations is about 300 to 400 per year.

There have been several thousand mergers since 1900. During the nine years between 1919 and 1927, inclusive, there were 4,953 firms brought into mergers and thus losing their former identity. The average is about three firms per merger; about one-third of these having a capital of a million dollars or over. It is particularly notable of mergers—(a) that they have been mainly among large and successful, not weak, firms; (b) that they have been formed mainly for reasons of distribution economy, whereas formerly they had been formed mainly for re-finance and competitive reasons and also largely for reasons of production economy; (c) that they have been financed largely by the public, rather than by private bankers; thus making the public co-owners on a wide scale; (d) that most conspicuous in merging have been three lines of business:—public utilities, banks, and foodstuff manufactures; (e) that the management of consolidations is passing into the hands of technical managers, on an absolutely strict merit basis.

Benefits of Combinations.—At one time it was the fashion for economists and publicists to deny merit to the combination and large-scale principle. There was held to be a 'point of diminishing return' and that it was an impossibility for one man or set of men to operate soundly a very large business. This theory has been exploded, for some of the best-managed corporations are ten times as large as those about whom fears had been voiced. It seems to remain true, however, that a very high degree of ability is needed for successful management of large-scale business; size alone being far from a guarantee of success. Many mergers are deliberately held from consummation until men able to operate them are found. In addition, it appears to be true that modern enlightened policies are necessary for success; (1) policies of public relations, (2) policies of research, consumer and market study, (3) policies of labor relations and employee welfare and high wages, and (4) policies of sharing economies with the public in lower prices.

The summarized benefits of consolidations are as follows: (1) Immediate or ultimate reduction of price to consumer; (2) Higher grade management and special technical ability; (3) Highly efficient plants only, used in dull times and run at full capacity whenever possible; (4) Specialization of plants; (5) Comparative tests; (6) Large capital for experiments, etc.; (7) Full use of patents and of best methods; (8) Utilization of waste for by-products; (9) Duplication of high-priced officials dispensed with; (10) Saving in cross freights; (11) Economy in advertising and salesmen; (12) Better credit and better discounts; (13) Less credit given and fewer bad debts; (14) Middlemen regulated; (15) Steady prices (supply adjusted to demand); (16) Strength for export business; (17) Cheaper raw material (bought in largest quantities and from nearest sources).

There are not only specific factors of economy impelling businessmen to consolidation, but also large, grave factors which underlie economy. The 'new competition' or intra-industry struggle for a larger share of the consumer's dollar is perhaps the first factor of this kind. It appears to be true that one industry's progress lies over the depression of another industry. The automobile has sapped the textile and shoe and home furnishings industries. Cement has sapped steel and lumber, and so forth. The second factor grows out of this—the factor of large-scale operation which presses down heavily on small-scale operation. Thus large-scale manufacturers secured the advantage in consumer prestige over distributors who were small; but large-scale chain and department and mail order organizations have regained part of it. This left the wholesaler ground cruelly in between, until he, too, remade himself into large-scale units by consolidation. In an industrial world of giants, all the protagonists need to be giants—*excepting* in those domains where personal service is supreme. This is the Achilles heel of the chain and department stores; and independent retailers and small specialty shops are at a new stage of growth in consequence. Even in manufacture and in transportation the special touch style, service and quick adaptability provide opportunities for small men to compete with large-scale enterprise, and the day of 'the small man' is far from over.

Types of Mergers.—There are now definitely marked types of combination. Physically speaking there is (1) *the vertical consolidation*, like the U. S. Steel Co. or Henry Ford, who own the mines from which the ores come, the coal with which to smelt it, the railways to haul it, and the mills to make it. (2) There is *the horizontal consolidation* which, like the International Paper Company, owns many paper mills. (3) There is the latest type—*the circular consolidation*, which like the General Motors Corporation, manufactures many articles—automobiles of various price levels, trucks, buses, spark plugs, lighting systems, electric refrigerators, aeroplanes—because they require the same general type of skilled labor and specialty marketing organization.

Generally speaking, there are three types of mergers, (1) *the refinancing consolidation*, made from the basis of coördinating the financial ownership or capital stock structure; (2) *the production merger*, which is a seeking after reduced manufacturing economy; (3) *the distribution merger*, which are mergers based on the fact that the goods are all sold through the same type of sales organization and advertising. This latter type has been very active in recent years. See also TRUSTS. Consult Frederick's *Modern Industrial Consolidation.*

Combining Weights, or equivalents, in chemistry, are the ratios of the weights, or more strictly of the masses, of elements entering chemical combinations as compared to a fixed weight of a standard substance with which the element in question combines or which it replaces in a chemical combination. John Dalton arrived at the valuable generalizations or laws of chemical combination which are known as the law of definite composition and the law of multiple proportion. The first states that all chemical compounds have definite compositions which can not be changed without altering the nature of the compound. Thus, water is a perfectly definite compound of 16 parts by weight of oxygen with precisely 2.016 parts by weight of hydrogen. It is impossible to make oxygen and hydrogen combine to form water except in this particular manner. The same thing is true for all other chemical compounds. The law of multiple proportions states that if more than one compound of two elements exist, the proportion of one element in the combinations to a definite amount of the other is a simple integral whole number. Thus, oxygen and hydrogen combine to form another compound, hydrogen peroxide, and in this compound these two elements exist in the proportions of 16 parts by weight of the former to precisely 1.008 parts by weight of the latter, the ratio of the relative hydrogen content of water and hydrogen peroxide being as 1:2. The proportions in which elements combine with 8 parts of oxygen or 1.008 parts of hydrogen (both by weight) are called the combining weights of the respective elements. These are characteristic of each element.

The combining weights of the element may be determined either by analysis or synthesis of its compounds. Formerly, the standard of comparison in determining combining weights was a precise unit weight of hydrogen, but because it was easier to make comparisons with oxygen, a weight of oxygen approximately 8 times that of hydrogen was adopted as the unit. By assuming a combining weight of exactly 8 for oxygen, the combining weight of hydrogen becomes 1.008, and the uncertainty of the ratio between oxygen and hydrogen which existed until recently is removed from the calculation of combining weights of other elements. The tables of combining weights are now ordinarily called tables of atomic weights because the atomic theory (q. v.) has led to the belief that chemical combinations take place between atoms which are of different weights for the different elements. The necessity for the most precise accuracy in the determination of these fundamental constants of matter comes about through the fact that all quantitative chemical data are based upon them. Thus, the methods of analysis by which the composition of materials are determined are entirely based upon a knowledge of the relative weights of the atoms of the elements entering chemical combinations.

It is now known that most elements are actually mixtures of isotopes (q. v.) but in all except a few special cases, the composition of this mixture is constant in Nature. The chemist, therefore, takes the combining weight of the naturally occurring mixture of oxygen isotopes as 8 and refers all other naturally occurring mixtures to that standard. When values are required for the individual isotopes of the element these must be obtained by the mass spectrometer or other physical means and can not be readily determined chemically.

Combustion, or Burning, a chemical reaction in which sufficient energy is evolved to bring the uniting bodies to a red heat. Modern chemistry may be considered to be founded upon a correct explanation of the phenomenon of combustion. Before the time of Lavoisier, combustion was considered to be the separation of phlogiston, a body of negative weight, from the burning material. Lavoisier, however, showed that combustion, as ordinarily understood, can only take place by the union of a combustible material with oxygen. This conclusion led to a complete revolution in chemical thought and on it is based the present day theory. In ordinary combustion, such as that of a piece of wood, oxygen of the air unites with the elements present in the wood so rapidly and with such vigor that enough heat is evolved to produce visible heating. Many substances unite with oxygen vigorously enough to bring about a degree of heating of this magnitude. However, all combustion need not necessarily involve oxygen. A number of substances will burn in an atmosphere of chlorine, for instance, almost as readily and vigorously as in oxygen. It is also possible to all appearances to burn oxygen itself in an atmosphere of some combustible gas such as illuminating gas or hydrogen. In any case, there must be present at least two substances which enter into direct chemical combination. These are ordinarily spoken of as the combustible and the supporter of combustion. A flame (q. v.) need not necessarily be present in combustion. Such substances as charcoal burn without flame and the flame noticed in the burning of many solid materials is not that of the burning solid but rather of the burning of a gaseous product generated by the intense heat of the combustion. A flame can not, however, be present unless there is combustion.

Spontaneous combustion, under certain conditions, may occur without the application of any external source of heat. Examples are stacks of hay or heaps of finely divided coal or cotton waste soaked in oil. When such materials are in ill ventilated places, oxidation may cause heat to accumulate until the temperature is raised to the 'ignition point' and inflammation occurs.

Slow and catalytic combustion is a phenomenon of great importance in chemistry (See Chemistry). Incandescent surface combustion, following the researches of Sir Humphrey Davy and later of W. A. Bone, is now established to have advantages as follows: combustion is greatly accelerated by the incandescent surface; combustion is perfect with a minimum excess of air; attainment of very high temperature is possible; and transmission of heat from the seat of combustion to the object to be heated is very rapid because of the large amount of radiant energy developed. A body can thus be kept in an incandescent state by combination of the gases at its surface without actual flame. This species of combustion can be applied to domestic and industrial heating.

It remains to mention the gaseous explosion pressure which is the source of power in gas and petrol engines. A combustible gas issuing from an opening, when ignited, maintains a stationary flame by the active chemical combination of the combustible with the oxygen of the atmosphere with which it mixes. The mixture, however, becomes explosive when the combustible has been previously mixed with oxygen in suitable proportion, and flame is propagated through it. When such a mixture is ignited in a confined space, the gases are raised to a high temperature by the heat developed with rapid increase in pressure.

Consult Bone and Townsend, *Flame and Combustion in Gases* (1927); Haslam and Russell, *Fuels and their Combustion* (1926).

Comedia, ko-mā'dyā, in the history of the Spanish drama, means a three-act play, either of serious or humorous import, and dealing with subjects of worldly interest; it was thus distinguished from the one-act *auto*, which was essentially a religious play. Subsequently a further distinction was drawn between the *comedia de capa y espada* (the comedy of cloak and sword), which chose its characters chiefly from the aristocratic life of Spain, and relied principally upon plot and witty language, and the *comedia de ruido* (show) or *de teatro*, the principal attraction of which was spectacular effect, stage-setting, and so forth. See DRAMA, and compare COMMEDIA.

Comédie Française, ko-mā-dē frän-sez′, or THÉÂTRE FRANÇAIS, often referred to by French writers as *La Maison de Molière*, may be traced back to the year 1658, when Molière's theatrical company, known as L'Illustre Théâtre, arrived in Paris from the provinces. In 1680 Louis XIV. ordered this company to amalgamate with the Théâtre du Marais, a rival establishment, under the name of the Comédie Française. The following year the king settled 12,000 livres annually on the actors. After 1688 a commodious house was built for them, and this they continued to occupy for eighty-three years, during which they produced not only all Molière's works, but likewise the comedies of other leading playwrights of the day. The present Odéon stands on the site of the house which the Comédie Française occupied in 1782. In 1793 the company was suppressed by the revolutionists. But Napoleon, by his decree of 1803 and the decree of Moscow (1812), gave the theatre the organization which it still preserves, and established it in the building which it occupied until the fire of 1900.

M. Francisque Sarcey says that the history of the Comédie Française is a perpetual compromise between tradition and the taste for novelty. To realize how powerful tradition is in this case, and how it continues to be a living force, it is only necessary to point to the chain of actors who link the mind of Coquelin with Molière's. Poisson served under Molière himself. Préville was Poisson's colleague. Dazincourt learned his profession from Préville. On Monrose fell the mantle of Dazincourt. Got was a contemporary of Monrose. M. Coquelin was only a child in 1841 when Got was a member of the Comédie. But Got was still a great actor when M. Coquelin stepped into his inheritance. There are no star actors. Authors whose plays are performed are allowed a fraction of the receipts varying from a twelfth to a twenty-fourth. On March 8, 1900, fire played havoc with the famous building, which was a veritable treasure-house of statuary, books, and pictures; the library included the archives of the Comédie Française from its birth. Happily, almost everything was saved, and on March 20, 1900, a grant of 220,000 fr. was made by the state toward the rebuilding of the theatre. The reconstruction was made by Guadet.

The Comédie Française has been the home of many of France's most illustrious actors and actresses, among whom are Mlles. Mars, Rachel, Bernhardt, and Lecouvreur, and M. Talma, and M. Mounet-Sully.

Comedy. See DRAMA.

Comenius, ko-mā′ni-o͝os, or KOMENSKI, JOHN AMOS (1592–1670), scholar and pioneer educational reformer, was born in Ungarisch-Brod or Nivnitz in Moravia. After an elementary education supplemented by study in Prerau, Amsterdam and Heidelberg, he became rector of the school of the Moravian Brethren at Prerau (1614), and in 1618 was appointed pastor at Fulnek, but all his property and library were destroyed when the town was sacked by the Imperialists (1621). Taking refuge at Lissa (1628) in Poland, he wrote his *Didactica Magna* (1632; new ed. 1893), in which he elaborated his new theory of education, and *Janua Linguarum Reserata* (1631), written in Bohemian and Latin, works which established his reputation, and were soon translated into most European and some Oriental languages. He was elected 'elder' of the Moravian Brethren (1632). In 1639 he issued at Oxford his *Pansophiæ Prodromus*, a kind of prospectus of a universal encyclopædia of Christian humanistic knowledge, which he dreamed would put an end to the unceasing strife and controversy of the age. In 1641 he went to England, but the outbreak of the civil war drove him to Sweden, where he found patrons in the Dutch-Swedish nobleman Ludwig de Geer, Skyte, the chancellor of Upsala University, and the Swedish national chancellor, Oxenstierna, who authorized him to formulate a plan for the organization of schools in Sweden, and sent him to live at Elbing (1642–8). In 1648 he was elected bishop of the Bohemian Brethren, and again took up his residence at Lissa, whence he was driven by a Polish attack in 1656, losing his possessions again, the loss this time including several MSS. Eventually he found an asylum at Amsterdam, and remained there until his death.

The principal productions of his later years were *Methodus Linguarum Novissima* (1649); *Orbis Sensualium Pictus* (1685), picturing the actual world, for children; *Panegersia*, a brief statement of his broad and enlightened views on humanity; *De Rereum Humanarum Emendatione* (1662), and *Unum Necessarium* (1668). The essence of his pedagogic views was that children should be taught through the eye and ear, and with the help of the familiar objects of the world—not through books of dry and remote learning. In his theory of education he is the forerunner of Rousseau, Froebel and Pestalozzi. Consult Monroe's *Comenius and the Beginnings of Educational Reform.*

Comenius Library and **Society.** The former was founded on the bicentenary of Comenius' death, in 1871, at Kassel, and numbers many thousand volumes and pamphlets, all more or less bearing upon the views advocated by the educational reformer whose name the institute celebrates. The latter, founded in Berlin in 1891, commemorates the tercentenary of Comenius' birth, and aims at spreading the spirit of his teaching.

Comet, a nebulous body revolving round the sun. About eight hundred such objects have made recorded appearances, and for upwards of one-half of them orbits have been computed. They travel for the most part in long ellipses indistinguishable from parabolas, inclined at all angles to the ecliptic; their motion is retrograde as often as direct, and their periods are very uncertain. Of the rest, half a dozen are hyperbolic, but almost certainly as the result of perturbations; while some seventy-five, which pursue unmistakable ellipses, can be depended upon to return to the sun. Twenty-five have been observed at one or more returns.

Halley's Comet is the most famous of these heavenly bodies, and was the first to make a predicted return. Edmund Halley (q.v.) was a distinguished English astronomer, friend of Sir Isaac Newton. He discovered that the orbits of the comets of 1531 and 1607 were similar to that of 1682, which he himself observed, and thereupon concluded they were one and the same. He predicted the comet's return about 1758, and called upon posterity to record and verify his prediction. It arrived at perihelion on March 12, 1759. Investigation of the past showed many references to its periodic appearance throughout the Christian era. In 1835 it returned again, and was next expected in 1910. While yet some 300,000,000 miles distant, it was photographed on Sept. 11, 1909, by Prof. Wolf of Heidelberg.

For months afterward, it was invisible to the eye; later it developed rapidly and was a spectacular object when it reached its greatest brilliance in May, 1910.

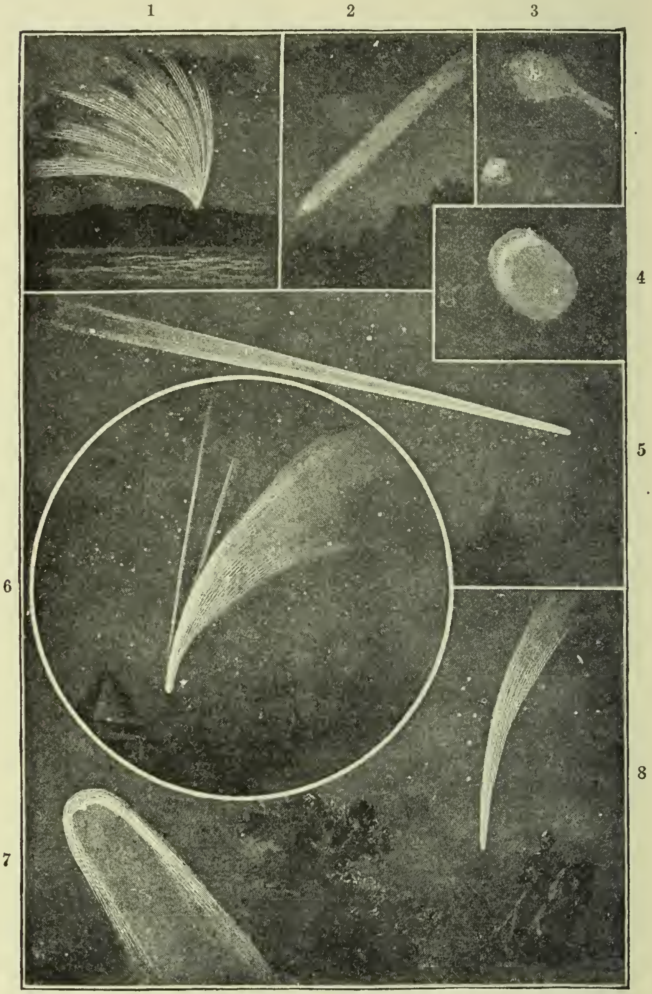
Among other comparatively recent great comets were those visible in 1811 and 1858 (Donati's), both revolving in immensely protracted terms; the southern comet of 1901, with sensibly parabolic elements; and the blazing object which rushed past the sun, Feb. 28, 1843, and which had successors in 1880, 1882, and 1887, all moving approximately in the same track.

Comets at a distance from our system are misty, amorphous objects. Structure develops in them through solar influence. As it strengthens with approach, the nucleus, a minute disk of condensed light, begins to shine brilliantly, paraboloidal envelopes are successively thrown off from it; then, usually in a direction diametrically anti-solar, the tail issues with extreme rapidity, extending in some cases to lengths of one hundred million miles or more. The fact that the tail precedes the comet, in its departure from the neighborhood of the sun, proves that the material of the tail, after ejection from the head of the comet, is repelled from the sun, and that it is not simply material left behind by the comet in its progress through space; and Olbers's 'electrical theory' of their nature gained plausibility through Brédikhine's division of cometary trains into three types, according to the atomic weights of the substances severally held to compose them. The tenuity of comets' tails is inconceivable to the human understanding, stars, which the slightest fog would conceal, shining clearly through a thickness of millions of miles of their material.

Modern theory identifies the repulsive force with the pressure of solar radiation. Only for very small particles would the pressure exceed the gravitational attraction.

Comets give spectra mainly composed of bright bands due to hydrocarbons; radiations of sodium and iron were also observed in the comet of September, 1882. Continuous light is present in varying degrees of intensity.

The continuous background of the spectrum is probably reflected sunlight, but the bright lines are due to the comet's own luminosity. There is much reason to believe that the illuminosity of such objects is the result of electrical discharges. Comets are of trifling mass; their vicinity has never been perceived to occasion the smallest gravitational disturbance. A number have been discovered by photography—the first by Barnard in 1892. The camera, moreover, has lately brought into view the filamentous texture of cometary tails, the rapid changes that affect them, and their essentially multiplex nature.



Famous Comets

1. Six-tailed comet of 1744 (according to Cheseaux). 2. Halley's comet, 1835 (telescopic view). 3. Biela's comet after duplication, Feb. 21, 1846. 4. Encke's comet, 1838. 5. Comet of 1843, as seen in Paris, March 19. 6. Donati's comet, October, 1858. 7. Coggia's comet, 1874 (telescopic view of nucleus). 8. The same, as seen by the naked eye.

There is no evidence that comets are transients from outside which happen our way. The parabolic orbits are probably very long ellipses. The few hyperbolic orbits are the result either of poor observations or of near approach to a large planet, with attendant change in the path of the comet. Furthermore, if comets are moving hither and thither in space it is to be expected that the solar system, with its own rapid motion through space, would meet and overtake comets more often than it would be overtaken by them. Observationally, this is not the case. The comets seem to have had their origin in an aggregation of cosmical matter, far from the sun, but moving with the solar system.

The genetic relationship of comets to meteorites, established by Schiaparelli in 1866, lends further countenance to the supposition that they eventually disintegrate into dust, and of their quondam splendor preserve only the fitful gleam of a shooting star. Consult C. P. Olivier, *Comets* (1930); C. A. Reeds, *Comets, Meteors, and Meteorites* (1933); K. P. Williams, *Calculation of the Orbits of Asteroids and Comets* (1934).

Comet Seeker, or Comet Finder, a telescope with large aperture and comparatively small magnifying power, adapted to searching for comets.

Comfort, George Fisk (1833–1910), American educator, was born in Berkshire, N. Y. He travelled and studied in Europe (1860–65), and on his return became professor of aesthetics and modern languages at Allegheny College, Meadville, Pa. (1865–68), and at Syracuse University (1872–93). He helped to organize the American Philological Association and the Metropolitan Museum of Art in New York City. In 1872 he founded the Syracuse College of Fine Arts, and was its dean (1873–93); also the Syracuse Museum of Fine Arts (1890). He wrote: *Art Museums in America* (1869); *Modern Languages in Education* (1870), a series of German text books; *The Land Troubles in Ireland* (1898).

Comfrey (*Symphytum*), genus Boraginaceae, erect often hispid herbs, hardy in most climates, some species grown for beauty of foliage. About 25 species are known, native to Europe, Western Asia, and Northern Africa. *S. officinale,* formerly used as a vulnerary, has white, yellowish, purple, or rose flowers in drooping cymes. *S. asperum,* native of Siberia and Persia, 2½–5 ft. or higher, has some forage value. Consult C. Bucknall in *Journal of the Linnean Society,* vol. 41.

Comic Opera, a combination of dialogue and music, both specially composed in the spirit of comedy. Its typical national forms have been the *Opera Buffa* of Italy, the *Opéra Bouffe* of France, the *Singspiel* of Germany, and the ballad opera, and later the Gilbert and Sullivan type, of England.

The earliest comic opera of which the score is known, *Le Jeu de Robin et Marion* of Adam de la Halle (13th century), consists of an ordinary pastourelle with songs set to music. Comic opera first attained prominence, however, in the 18th century. In Italy it became customary to introduce into the *entr'actes* of the heavy and artificial grand opera, light musical sketches of everyday life, without limitation as to form. These proved popular, and were presented as separate entertainments, known as *opera buffa,* which were sung throughout, the dialogue being in recitative. The best examples are *La Serva Padrone* of Pergolesi, *Il Matrimonio Segreto* of Cimarosa, and *Il Barbiere di Siviglia* of Paisiello and of Rossini.

The *Singspiel* of Germany was a more or less farcical entertainment in which spoken dialogue was interspersed with music. Its most notable exponent was Hiller, whose fourteen *Singspiele* are still occasionally performed. The form developed into the romantic opera, of which examples are Mozart's *Die Zauberflöte,* Beethoven's *Fidelio,* and Weber's *Der Freischütz.*

The *opéra comique* of France resembled the *Singspiel* in having the dialogue spoken instead of sung, as in the *opera buffa.* It was at first largely concerned with comic subjects, but later included tragedy as well, so that its treatment on smaller lines and its spoken dialogue alone distinguished it from grand opera. Typical *opéras comique* are the works of Cherubini, Lesueur, and Méhul, Meyerbeer's *Étoile du Nord* and *Dinorah,* Thomas' *Mignon* (1866), Bizet's *Carmen* (1875), Delibes' *Lakmé* (1883), and Massenet's *Manon* (1884).

The comic opera of France is the *opéra bouffe,* which had its origin in the middle of the 19th century with the musical burlesques of Offenbach (q. v.). Suppe, Strauss, and others followed the new form, Strauss and the Viennese school giving special prominence to dance music.

In England, Gay's *Beggar's Opera* (1728) started the vogue of the so-called ballad opera. It consisted of a burlesque by Gay of the fashions and customs of the day (including the artificial Italian opera), interspersed with English and Scottish ballads and popular airs, arranged by Dr. Pepusch. Modern English comic opera, which finds its origins in the *Singspiel* and *opéra bouffe,* is represented by the works of Gilbert and Sullivan. Composer and author combined to produce their effects, the metrical ingenuities of Gilbert being translated into music of equal ingenuity and exquisite melody by Sullivan.

American comic operas of note are *Robin Hood* and *Rob Roy* by Reginald De Koven. The form was superseded in both England and the United States, by musical comedy, which demands no consistency of plot, and sets a lower musical standard. See Opera. Consult S. Mackinlay, *Origin and Development of Light Opera* (1927).

Comillah, chief town of Tipperah district, Bengal, India, on the Gumti River, with a station on the Assam-Bengal Railroad; 96 miles N.W. of the coast terminus at Chittagong. It has an English church and a college. Pop. (1931) 31,220.

Comines, or Commines (Flemish Komen), town, on the borders of Belgium and France; 15 miles s.w. of Courtrai by rail. It is divided by the Lys into two parts, of which that on the left—pop. (1930) 7,524—belongs to Belgium; the other, on the right—pop. (1931) 6,738—to France. The town manufactures textiles and was the seat of the family of Comines.

Comines, Philippe de la Clite de, Sieur d'Argenton (1445–1509), French statesman and historian, was born near Hazebrouck. He was at first an adherent of the court of Burgundy, and was entrusted by Charles the Bold with important missions to England, France, and Spain; but in 1472 he was induced to enter the service of Charles the Bold's antagonist, Louis XI of France. On the accession of Charles VIII he fell into temporary disfavor, and was imprisoned. He, however, accompanied Charles VIII in his expedition into Italy, where he had a memorable interview with Machiavelli in Florence. His fame rests chiefly on his *Mémoires,* which deal with the political history of Louis XI, a truly Machiavellian character, and of Charles VIII, covering a period from 1464 to 1498. They have been translated into English. The *Mémoires,* ed. by J. Calmette (3v., 1925), have a biographical introduction and a bibliography.

Comiso, town, province Ragusa, Sicily; 23 m. by rail S.E. of Gela. Here in ancient times was the famous fountain of Diana, the waters of which were a test of chastity in women. There is a beautiful renaissance church (San Francesco) and a restored 15th century Palazza. Pop. (1931) 29,555.

Comitan, town, state of Chiapas, Mexico, 5,300 feet above sea level; 35 miles S.E. of San Cristobal, and 12 miles from the Guatemalan frontier. It is noted for its brandy (*comiteco*), made from the maguey plant. It has a large trade in sugar and cattle. Pop. (1930) 19,594.

Comitia ('assemblies'), formal and legal meetings of the Roman citizens, as distinct from *contiones,* which were mere mass meetings. Of such there were three, namely:

(1) The *Comitia Curiata,* or assembly by *curiæ* or wards. This was the original form of assembly; but in historical times it became unimportant, though

certain measures, whose import was distinctly religious, such as the conferring of supreme power on consuls, authorizing the adoption of children, etc., were still entrusted to it.

(2) The *Comitia Centuriata,* or assembly by centuries or hundreds, instituted, it is said, by Servius Tullius. In this the citizen body was divided into five classes, according to their property, and each class into a varying number of centuries, which were again separated as centuries of seniors and juniors. The purpose of this assembly was primarily military. It was called 'the army,' and could not meet in Rome; its meetings were held on the Field of Mars outside the walls. In the early days of the republic it was the chief form of assembly, and always retained the right of electing the chief magistrates, and the decision of questions of peace and war.

(3) The *Comitia Tributa,* or assembly by tribes. Originally there were four city tribes, but as the territory of Rome extended, the number was increased, until there were thirty-five in all. This was the democratic assembly of Rome. It met in the Forum, and came to undertake practically all legislation; it also elected the tribunes and minor magistrates.

These were not three different assemblies, in which members had a different franchise, but merely three forms of assembly, in all of which every citizen was included, though the classification was different. In all, again, voting was by groups—that is, the individuals in a tribe, century, or *curia* voted, and the result was decided by the majority of tribes, centuries, or *curiæ.* They depended entirely on the magistrates, who convened them at their own pleasure, and entirely controlled their management, only allowing such people to speak as they invited to do so, so that there was no free discussion. Consult G. W. Botsford, *Roman Assemblies* (1909).

Comity, the term for a legal concept in (a) constitutional law, (b) international law, and (c) conflict of laws (q. v.), where it is losing ground. It is applied to purely voluntary acts of courtesy.

In the constitutional law of a federal state comity is concerned with such questions as: recognition by a federal court in one circuit of the decisions rendered in another circuit; recognition by a federal court of a state court's interpretation of its state laws; and conflicts in jurisdiction between federal and state courts or between federal courts of concurrent jurisdiction.

In international law comity usually denotes the ground on which the judicial body of one nation recognizes the laws of another nation although not legally bound to do so. The extradition of fugitives, the immunities of merchant ships in port may rest on comity.

In the conflict of laws comity is concerned with the application of principles of the laws of another nation to cases judged in local courts.

Comma, in music, is the name given to the small interval occurring between the pitches of a note whose vibrations, calculated from the same fundamental tone, are determined by means of two different successions of *perfect* intervals. This variation of pitch cannot be produced on the piano or on other instruments tuned to tempered intervals. The comma most frequently used has a vibration of about 80:81. The larger or 'Pythagorean comma' has a wider interval, which amounts to about a quarter of a semitone. See TEMPERAMENT.

Comma Bacillus. See BACTERIOLOGY; CHOLERA.

Commagene, the northernmost province of ancient Syria, lying between the Euphrates, the Taurus, and the Amanus Mountains, in about 37° to 39° E. long. and 37° to 38° N. lat. It belonged to the kingdom of Assyria, passed under the domination of the Persians, and at the partition of the empire of Alexander the Great became a satrapy under the Seleucids. Already under the Assyrians, Commagene endeavored more than once to gain its independence. This object it succeeded in effecting under a dynasty related to the Seleucids, who reigned from 162 B. C. to 72 A. D., when it became a Roman province. Its capital was Samosata (modern Samsat), on the Euphrates. Bronze coins of the various kings of its dynasty were discovered by a German explorer, O. Puchstein, who also found a beautiful tomb of Antiochus I (69–38 B. C.) near the Nimrud Dagh. Under the Roman Empire, Commagene suffered much from the incursions of the Parthians. Finally it became subject to the Arabs, then to the Turks (Seljuk and Ottoman).

Command. See RANK AND COMMAND.

Commandant, the commanding officer of a place or of a body of men. Commandant is not a separate rank in the U. S. Army and Navy. The officer in command of troops at an army school, whatever his rank, is usually called the commandant; for instance, the commandant of cadets at the U. S. Military Academy, the commandant of the artillery school.

In the U. S. Navy, commandant is the title of the officer of a navy yard or naval station. The commandant of the U. S. Marine Corps is in rank a major general.

The title is given to the governors of Guam and Samoa; to the officer in command of the air stations at Pensacola, Fla., and Guantanamo, Cuba.

Commandeer, a word of Dutch origin, meaning the forcible possession of men or goods for military or other purposes.

Commander, in the U. S. Navy, is an officer who ranks below a captain and above a lieutenant-commander. The title was derived from the British navy. It was first introduced in the U. S. service by the pay bill of March 3, 1835, and was established by definite enactment three years later. A commander ranks with a lieutenant-colonel in the army, and has the same pay when on sea duty. A commander may command a ship of the second or third rate, and may act as chief of staff to a flag officer or perform other similar duty.

In the Army, commander is not a rank, but the general title given to officers in charge of territorial departments, divisions, field armies, separate brigades, squadrons, artillery districts, etc.

Commander-in-chief, the supreme commander of the military or naval forces of a state, nation or allied nations. In the United States, the President is the constitutional commander-in-chief of the Army and Navy and of the militia of the States when called into the actual service of the United States. As commander-in-chief he has supreme control over territory occupied or conquered during war. In times of war he designates a commander for each army.

In the U. S. and British navies the term is applied to the senior flag officer in command of a fleet or detached squadron or within the limits of a station or port.

The British apply the term to the colonial governors, the general over all the forces in India, and the general over an expeditionary force.

Commander Islands, a group of islands lying near the coast of Kamchatka, the chief of them being Bering Island, named for the Danish navigator of that name, who died here in 1741. They belong to Russia.

Commander of the Faithful, a title assumed by the Calif Omar I (634–644), the father-in-law of Mohammed, and continued among the titles of his successors until 1924. See Calif.

Commandery, in the Middle Ages, an estate or manor belonging to the Knights Hospitallers or the Teutonic Knights. The term is sometimes applied in modern usage to local branches of fraternal orders, such as the Knights Templar in the United States.

Commanding Officer, in the U. S. Army and Navy, is the officer in actual command of an ordinary post or troops in the field, or of a war vessel. In the Navy, he is usually addressed as 'captain,' and upon him devolves the responsibility for the crew, guns, and stores, and navigation of the ship.

Commandments, Ten. See Decalogue.

Comman'do a word of Portuguese origin, first generally used by the Boers to signify military expeditions against natives; afterward a loose term for a military levy.

Commedia, kom-mā'dyä, in Italian literature, meant originally any Italian poem which had a happy ending (*e. g.*, the *Divina Commedia* of Dante), but later was used to indicate generally any kind of play; and more especially the comedy in the English sense of the word. (See Drama.)

From this must be distinguished the popular scenic representations, with stock characters (*e. g.*, Arlecchino, Pulcinella, Pantalone, Scaramuccia, Colombina), known as *Commedia dell' Arte.* In these pantomime-like exhibitions the dialogue was frequently impromptu.

Commelyna'ceæ, an order of petaloid monocotyledons, all herbaceous, chiefly neotropical, of which a few species are cultivated in herbaceous borders on account of the beauty of their flowers, notably Spiderwort, or *Tradescantia* (*Virginica,* and other species), *Commelyna cœlestis,* etc.

Commemoration, at Oxford University, the day when degrees are annually conferred at the close of the academic year, corresponding to commencement (q. v.) at Cambridge University and in the United States. It is usually observed on the third Wednesday after Trinity Sunday.

Commencement, in the United States, the day when degrees and diplomas are annually conferred by universities, colleges, and schools. The term originated at the University of Cambridge, passed to Harvard, and thence into general use in the United States.

Commen'dam and Commendators. In ecclesiastical law, a vacant benefice, the spiritual duties of which were provisionally committed to the charge of an absentee, was said to be held *in commendam.* Gradually such holding carried emoluments also; and bishops, legally incapable of holding other benefice, thus evaded the law. The practice was abolished in England in 1836.

Commendators were the appointed stewards of a void benefice, nominally mere trustees, but in fact often appropriating the emoluments.

Commendation, in feudalism, the act whereby a free man became a voluntary vassal for protection. See Feudalism.

Commen'salism (literally, 'at the same table'), is the name given to one of the forms of association between animals or between animals and plants. Strictly speaking, it should be applied only to those cases where two animals share the same food, and confer mutual benefit; but in nature the various forms of association are so graduated that it is difficult to frame definitions which shall cover all the known cases. It seems better, therefore, to use the term in a loose sense, to cover those cases in which there is no evidence that the one animal inflicts temporary or permanent injury on the other; reserving the term *symbiosis* for such cases of intimate association as occur between algæ and animals, or algæ and fungi, and the term *parasitism* for cases where injury is certainly inflicted by the one organism on the other.

The stronger member of the partnership is called the *host,* the weaker, the *commensal.* Commensals usually live outside of their hosts as barnacles attach themselves to whales and remora fish to large aquatic animals. The association may be free as in the case of zoöphytes and hermits, which are frequently found quite away from each other. Or the association may be fixed in the following forms: (1) external unadvantageous as sponges on mollusc shells, (2) fixed external association where the commensal alone benefits as in the case of Cirripedes on whales, (3) fixed association with mutual advantage as polyps on crabs, (4) deliberate partnership with mutual benefit as sea-anemones on hermit crabs.

This last is one of the most striking instances of commensalism. On the Atlantic Coast of Europe the species of hermit crab *E. Prideauxii* almost invariably has a gay pink and white anemone (*Adamsia palliata*) placed on the back of its borrowed shell. When touched the hermit withdraws as far as possible into his shell, and the anemone at the same time discharges quantities of stinging threads (*acontia*) through holes in its body wall. The anemone very rarely occurs except on shells inhabited by this particular hermit crab; its body is modified to fit to the shape of the shell, the mouth of the anemone coming immediately beneath the mouth of the hermit; and finally—as was noticed by P. H. Gosse—the hermit in changing its shell removes the anemone to its new abode. The association is one of mutual benefit, the anemone obtaining food and the hermit protection.

As the hermit keeps growing throughout its life, but the shell in which it is contained does not grow, it must periodically exchange one dwelling for another. In the case of association between hermit and anemone, the anemone moves when the crab moves. Such a solution is impossible, however, where the commensal is a complex zoöphyte colony, or a diffuse, shapeless sponge. In such cases the operation of moving is often avoided or postponed by various artifices. Thus in the case of Hydractinia the colony grows at the margin of the shell, and actually enlarges it by laying down chitinous substance, so that the hermit can remain for a longer period within the shell than it otherwise could. In other cases, as in the commensalism between *E. cuanensis* and the sponge called Suberites, the commensal grows to a considerable size, and the hermit, discarding its original shell, depends entirely on the protective qualities of its partner. A further improvement upon this is the *American E. pubescens,* which has as commensal a polyp called *Epizoanthus americanus.* In this case a single polyp first settles upon the shell, and then buds until a colony is formed. The polyps exert a solvent action on the shell, so that this gradually disappears, leaving the hermit enveloped in the soft polyp mass, which apparently yields to allow for the growth of the hermit.

Commensals may live in the homes of their hosts. Those living in the homes of termites are called termitophiles; such are beetles, aphids, etc. Those living in the homes of true ants are called myremecophiles, some of whom produce agreeable excretions. Frequently animals such as tunicates or bivalve molluscs, which have within the body a chamber traversed by continual currents of water, contain messmates within these chambers. Thus the curious little pea-crab (*Pinnotheres pisum*) occurs in the gill chamber of the oyster, horse-mussel, and some other common bivalves; allied forms live within the pharynx of tunicates, the cavity of holothurians and elsewhere. There can be little doubt that in these cases the crab depends upon the inhalent currents of the host for food and oxygen, and that the benefit is chiefly upon its side. Such cases of commensalism tend to pass, by almost imperceptible degrees, into true parasitism, which is particularly common among various groups of crustaceans. Many forms of commensalism may indeed be described as simply stages in the acquisition of the parasitic habit. See PARASITES; SYMBIOSIS. Consult E. Step, *Messmates* (1913); W. Calman, *Life of Crustaceae* (1911).

Commen'surable. Two quantities or numbers are commensurable which are of the same kind, and each of which contains a third quantity or number (unity excepted) a certain number of times without remainder. See INCOMMENSURABLE.

Com'mentary. **(1.)** A memoir, such as Cæsar's *Commentaries* on the Gallic War. **(2.)** An expository treatise on a technical subject, such as law. **(3.)** Criticism of a text following the order of the text, as the various Commentaries on the Bible, Shakespeare, etc.

Commentry, kō-mäṅ-trē', town, department Allier, France: 9 miles southeast of Montluçon. Its importance dates from the commencement of coal mining in 1842. There are also iron works and foundries. Pop. (1931) 10,136.

Commerce. See EXPORTS AND IMPORTS; TRADE.

Commerce, city, Hunt county, Texas, on the St. Louis Southwestern Railroad; 60 miles N.E. of Dallas. It is in the midst of an extensive cotton, grain and live stock district. East Texas State Teachers College is located here. Pop. (1930) 4,267.

Commerce, Chambers of. See CHAMBERS OF COMMERCE.

Commerce Court, U. S., a court, consisting of five judges appointed as circuit judges of the United States, created by the law of June 18, 1910, to exercise jurisdiction in certain classes of cases arising under the Interstate Commerce Act, which, prior to the creation of the Commerce Court, had fallen in the jurisdiction of the circuit courts.

The first session of the Commerce Court was held on Feb. 15, 1911; and during the years following, the new Court and the Interstate Commerce Commission were in dispute over their respective limits of jurisdiction. The Commerce Court claimed the right to review the Commission's findings of fact, thus denying its final authority to fix rates; while the Interstate Commerce Commission declared that the Commerce Court was to enforce the Commission's findings of fact, but to review only the points of law, unless the rates fixed by the Commission were shown to be confiscatory. The U. S. Supreme Court in 1912 declared that the Commerce Court was to determine only whether the Commission's orders were contrary to law.

In 1911 opposition to the Court arose in Congress; and in 1912 two bills abolishing the Court were vetoed by the President. By action of the Sixty-third Congress it was abolished on Dec. 31, 1913, and the judges comprising it were assigned to duty as U. S. circuit court judges.

Commerce, U. S. Department of, one of the departments of the U. S. Government whose province it is to foster, promote, and develop the foreign and domestic commerce, the mining, manufacturing, shipping, and fishery industries, and the transportation facilities of the United States. It is administered by the Secretary of Commerce, who is a member of the Cabinet (q. v.).

The Department consists of the following bureaus: Bureau of Foreign and Domestic Commerce, Bureau of Air Commerce, Lighthouse Service, Bureau of Navigation and Steamboat Inspection, Coast and Geodetic Survey, Bureau of the Census, National Bureau of Standards, Bureau of Fisheries, Bureau of Federal Employment Stabilization, Patent Office, and Shipping Board Bureau.

About 65 per cent of the Department's funds are spent for purposes which are protective: the operation of lighthouses and marine inspection; the regulation and protection of air traffic; the preparation of charts; and the protection of the public against false weights and measures.

The Department was originally a part of the Department of Commerce and Labor, created by Act of Congress on Feb. 14, 1903. In 1913 a separate Department of Labor (q. v.) was created, and the older Department became known as the Department of Commerce.

The first Secretary of Commerce and Labor, appointed in 1903, was George B. Cortelyou. Victor Metcalf was appointed Secretary in 1904; Oscar S. Straus in 1906; Charles Nagel in 1909. William C. Redfield, the first Secretary of Commerce, was appointed in 1913. Joshua W. Alexander was appointed in 1919; Herbert Hoover in 1921; William F. Whiting in 1928; Robert P. Lamont in 1929; Roy D. Chapin in 1932; Daniel C. Roper in 1933.

Commercial Agency. See MERCANTILE AGENCY.

Commercial Agent, an officer stationed at a foreign port to attend to the commercial interests of the country he represents. He may have consular jurisdiction.

Commercial Analysis. See ANALYSIS, COMMERCIAL.

Commercial Court. In England since 1895 commercial causes entered in the High Court may be placed in a special list to be dealt with, under a more rapid form of procedure, by a judge assigned for the purpose. This arrangement depends merely on an agreement between the judges of the King's Bench Division.

Commercial Crises. See CRISES, ECONOMIC.

Commercial Education, as defined in the practice of the various schools which offer it in one shape or another, includes all instruction designed to fit students for engaging in business. In medieval times business training was by apprenticeship and gave both technical skill and ability to conduct business in an environment complicated by difficult economic and social conditions. There was a literature on commercial arithmetic and accounting at least as early as the 14th century in Italy. Formal direction and constant contact with the master were held sufficient training until the machine age made a more restricted business education necessary. Letter writing, calculating, accounting, and communication required accuracy on the part of clerks, to provide which the private commercial school came into being. The earlier commercial schools both in America and in Europe undertook little more than the preparation of youths for filling clerkships. On the continent of Europe, where commercial instruction dates back at least to 1820, the primitive course of study was much more inclusive than that just mentioned, adding history, geography, and other elementary courses supposed to make for a more intelligent interest in business. Since these crude beginnings, commercial education has been developed to a very high degree in Europe where very advanced types of business schools exist and in the United States where business education is most extensively developed.

Of the six Higher Schools of Commerce in Germany before the World War—at Berlin, Leipzig, Hamburg, Cologne, Aachen, and Frankfort-on-the-Main—that at Berlin, the Handelshochschule, was easily foremost in the Empire. It was controlled by the Corporation of Merchants of Berlin. Its course of work was for teaching and investigation and the approval of the curriculum by the Prussian Minister of Instruction made it official. It was and is of university grade. Its students are not only young men and women preparing for teaching and practical work, but mercants in business. The instruction includes, besides the obvious subjects—such as accountancy, banking, economics, etc.—training in the technology of the chief industries, sociology and political economy, and the study of commercial and marketing problems. Below the Handelshochschule are elementary and secondary commercial schools with courses varying from one to three years.

France has had some form of commercial instruction in schools since very early in the 19th century. Schools of the primary and intermediate type were numerous. The Superior Schools of Commerce were recognized by official decree in 1890, and the courses of study were under official supervision, and uniform in type, and in consequence less valuable and efficient than they might have been. Of the thirteen higher schools of commerce in France, that of Paris was the oldest, having been founded in 1820 as a private undertaking, and taken over by the Paris Chamber of Commerce in 1870. This school, the École des Hautes Études Commerciales, is of university grade, and requires the bachelor's degree of students entering without examination. It is the most important school of commerce in France. There is also commercial instruction in primary and intermediate schools.

In Italy modern commercial education began in 1868 when a Commercial Institute of university grade was established at Venice. Other higher commercial schools were organized which, numbering five in 1913, were put under government regulation in that year, a bachelor's degree being required from entering students. The curriculum resembles that of the German higher schools, though the technology of industries is omitted. They have greatly influenced the other types of commercial schools in Italy which include 'complementary schools,' 'commercial schools' and 'commercial institutes.'

England was backward in commercial education, a distinguished English authority concluding a paper on that subject as late as 1899 with a comparison of what he had written with the celebrated account of 'snakes in Ireland.' The Technical Instruction Act of that year, however, was construed to cover commercial education, and county and city councils have done a good deal since then to provide commercial instruction. The Chamber of Commerce of London for some years conducted examinations for clerks, giving certificates of proficiency in various subjects; and other chambers of commerce accepted these certificates as evidence of adequate commercial education. The rise of the London School of Economics and Political Science in 1895, and its success in a wide range of instruction essentially commercial, which led to its admission to London University in 1900, put a new aspect on the matter. The London School gave high-grade instruction, comparable in quality with that of the Continental schools. There was a higher school also in Liverpool. The English employer has been rather sceptical of the value of specific preparation for business before entry thereto; but he demands of his employees a greater effort in equipping themselves in highly specialized branches of study; hence evening classes in commercial education are provided by three main agencies: the universities, the local education authorities, *i. e.,* the municipalities and county councils, and proprietary institutions. Training of university grade was first undertaken in 1901 in Birmingham and is to be found normally in a three-year course in about six British universities. The chief agencies of the local authorities are the continuation or Technical Schools or Colleges which provide junior, senior and advanced courses, attendance being optional. Private commercial schools appeal to a more exclusive group and some of the better known specialize in preparing students for a particular profession.

Commercial education in Japan commenced in 1875 when a private business college was founded in Tokyo. It was soon transferred to the Government and became a Higher Commercial School. The institutions specializing in commercial education in Japan are Commercial Universities, Higher Commercial Schools, Secondary Commercial Schools, and Commercial Continuation Schools. Every effort is made to foster business education.

Czechoslovakia is very active in the expansion of business education. Following independence in 1918 many commercial academies, apprentice continuation schools and two-year business schools were established. In 1919 the Graduate School of Commerce was founded at Prague giving advanced training in business and economics so that students may become 'organizers of the economic life of the State.' In 1931 the Commercial Academies received a new normal curriculum similar to the four-year course in American commercial high schools.

In Spain, commercial education is not fostered in the universities. Business knowledge is taught only in official Business Schools depending on the State, or in private schools. The former prepare students for practical jobs and also official positions; the latter lead to only modest commercial jobs, through courses in bookkeeping, typewriting, shorthand and languages.

In Switzerland, about one-half of the business men are trained in three or four years of apprenticeship, during which they attend lessons; and they attend higher classes afterwards. The other half of the business recruits attend full-day commercial school, and a few attend the Commercial University of St. Gall, which is of German 'Handelshochschule' type, or one of the country's great universities, which provide courses similar to those in the American University Schools of Business Administration.

Austria had a well-developed system of commercial instruction as far back as 1840, though the efficiency of the system was not high. The system was reorganized in 1888 by the Minister of Public Instruction of the Empire, with the result of providing grades of commercial schools, much after the system then existing in Germany. There are four business school categories in Austria: the commercial continuation school; the two-year commercial school, preparing for office work; the commercial academy, preparing by a four-year course, for the wholesale trade, and banks; and the commercial high school which confers the title of Doctor of Commercial Science following a two-year course. The High School for International Commerce in Vienna is the highest of these.

In the United States commercial schools, associated with the names of Bryant and Stratton, Comer, and Packard, arose about 1840, though the pioneer may have been R. M. Bartlett, who started a school in Philadelphia in 1834. Packard began as an itinerant teacher of penmanship about 1840, organizing schools in many places. So also did Platt R. Spencer, the author of the Spencerian system of handwriting, which was an early scientific system of penmanship, though based on the work of a contemporary named Dayton. Stratton was a pupil of Spencer. Bryant and Stratton opened their first commercial college in Cleveland, O., in 1853, and proceeded to establish other 'colleges' with local partners in some fifty cities. Their attempt to monopolize control of all such institutions was broken by their partners, who were alive to the need of better instruction. The course of study was gradually lengthened to two years, and the Spencerian College at Milwaukee and the Packard College in New York turned out many thousands of graduates who were well trained, considering the circumstances and the requirements of business men at that time. Notable private foundations for furnishing commercial education established in the 'eighties and 'nineties were the Drexel Institute (see DREXEL, A. J.) in Philadelphia, and the Pratt Institute (q. v.) in Brooklyn, N. Y.

The movement spread to the public school system. An early trial of shorthand had been made in the Central High School in Philadelphia in 1849, and numerous short courses were established in the public high schools in the 'eighties and 'nineties. In 1898 there was opened in the Central High School of Philadelphia the School of Commerce, with a four-year course of study patterned somewhat after the European model of a commercial school.

Four influences at least operated to lengthen the course of the secondary commercial school: first, comparison with other educational courses conducted by the same institutions, as general and manual training courses, which were longer in extent and with a better academic basis; second, the development of higher commercial schools in America with their broader treatment of commercial studies and professional outlook; third, the example of foreign commercial schools, with longer courses and more ambitious educational undertakings; fourth, and perhaps most important of all, the demand of business itself for those who had broader intelligence, more mature judgment, and more highly specialized skill. All of these forces combined to change the one-year course to a two-year course, the two-year course to a three-year course, and the three-year course to a four-year course. By 1900, we may say that the approved commercial course for the public high school was four years.

Of commercial instruction given by colleges or universities in the United States, the first example was the Wharton School of Commerce and Finance founded in 1881, as a part of the University of Pennsylvania. The four-year course at this school is elaborate and of advanced grade. The University of Wisconsin was offered a fund for a commercial education course as early as 1866, but the offer was not accepted; and it was not until 1900 that Wisconsin offered a group elective system of a commercial character, leading to the bachelor's degree. The University of Chicago has a separate faculty for its College of Commerce and Administration. The University of California was the first to adopt the name and idea of the 'College of Commerce.' The University of Michigan established a School of Business Administration in 1924 which was an outgrowth of the Department of Economics founded many years before.

The New York University School of Commerce, Accountancy and Finance, opened in 1900, offered a wide range of courses and became the largest school of its kind in the world with 9,000 students in 1931 and 75 professors and 130 instructors and lecturers in 213 different subjects. Its Graduate School of Business Administration confers the master's degree.

The Boston University College of Business Administration established its Evening Division in 1913 and its Day Division in 1916. It has a Graduate Division conferring the master's degree following a two-year course. Columbia University and Northwestern University offer two years of business training following two years of college work.

The most distinctive of American business schools is the Harvard Graduate School of Business Administration, which requires the bachelor's degree for admission as candidate for its own degree. The school, founded in 1908, offers advanced instruction in the usual subjects, such as business and banking law, accountancy, contracts, business and commercial organization, etc. The second year of the two-year course is devoted largely to practical investigation in business establishments opened to the school. It is noted for its use of the 'case method' of instruction. To collect authentic business cases, a Bureau of Business Research was formed and Harvard Case Books are used in about 150 colleges and universities. The case method is an effort to introduce into business teaching a combination of the case method of teaching law and the clinical method of teaching medicine. Its aim is to give students command over new concrete situations by applying to new facts the lessons of similar events in the past. Co-operation with local business enterprises has been developed in American business schools, the University of Cincinnati being a conspicuous example. About 250 firms co-operate with the school and the students spend half their time in paid employment.

Broadly speaking there are in the United States three types of public institutions giving commercial education. The first are elementary in character, covering the seventh, eighth, and ninth school years. These are the last two years of the old grammar school course and the first year of high school, or, speaking in terms of a present tendency, the period of the junior high school. The best educational thought seems to be that commercial education in these years should be general in character and of the 'sampling' or 'try-out' variety, in order to give an all-aroundness of development to those who are not to elect commercial studies, and to furnish at the same time a sufficient background by which an intelligent election can be made for the last three years of the secondary school period.

In the tenth, eleventh, and twelfth school years more highly specialized commercial instruction is generally given. For a considerable time this instruction was mainly along the lines of either bookkeeping and general office practice, or stenography, typewriting, and secretarial work. A third division now claims a place in commercial education. Salesmanship, store service, business organization, economics, and related subjects offer a field in their entirety even larger and more promising to those who are pursuing commercial education than either of the traditional lines above mentioned.

There are hundreds of private business schools in America and a limited number of endowed institutions maintaining commercial courses. In general these courses are much abbreviated, more highly technical, and more practical in character.

Supplementary to, rather than competing with public secondary education are the company schools, formerly called corporation schools, opened by large corporations for the specialized training of their employees.

High schools in the United States usually offer a four-year business course, but a two-year course is common. High schools of commerce are found in many cities. High school evening commercial courses are often provided and short intensive postgraduate technical courses are given in some places. Generally high school business education is of the type that produces clerks trained in mass production methods. A few teachers have turned business teaching into broader channels by emphasizing studies in economics and social culture.

It should be observed in conclusion that as 'spontaneity is the keynote of American education,' so it is essentially the means of understanding the origin, growth, and present conditions of commercial education. Commercial schools were established because of a need for the instruction which they give. They have grown in response to obvious demands, and their prosperity and wide influence result from their having recognized their field and suited their instruction to the public need.

Consult J. Bossard and J. Dewhurst, *University Education for Business* (1931); C. Fraser, *Case Method for Instruction* (1931); J. Graham, *The Evolution of Business Education in the United States and its Implications for Business-Teacher Education* (1933); B. R. Haynes and H. P. Jackson, *History of Business Education in the United States* (1935); F. G. Nichols, *Commercial Education in the High School* (1933); Eastern Commercial Teachers' Association *Yearbooks; Journal of Business Education; Proceedings* of the International Congress on Commercial Education.

Commercial Law. See LAW MERCHANT; MERCANTILE LAW.

Commercial Paper. See BILL OF EXCHANGE; NEGOTIABLE INSTRUMENTS.

Commercial Registers. See MERCANTILE AGENCY.

Commercial Traveler, a representative of a wholesale or jobbing house, sent out to secure contacts or orders—is familiarly known as a 'drummer' in the United States. He sells by the aid of samples, price lists, etc., and carries no goods for sale.

Historically, the commercial traveler is in a sense the successor of the chapman or traveling merchant of earlier ages but his operations are on a more extensive scale and his methods very different, since his predecessor carried his stock of wares with him. The rise of the factory system, increased facilities in banking, improved means of locomotion, and the growing competition for business have made the commercial traveler an important factor in the commercial world.

Special agreements among the principal countries of Europe and the United States facilitate the customs inspection of commercial travelers' samples; and many nations remit the duty on such samples, or refund the duty on their re-exportation within a specified time.

It is claimed that the number of commercial travelers has decreased during the 20th century because of the concentration of the management of business in the hands of the trusts. Commercial travelers in the United States are organized in various associations in order to promote their interests as a class. One of the most important of these is the Commercial Travelers' Protective League.

Consult H. N. Casson, *Tips for Travelling Salesmen* (1929); F. W. Schrubsall, *Training for Travelling Salesmen* (1928); A. Warren, *Commercial Travelling: Its Features Past and Present* (1904).

Commercial Treaties are contracts between states relating to the rights and protection of persons and property, to commerce, navigation and consular jurisdiction, and may include special provisions as to customs, tariff rates, etc.

A treaty of commerce and navigation was concluded between Rome and Carthage as early as 509 B. C.; and trade agreements were common in the Middle Ages among the Italian city republics and the Mediterranean states. The 'capitulations' concluded between Turkey and the Christian European nations granted trading privileges to subjects of the latter residing in Turkey. The treaties of commerce of the 17th and 18th centuries dealt chiefly with the treatment to be accorded the individual traders of each contracting nation in the dominions of the other. The principle of reciprocal reductions in duties was employed only to a limited extent until the nineteenth century, when it became the cardinal point in commercial negotiations.

In the seventeenth century, the idea of permission being necessary for mutual trade between the subjects of two states gave way to the regulation of details in that intercourse, and the determination of privileges, incapacities, or exemptions under the local law. By extending to a third nation privileges granted to particular countries, 'the most favored nation' clause came into existence. This clause appears in a treaty between England and Portugal of 1643, and in the Treaty of the Pyrenees of 1659, and was therefore generally introduced without conditions in commercial treaties.

The first commercial treaties entered into by the United States (18th century) made this clause conditional upon the granting of equivalent concessions; and American practice and interpretation long adhered to this conditional form. It was not until the commercial treaty with Germany in 1925 that the United States adopted the unconditional form of the most-favored nation clause. In a statement released by the Department of State, April 1, 1935, outlining the 'Policy of the United States Concerning the Generalization of Tariff Concessions under Trade Agreements' the unconditional most-favored-nation principle was upheld as the 'most effective means of bringing about rapidly a general reduction in trade barriers, of giving elasticity to trade arrangements, and of expanding foreign trade.'

In Europe, reciprocal concessions were the rule in the early 19th century; the unconditional principle was used under the European treaty system from the Cobden treaty (1860) to the World War; after a period of doubt as to its utility, it again became the accepted practice because it was believed that it contributed to commercial stability. Great Britain, however, in 1932 entered upon a program of reciprocal agreements in bilateral treaties. Her 'new-model' trade agreements were thus conditional and represent bargaining, to 'secure stability and continuity in export trade.' See TRADE; RECIPROCITY; TARIFF and TARIFF SYSTEMS.

Consult W. Culbertson, *International Economic Policies* (1925); *Commercial Treaties* in *Encyclopaedia of the Social Sciences* (1931); *U. S. Commerce Reports* (1935).

Commercy, ko'mâr'sē', town, Meuse department, France, 26 m. east of Bar-le-Duc. It has iron works and manufactures of boots and shoes. Pop. (1931) 7,303.

Commers, kō-mers', social gatherings of German students at which academic anniversaries are celebrated with songs, speeches, and the drinking of beer.

Commina'tion, a service announcing God's judgment against sinners, which was used in the early church, and which is appointed to be read on Ash Wednesday throughout the Anglican Church. This office is one of the last memorials retained by the English Church of those public acts of penitence which were conspicuous in the primitive church. The present service of the Church of England is of very early origin, and is found in the MS. Sacramentary of Leofric (A. D. 800–900). The American Prayerbook omits this office, but several prayers taken from it are appointed to be said on Ash Wednesday at the end of the litany.

Commines. See COMINES.

Com'minuted Fracture, a fracture in which the bone is broken into fragments. See FRACTURE.

Commissariat, kom-i-sā'ri-at, a general term denoting the system by which armies are fed and supplied with daily necessities of life in peace and war. The subsistence of an army in the field, especially when in motion, is a difficult problem; and since upon its proper solution depends the health, if not the very existence, of the soldiery, it requires the highest efficiency in the organization charged with these duties. In the U. S. Army, the duties of the commissariat devolve upon the Quartermaster Corps (q. v.). See RATIONS; ARMY OF THE UNITED STATES. Consult *U. S. Army Regulations.*

Com'missary, in the U. S. Army an officer detailed at each post to the staff of the post commander to perform all duties relative to procuring and issuing the rations to the enlisted men, and the sale of subsistence stores as authorized by army regulations. The term is also applied to the storehouse in which rations and other supplies are kept for issue and sale. See COMMISSARIAT; RATIONS.

Commissary, in ecclesiastical law, is a bishop's deputy, who may be appointed to perform the bishop's duties in out-of-the-way parts of the diocese. He may be a deputy either for spiritual or for legal business. In the latter case, he may be a layman, and practically has the same powers as a chancellor of a diocese.

In the Soviet Union a commissary is similar to a cabinet minister, *e. g.*, Commissary for Foreign Affairs, Finance, War, etc.

Commissary General, formerly an officer in the U. S. Army, with the rank of brigadier-general, chief of the Subsistence Department. The office was abolished with the organization of the present Quartermaster Corps (q. v.) and the discontinuance of the Subsistence Department.

Commission, in business, an allowance made for services rendered to one who acts as agent for another in the sale or purchase of goods. It is usually a percentage on the amount of money involved in the transaction. Commercial travelers and other salesmen often receive all or part of their remuneration in commissions; and such compensation is granted to executors and trustees of estates. Agencies of various sorts, brokerage houses, etc., transact their business on commission.

Commission, in politics, is a board appointed with specified duties and limited jurisdiction. The word is often loosely used, sometimes as a synonym for committee. Commissions may be divided into international and domestic. International commissions are appointed to adjudicate a dispute or arrange an agreement with a foreign power, and may include representatives of neutrals as well as of the contending nations. Domestic commissions may be appointed to investigate a subject and make a report to the creating power, with or without suggestions for legislation; or they may be created to plan and construct particular public works, such as highways, buildings, sewer or water systems; or they may be appointed to adjudicate a particular question or set of questions.

Recent years have seen a rapid development of permanent commissions, possessing administrative, legislative, and judicial powers, conferred either by Congress, the State legislature, or even by the State constitution. The most important are those created for the purpose of regulating railroads and other public service corporations. Some of them are merely advisory; others have authority to fix rates, to oversee the issue and sale of corporate securities, to grant and revoke permits and to require reports; others administer factory inspection laws and minimum wage laws; others are set up to conserve forests, fish and game, waterways, etc. Civil service, labor, municipal art, and similar commissions likewise exercise powers delegated by legislation, and their actions are subject to review by the courts. For various public commissions, see such titles as INLAND WATERWAYS COMMISSION; INTERSTATE COMMERCE COMMISSION; PUBLIC SERVICE COMMISSIONS; COMMISSION OF FINE ARTS. See also COMMISSION GOVERNMENT.

Commission, MILITARY, a written certificate of rank or authority. In the United States Army it is bestowed by the President, confirmed by the Senate, and issued by the War Department through the Adjutant General's office. U. S. Army Regulations define military rank as 'that character or quality bestowed on military persons which marks their station and confers eligibility to exercise command or authority in the military service within the limits prescribed by law. It is divided into degrees or grades which mark the relative positions and powers of the different classes of persons possessing it.

Commission, SECRET. A secret commission may be defined as an advantage derived by an agent in the course of his employment as agent, without the knowledge of his principal, from a third person. All such advantages, whether they take the shape of money, presents, or information, belong at law to the principal and not to the agent; and the agent will be liable to account for them to the principal, even though the principal has suffered no loss in consequence of the secret commission.

By English law, if it is shown that the principal has suffered loss owing to the secret commission, both giver and receiver will be liable to damages. By the Prevention of Corruption Act, 1906, the obtaining or attempting to obtain any gift or consideration as an inducement or reward to an agent for doing or forbearing to do any act, or showing or forbearing to show any favor or disfavor to any person in relation to his principal's business, is a misdemeanor on the part of both giver and receiver, punishable by fine or imprisonment or by both. The act extended to Scotland and Ireland. In the case of public officials, secret commissions are called bribes. See BRIBERY.

Commission Agent, or COMMISSION MERCHANT, a person employed to sell goods for another for a certain percentage. See BROKER; COMMISSION.

Commissionaire, kom-mish-un-âr', the attendant at Continental hotels, who awaits the arrival of trains and steamboats to secure customers, and take charge of luggage. In 1859, Sir Edward Walter, K. C. B., established a *Corps of Commissionaires,* composed of retired British soldiers, with divisions in the principal British cities.

Commissioner, one who has a commission or warrant from some specific authority to perform some special duty. See COMMISSION.

Commissioner of Deeds. See Notary Public.

Commission Government, a form of city government which unites the executive and legislative departments of a city, and vests them exclusively in a small board of officers numbering from three to nine—five being the usual number—elected by the voters of the municipality. The term of office of commissioners varies from two to six years. In some cities partial renewal of commissions is used, *e.g.,* in North Dakota one commissioner is elected each year to give continuity of personnel and of policy. As a body they enact the city ordinances, make appropriations, fix the tax rate, and appoint officials; as individuals they become administrative heads of the city departments. The following departments are generally found: public safety, municipal finance, public works, public utilities, health and civic welfare. In some commission-governed cities the title of mayor is retained for the commission's presiding officer, who is usually commissioner of public affairs.

The hope that this concentration of power would lead to a more businesslike administration of municipal government has not been realized for the following reasons: disagreements among the commissioners on a three-to-two basis hinder progress; each commissioner gives undue prominence to his own department instead of regarding the city government as a whole; political influences continue to dictate against administrative efficiency. Undoubtedly the success of the commission plan depends upon an intelligent exercise of public opinion which the commission must respect.

The experiences of St. Paul and Nashville are illustrative. In the former case there was lack of coördination of activities resulting in duplication of effort, rivalry between heads of departments, and increased cost of government administration. In Nashville there were rivalry, political antagonism and quarrels, lack of planning, improper distribution of funds.

Commission government claimed the following merits: promptness and efficiency, centralization of responsibility, responsiveness to public opinion, and greater zeal in the performance of public duties by the commissioners. Opponents of the commission plan point out the absence of checks and balances, the abandonment of the principle of separation of powers in the appropriating and spending of money, the failure to select qualified administrators by popular election, the absence of a single responsible head, and the impossibility of a small commission to represent all groups and shades of opinions in a great city. The council is too large for executive and administrative purposes and too small for legislative purposes. On the administrative side, therefore, which is the most important side of city government, the commission plan is admittedly weak. This accounts for the popularity of the council manager plan which is in a sense an outgrowth of commission government, being an attempt to remedy its defects.

History of Commission Plan.—The charter granted to Sacramento in 1863 conformed very closely to the commission plan. A board of trustees of three members elected for two years formed the legislative body and were severally in charge of the departments of (1) Police, (2) Streets, and (3) Waterworks. New Orleans in 1870 also adopted the commission plan. Other early cases where city governments resembled the commission plan were Washington, D. C. (1874), Memphis (1879) and Mobile (1879) but none of these were such striking precedents for the commission plan as Sacramento and New Orleans. It remained for Galveston, Texas, to popularize the plan after that city suffered a devastating tidal wave in 1900. Loaded with debt by inefficient administration, the people appealed to the Deepwater Committee, a business organization, who framed a new charter having the commission plan as its central idea, 'placing entire control of local government in the hands of five commissioners, designed to benefit the people rather than to provide sinecures for politicians.' The legislature granted the charter in 1901 and it went into operation the same year. Two of the commissioners were elective and three were appointed by the governors of the State. The courts declared the charter unconstitutional in that it deprived the citizens of a voice in the selection of persons who were to govern them and the legislature accordingly made the entire commission elective. The immediate and remarkable success of commission government in Galveston received nation-wide publicity. In 1905 Houston adopted the plan but the mayor was given the veto power and the power to appoint all heads of departments with the consent of the other commissioners and the latter were to devote their entire time to their offices.

However, Des Moines, Iowa, must be credited with a large share in the success of commission government. A bill permitting the use of the plan by cities ot Iowa became a law in 1907. Features which were embodied in the *Des Moines Plan* were the initiative, referendum and recall, and a non-partisan ballot for primaries and elections. Thus a means was provided by which the commission could be held responsible for the exercise of its power, which accounted for the rapid spread of the plan to other large cities. About 1917 the movement was at its peak when about 500 cities were commission-governed. Thereafter the number of cities thus governed steadily decreased, the majority adopting the council manager plan. Some went back to the mayor and council plan, *e.g.,* Buffalo. Among the large cities using commission government as late as 1934 were: Birmingham, Des Moines, Jersey City, Memphis, Newark, New Orleans, Omaha, Portland, St. Paul, and San Antonio.

When compared with earlier forms of city government the commission plan displays some notable advantages: the voter's task is generally rendered simple; the government is easy to see, easy to understand, and easy to follow; the small size of the executive body makes possible expeditious handling of the public business; unification of powers makes it difficult to shift responsibility. It may, therefore be said that while the commission plan is a step forward in municipal organization, simplifying and unifying the government and making popular control more effective, it has not achieved the administrative results hoped for it, nor put the administration on a permanent and professional basis.

City Manager or Council Manager Plan.—The latest and most popular development of the commission form of government is the city manager plan, originating in Staunton, Va., in 1908, where Charles E. Ashburner was selected as the first city manager at a salary of $2,500 per year. But it was Lockport, New York, which popularized the idea, when in 1910 its efforts to adopt the plan were defeated. The matter received wide publicity at the time. The first city to adopt the council manager plan by charter amendment was Sumter, S. C. (1912) and the first city to establish firmly the city manager idea was Dayton, Ohio (1912), the first large city to demonstrate the plan's efficiency. Other large cities which had doubted its practicability now followed Dayton's example. By 1918 the plan was in effect in 81 cities; by 1922, in 240 cities; by 1933, in 429 cities. In 1933 there were 13 council manager cities in Canada, three in Ireland and one in Puerto Rico.

Under the city manager plan the people elect a council which in turn appoints the manager who is the chief executive officer, having direct charge of all administrative duties and removable by the council at any time. Since the council is usually a small body, the plan is comparable to that of a business corporation with the people as stockholders. The manager is a professional officer, chosen for his special ability and herein lies the essence of the plan. Other advantages of the plan are the complete unification of powers with a separation of functions; and complete separation of the political from the administrative branch of government. Opponents of the city manager plan claim that it fails to provide adequate political leadership and that eventually an oligarchical administration will be the result; that in practice it does not actually separate politics from administration; that the managers chosen are often men of mediocre attainments, mere politicians who lack training and experience for the position. In conclusion it may be said that the arguments in favor seem to be more cogent than those against, and that the city manager plan calls for more integrity and intelligence than earlier plans of organization and seems to be gaining in popular favor.

Consult G. Benson, *City Managers and German Burgomasters: a comparison* (*National Municipal Review,* May 1933); W. P. Capes, *The Modern City and Its Government* (1922); T. S. Chang, *History and Analysis of the Commission and City Manager Plans of Municipal Government in the United States* (1918); E. S. Griffith, *Current Municipal Problems* (1933); C. M. Kneier, *City Government in the United States* (1934); A. F. Macdonald, *American City Government and Administration* (1929); W. B. Munro, *Municipal Administration* (1934); T. H. Reed, *Municipal Government in the United States* (1926); C. E. Ridley and O. F. Nolting, *The City Manager Profession* (1934); C. P. Taft, *City Management; the Cincinnati Experiment* (1933); L. D. White, *The City Manager* (1927); International City Managers' Association's *City Manager Yearbook.*

Commission Merchant. See COMMISSION AGENT.

Commission, Military, in military law, a court for trying offenders against the laws of war. See COURTS, MILITARY.

Commission of Appeals, a court appointed in some States for a limited period, to determine appeals when the permanent court is overburdened with business.

Commission of Fine Arts, National, a permanent board, established by act of Congress in 1910, composed of three architects, one landscape architect, one painter, one sculptor, and one layman, who are appointed by the President for four-year terms, and serve without compensation, other than actual expenses incurred in discharge of duty. The plans of all new structures to be erected in the District of Columbia under the Federal Government, and all questions involving matters of art with which the Federal Government is concerned, must be submitted to the Commission for advice and comment before final action is taken. In 1930 the Commission was given control over certain parts of the city in the matter of private buildings (Shipstead-Luce Act). Annual reports are issued.

Commission, Public Service. See PUBLIC UTILITY REGULATION.

Commissions, U. S. Army, certificates of military rank and authority issued by the President of the United States, and confirmed by the Senate. In peace time all original commissions in the Regular Army, except the professional branches, *i.e.,* Medical Department, Judge Advocate General's Department, Dental Corps, Veterinary Corps, Medical Administrative Corps, and Corps of Chaplains, are issued in the grade of second lieutenant of Infantry, Cavalry, Field Artillery, Coast Artillery Corps, Air Service, Corps of Engineers, Signal Corps, Ordnance Department, Quartermaster Corps, Chemical Warfare Service, Finance Department, and Philippine Scouts. After the year's graduating class of the United States Military Academy has been commissioned, vacancies may be filled by appointment from civil life.

A soldier, to be eligible to compete for appointment in the class of enlisted men cited above, must be a citizen of the United States, between the ages of twenty-one and thirty years, physically sound, of good character before and after enlistment, and with two years' honorable service in the Army. A soldier fulfilling these requirements, except having less than the required two years' service, may be commissioned among the civilians. A civilian, to be eligible, must be a citizen of the United States, between twenty-one and thirty years of age, must be either a member of the Officers' Reserve Corps, Enlisted Reserve Corps, National Guard, or a graduate of a technical institution approved by the Secretary of War, and must be examined and approved as to habits, moral character, mental and physical ability, education, and general fitness for the service. The National Defense Act, as amended, provides that in time of war any officer of the Regular Army may be appointed to higher temporary rank without vacating his permanent commission, such appointments in grades below that of brigadier-general being made by the President alone, but all other appointments of officers in time of war shall be in the Officers' Reserve Corps. Every officer, on promotion, receives a new commission in the grade to which he is advanced. See RANK AND COMMAND. Consult *U. S. Army Regulations.*

Commissure, an anatomical term applied to nervous connections between adjacent parts of the nervous system. Though it is not always used in the same way, the general significance is that of a uniting bridge.

Commitment, an engagement. Used in speaking of the money market to signify liabilities arising in the immediate future. Thus, to say, 'Money is easy, as there are no fresh commitments,' means that loanable capital is available to borrowers at low rates because no big demands for capital (*e. g.,* when government or corporation loans are being issued, or when company promoting is active) are anticipated for the time being.

Committee, usually a selected portion of a larger body to which is committed or entrusted some particular act or course of action to be carried through, or some investigation to be performed, on behalf of the larger body; but it may also, in some important cases, be the whole body acting in a different capacity under different rules.

Committees are elected by nearly all clubs and societies to act as executive on ordinary matters, and public bodies frequently delegate part of their powers to standing committees, appointed to look after particular branches of their affairs.

In the U. S. Congress, every proposed measure is referred to the appropriate committee; its details are arranged there, if the committee is disposed to urge its enactment; if the committee refuses to report the measure favorably, it is usually dropped.

The members of the various committees are appointed by the Speaker; a majority, including the chairman, are of the majority party, but the minority party is always represented. In the Senate election to committees is nominally by ballot, but in practice a conclave of Senate leaders makes up the assignments to committees. The principal committees of the House are the Rules, Ways and Means, Appropriations, Foreign Affairs, Judiciary, Elections, Commerce, Military Affairs and Naval Affairs. The Committee on Rules, composed of the Speaker and the two principal leaders of each of the great parties, has the power practically to direct the course of legislation. It may at any time bring in a report requiring a vote to be taken on a specified measure at a specified time; and the report must at once be voted upon, subject to one vote upon a motion to adjourn. In practice the power of the Speaker is sufficient to compel the adoption of a report of the Committee on Rules. When the House and the Senate are in the main agreed upon a particular measure, but disagree as to particular details, a conference committee, composed of members of both houses, is appointed to take charge of the measure and discover some middle ground upon which both bodies can agree. Sometimes the measure reported by the conference committee, and voted without debate, is made up of provisions previously agreed upon by neither house. In the legislatures of the larger States there is an analogous committee system, with analogous functions.

Committees of Correspondence, committees appointed immediately before and during the American Revolution, in the various colonies and in their political subdivisions—townships counties, cities, parishes, etc.—to represent their constituencies in various matters, and particularly to correspond and concert measures with one another. At the outset no other agency did so much to unite the colonies within themselves and the several colonies with one another in opposition to Great Britain, and to bring about concerted action; they constituted a revolutionary and revolutionizing force, whose effectiveness it is hard to overestimate. The appointment of such committees was suggested certainly as early as 1754 by Peters and in 1766 by Jonathan Mayhew, but the first committee of correspondence of the Revolutionary period was the Boston committee (1772) whose creation was due to Samuel Adams.

By the early part of 1774 the assemblies of all the colonies, except Pennsylvania, had appointed similar committees. These assembly committees, however, were greatly hampered and restricted in their freedom of action, owing to their being, in effect, merely standing committees of their various assemblies; and the most effective work was done by committees appointed more directly by the people themselves. The best account of the committees of correspondence is that by Collins in the *Report of American Historical Association for 1901.*

Committees (or **Councils**) **of Safety,** committees appointed in the various American colonies engaged in the American Revolution, primarily to act as a sort of executive board. They were chosen as a rule by the provincial conventions, and served an important purpose during the interval between the deposition of the royal governors and the organization, after the adoption of the Declaration of Independence (1776), of new State governments. The first of these committees was appointed in Massachusetts in the fall of 1774.

Com'modore, a courtesy title in the United States and British navies. Previous to 1862 there existed in the United States navy no grade higher than that of captain, but captains who commanded squadrons were given the courtesy title of commodore. In 1862 the grade of commodore was established by law. It continued to exist as a grade between that of rear admiral and captain until 1899 when it was abolished (except for the retired list). In the British navy, commodore is an office of a temporary nature, conferred upon a captain in command of a small squadron or station, entitling him to exercise most of the functions of a flag officer. In yacht clubs the commodore is a courtesy office entitling the holder to take charge of certain club affairs such as regattas, cruises, and the like; in the merchant service the senior master serving afloat is cometimes called the commodore of the line.

Com'modus, Lucius Aurelius (161–192 A.D.), Roman emperor, the son of Marcus Aurelius and Faustina. He succeeded his father as emperor of Rome in 180 A.D. He was one of the most bloodthirsty and contemptible tyrants that ever disgraced a throne, degrading his position by fighting over seven hundred times as a gladiator (wearing full armor, while his opponent's weapons were of lead or tin), and by slaying wild beasts in the arena. Finally his mistress failing in a plot to poison him, summoned an athlete, Narcissus, to strangle him.

Common, in the law of real property, the right which one person has, together with others, of taking some profit from the land of another, or of the state. However, the term is also used to designate what is, strictly speaking, a *profit à prendre;* that is, an exclusive or several right of the above character, in one or a limited number of individuals. In this latter sense it includes: (1) Common of pasture, or the right of feeding beasts upon the land of another. (2) Common of piscary, or the right of fishing in the waters on another's land. (3) Common of estover, or the right of cutting a certain amount of wood on the land of another. (4) Common of turbary, or the right of digging turf upon another's land. In England, practically every village formerly had an unenclosed parcel of land, as to which no one claimed to be exclusive owner; and as to these lands the right of common was claimed and exercised by all the villagers. Most of this common land has been taken in modern times by eminent domain or under various statutes, by the state or individuals. The name has been retained in the United States chiefly to designate parcels of land set aside by the municipality for public gatherings or for games, and the like, for the pleasure of the community. See EASEMENTS; REAL PROPERTY.

Common Carrier. See CARRIER.

Commoner, in Great Britain, any person below the rank of a peer. The term 'Great Commoner' has been applied to Lord Chatham, John Hampden, and Mr. Gladstone. At Oxford, Cambridge, and Dublin universities a 'fellow-commoner' is a student who pays the highest fees and eats his 'commons' at the fellows' table.

Common Forms, forms of personal actions under the common law system of pleading, under which an action could only be commenced by obtaining a *writ* from the proper court officer. These writs were limited in number, and by their terms only applied to certain ordinary causes for complaint, and this gave rise to the practice of allowing the pleader to prove the true state of facts under the fictitious allegations of a writ most nearly applicable to his case. For example, under the writ in trover, which set forth that personal property had been lost by the plaintiff and found by the defendant, the plaintiff could prove any facts legally entitling him to possession of the property. Common forms were abolished in England by the Judicature acts and in most of the United

States by codes of civil procedure. See Pleading.

Common Informer. See Informer.

Common Law, a term used in several senses. (1.) As opposed to statute law, it is the unwritten law of the land. Being older than statute law, it was founded on considerations of general justice, and fortified by the decisions of judges handed down from generation to generation, and binding on their successors. Thus it covers the whole range of law not specially covered by statute. It derives its certainty from the harmony of numerous decisions, and its flexibility from the ease with which doctrines can be gradually and almost imperceptibly widened or retrenched in accordance with the opinion of the age or the alteration of circumstances. Its difficulties lie in the application of a rule drawn from one set of facts to another set, in the occasional apparent conflict of decisions, and in the uncertainty of the early reports, whereas the chief difficulty of statute law arises from ambiguity of language. (2.) It is distinguished from the civil law, prevailing in Europe, which is based upon the Roman jurisprudence, both as to many of its rules and in that the latter is codified and is generally considered less adaptable to the constantly changing business conditions, which mark the advance of civilization. (3.) It is also distinguished from Equity jurisprudence, which was devised to alleviate the hardships and prevent the injustice sometimes occasioned by the application of the more inflexible rules of common law, and which, as its name indicates, at its inception, consisted of the application of natural principles of justice to cases where the law afforded no adequate remedy. This was done in separate courts, and gave rise to some conflict at first, but the jurisdiction of courts of law and of equity is now so well defined, that there is practically no confusion, and an adequate remedy is afforded in all cases. See Equity.

The common law of England prevailed in the American colonies, except Louisiana, at the time of the Revolution, and obtains to-day in all the States, except in so far as certain branches of the law have been codified in some States, and where changes have been effected by statutes. See Codification.

Common Pleas. See Supreme Court.

Commons, House of. See Parliament.

Common Sense, a term used nearly in its ordinary meaning in such an expression as 'the morality of common sense,' which signifies the morality recognized by the average upright man, as distinguished from the morality required by the speculative tenets of philosophers. But it is used in a special sense in the expression 'the philosophy of common sense,' which denotes the philosophy—*viz.* that of the Scottish school (Reid and others)—which bases all knowledge upon certain fundamental intuitions natural to man and universally recognized as true by the 'common sense' of mankind.

Common Stock. See Stock.

Commonwealth, a term sometimes used in political science as the equivalent of the Latin *respublica* (republic), the sense in which it is used in English history at the time of Cromwell; but it has usually a more limited application—*viz.* to subordinate communities with only a semi-independence, and can thus be used even when the monarchical principle still prevails. Thus some of the States of the American Union are designated commonwealths, such as the Commonwealth of Massachusetts and of Virginia; and some writers on political science consistently employ the term to designate a government of the rank of such States. The term in English history is generally applied to the period between the execution of Charles I. in 1649 and the restoration of Charles II. in 1660.

Commonwealth of Australia, The. See Australia.

Commune, the administrative unit in France corresponding more or less to the English parish and the New England township in the country, and in urban districts to the municipality. But although the commune may elect its own council, in the larger communes, the *maire* or president is appointed by and is responsible to the central government, and in the smaller is appointed by the prefect of the department.

Commune of Paris (1871), a period of anarchy and bloodshed in Paris at the end of the Franco-German War, which is sometimes regarded as an outbreak of revolutionary socialism. The movement was in part political, having for its object the creation of an autonomous Paris (hence *commune*), which should be a sort of 'state within the state' of France; and also in part social and communistic, or revolutionary. It lasted from March 18 to May 28, and began with the refusal of the Paris National Guards to give up their arms, their murder of Generals Thomas and Lecomte, and their organization of themselves into a Central Committee. On March 18 Thiers, the head of the national government, retired with the regular troops to Versailles, and the Parisian central committee assumed the executive power in Paris. They proceeded to elect a communal council of seventy-five members on March 26 and April 16. The character and aims of this body are indicated in the principal resolutions passed and put in force by them—the abolition of conscription; free rent for the quarters October, 1870–April, 1871; complete separation of church and state; the suppression of the budget for public worship, and the restitution to the nation of all property held by ecclesiastical bodies in mortmain; enforced enrolment in the National Guard of every man between the ages of nineteen and thirty-five; the institution of a labor commission; the establishment of coöperative workshops: all education to be in the hands of the laity only.

Meantime fighting was going on between the insurrectionary army, numbering 200,000, and the army of Versailles, of about 100,000, under the command of Marshal MacMahon. The communal army took the offensive on April 2, but was repulsed. After a few days the second siege of Paris began; and terrible fighting went on every day until May 22, when the army of Versailles entered Paris. Then for a full week—the Red Week of May—there was fierce and incessant fighting in the streets of Paris. The army of Versailles fought its way quarter by quarter and street by street, gradually sweeping the insurgents off their barricades; and the latter, as they sullenly retired, fired the public monuments. On the 23rd the communist prisoners were shot by the army without trial, and in revenge the communists fired the Treasury and the Tuileries palace; on the 24th the Palais Royal and the Hotel de Ville were set on fire, and several hostages of the commune (including the archbishop of Paris) were put to death by the communists inside the prison of La Roquette; on the 25th the docks of La Villette were burned, and the Dominican monks at Arcueil were massacred; on the 26th another execution of hostages took place by the commune; and on the 28th the last barricade was cleared and forced by the army under Marshal MacMahon, and the central government reëstablished in Paris. March's *History of the Commune of 1871.*

Communion, in ecclesiastical usage either the participation in the Lord's Supper (1 Cor. x. 16), or the unity of those who partake together of this sacrament.

From the latter usage comes the application of the term 'communion' to a denomination—*e.g.* the Lutheran Communion, or the Anglican Communion. 'Communion in one kind' denotes the practice of omitting the service of the wine to laymen, sanctioned by Pope Urban II in 1096; it is still the custom in the Roman Catholic Church, while the reformed churches have resorted to the original communion in 'both kinds.' See Eucharist.

Communism represents the left wing or the revolutionary camp of the Marxist, world-wide Socialist movement. The Utopian Socialists such as St. Simon, Fourier, Louis Blanc, Proudhon, Cabet and Robert Owen were the forerunners of both Socialism and Communism. With the publication of the famous *Communist Manifesto,* written by Karl Marx and Friedrich Engels, in 1848 Marxism, or scientific socialism, was ushered in and soon superseded all schools of Utopian socialism; it was the product of the decaying feudal society, whereas Marxism was the child of expanding, machine-dominated capitalism. The Utopians believed that a socialist community could be built anywhere, at any time, under any conditions; all that was necessary was a strip of territory, in an isolated community, with a group of men and women inspired by the socialist ideal and possessed by the will and zeal to create the socialist society on the spot. The Marxist Socialists regarded these Utopian schemes as puerile. They held that socialism cannot be maintained as an oasis in a society dominated by capitalist laws and ideology. They stressed the fact that capitalism itself was developing in its midst forces, social and economic, that would make it ripe for socialism, the succeeding society upon the ladder of civilization, and that socialism cannot be ushered in until capitalism had accomplished its historic mission.

In their *Communist Manifesto,* Marx and Engels say about the bourgeoisie, or the capitalist class: 'The bourgeoisie has played a most revolutionary role in history. The bourgeoisie, wherever it has got the upper hand, has put an end to all feudal, patriarchal, idyllic relations. The bourgeoisie cannot exist without constantly revolutionizing the instruments of production, and thereby the relations of production, and with them the whole relations of society. Through its exploitation of the world market it has given to production and consumption in every country a cosmopolitan character. To the great chagrin of reactionaries, it has drawn from under the feet of industry the national ground on which it stood. All old-established national industries have been destroyed and are dislodged by new industries which become a life and death question for all civilized nations. In the place of the old wants, satisfied by the production of the country, we find new wants, requiring for their satisfaction the products of distant lands and climes. In place of the old local and national seclusion and self-sufficiency, we have intercourse in every direction, universal inter-dependence of nations. And as in material, so also in intellectual production. The intellectual creations of the individual nations become common property. National one-sidedness and narrow-mindedness become more and more impossible, and from the numerous national and local literatures there arises a world literature. The bourgeoisie, by the rapid improvement of all instruments of production, by the immensely facilitated means of communication, draws all nations, even the most barbarian, into civilization. The cheap prices of its commodities are the heavy artillery with which it batters down all Chinese walls and forces the barbarians' intensely obstinate hatred of foreigners to capitulate. It compels all nations, on pain of extinction, to adopt the bourgeois mode of production; it compels them to introduce what it calls civilization into their midst, *i.e.,* to become bourgeois themselves. In a word, it creates a world after its own image.'

How will capitalism become ripe for socialism or communism? 'By developing contradictions of its own forces, by generating crises which grow ever more intensive and extensive in scope, by increasing the misery of the workers who have become numerous, class-conscious and politically articulate; and by widening the gulf between the proletariat and the capitalist class, which eventually will create a revolutionary situation and make capitalism ripe for transformation into socialism or communism.' To quote further from the *Manifesto:* 'With the development of industry the proletariat not only increases in number; it becomes concentrated in greater masses, its strength grows, and it feels that strength more. The unceasing improvement of machinery, ever more rapidly developing, makes the livelihood of the worker more and more precarious; the collisions between individual workmen and individual bourgeois take more and more the character of collisions between two classes. The workers begin to form combinations (trade unions) against the bourgeoisie; they club together in order to keep up the rate of wages; they found permanent associations in order to make provision beforehand for these occasional revolts. Here and there the contest breaks out into riots. This organization of the proletarians into a class, and consequently into a political party, is continually being upset again by the competition between the workers themselves. But it ever rises up again, stronger, firmer, mightier. As the class struggle nears the decisive hour the process of dissolution going on within the ruling class and within the whole range of society assumes such a violent, glaring character, that a small section of the ruling class cuts itself adrift, and joins the revolutionary class, the class that holds the future in its hands. Of all classes that stand face to face with the bourgeoisie today, the proletariat alone is a really revolutionary class. The other classes decay and finally disappear in the face of modern industry; the proletariat is its special and essential product.'

On Sept. 28, 1864 the First International was formed at St. Martin's Hall, London. The world proletariat was not receptive and it soon disbanded. On July 14, 1889, upon the anniversary of the Bastille, the Second International was organized in Paris and at once it became the directive and intellectual fountain-head of the international socialist movement, sworn to carry out the teachings of Marx (or Marxism) into practice. From its very inception, the Second International harbored two conflicting groups who continually sought to impose their ideologies upon the rank and file in the movement, fought bitterly for control of the International and the national movements, and who finally became irreconcilable. The issue that divided them was principally that of the methods and tactics to be employed in effecting the transition of capitalism into socialism. The groups were variously called opportunists and extremists, reformists and revolutionaries, revisionists and Marxists. Their differences may be summed up in terms of tactical and programmatic terms as follows: The moderates held that a peaceful transformation from capitalism into socialism was possible; the immediate demands must receive most attention; the class struggle must not be intensified; the socialist parties must be democratic, the voice of the people and not of new gods, and run by those most competent regardless of class origin; religion must be regarded as a private matter; the property of the small farmer must not be nationalized; trade unions, wherever organized on a national scale, should be firmly supported regardless of their theoretical principles; socialism is an evolutionary science—the spirit and not the letter of Marxism being predominant; freedom of the press must be maintained and heresy hunting avoided; the socialist parties must pursue legal methods and expand by emphasizing political and trade union action; the world-wide movement should take all legal steps to oppose war although it should not blindly condemn all wars; the socialists cannot deny the fact that the worker has a country worth fighting for and that, therefore, international socialism does not preclude working class nationalism.

The revolutionists contended that a violent revolution was inevitable; that the final conflict should be emphasized; that the proletariat should be made class conscious. The socialist parties must emphasize the class struggle, advocate industrial and revolutionary unionism; must be democratized with control and power vested in the rank and file. The socialist parties must teach the materialistic basis of religion; must not make any concession to the property-owning, exploiting, decaying small farmer; make no compromise with labor parties or conservative trade-union officialdom; must insist that their candidates and elected public officials adhere rigidly to socialist platforms and principles or be read out of the parties and disowned; must own the press, all publishing enterprises and the editorial policies of all literary enterprises must conform strictly with the official socialist platforms and principles. The members of socialist parties should have the freedom to advocate sabotage, mass action, and illegal means. Officials, members and organs of socialist parties must fight preparedness for war on pain of expulsion—the only war deserving their undivided support being the class war; they must pledge themselves to try to convert imperialistic wars into civil wars, there being no such thing as civil peace under capitalism. The socialist parties must teach that the worker has no country and that only in international socialism and in a world dominated by a socialist republic lies his salvation.

After the Bolshevik Revolution in Russia in 1917, the revolutionaries added demands for the immediate formation of workers' and soldiers' councils in all countries where a revolutionary situation prevailed and prepared for a proletarian dictatorship on the model of the experiment in Soviet Russia. With the outbreak of the World War the moderate socialists generally gave their support to their respective governments, many of the leading socialists becoming important functionaries in government councils. The revolutionaries, on the other hand, intensified their defeatist campaigns and called upon the workers to turn the war into civil warfare. The Russians, Lenin and Trotsky, both of whom lived abroad; the Germans, Karl Liebknecht and Rosa Luxemburg; the Americans, Louis Fraina and Bill Haywood were among the prominent revolutionary socialists who directed the Left Wing after the outbreak of the war. In Russia, which according to the principles of orthodox Marxism was least ripe for socialism, the revolutionary Marxists staged a successful revolution and gained possession of the entire country within a year. At once the Russian communists got busy in winning the world proletariat to their cause and in stirring the workers to revolts wherever the situation was encouraging. The term 'socialist' was dropped, the Communist Party was officially launched and designated as the party of the Russian workers, all opposing groups were disbanded and suppressed mercilessly and steps were taken for the convocation of an assembly in Russia to which representatives of all revolutionary groups of the world would be invited and plans discussed for the launching of a new International and of Communist parties throughout the world. The call was issued, signed by representatives of the left wing Socialists of nine countries and by the Minister of Foreign Affairs of Russia. Delegates from 22 countries assembled in Moscow and from March 2 to 6, 1919, laid the foundation of the Third (Communist) International (*Comintern*). A war was declared not only on the bourgeoisie but on all socialist elements who were conciliatory to capitalism and capitalist democracy. In the manifesto issued by the Congress the workers of the world were told that 'The period of the last decisive struggle has begun . . . it is here: it has come. We communists representative of the revolutionary proletariat in different countries both feel and consider ourselves to be followers of, and participaters in, a cause for which the program was drawn up 72 years ago. Our duty is to gather together the revolutionary experiences of the working classes, to free the movement from the harmful interference of opportunist and social patriotic elements, to unite the forces of all genuine revolutionary parties of the world proletariat, and thereby to facilitate and hasten the victory of the communist revolution. . . . The only question is, who in the future is to conduct nationalized production, the imperialist state or the victorious working-class state? To bring to an end the prevailing crisis will only be possible with the help of proletarian dictatorship, a proletarian revolution, which releases all the productive forces in every country from the grip of national states, unites the nations in the close economic coöperation based on a joint social economic plan, and grants to the smallest and weakest nation the possibility of developing the national culture independently and freely without detriment to the united and centralized economy of Europe and of the whole world. Socialist Europe would also come to the aid of the liberated colonies with its technique, its organizations, and its spiritual influence, to facilitate their transition to a methodically organized establishment. The proletariat must create its own apparatus. The workmen's councils constitute this apparatus. It is the duty of the International Communist Party to overthrow the capitalist order, and to establish instead the system of socialist order. Proletarians of all lands! Unite to fight against imperialist barbarity, against monarchy, against the privileged classes, against the bourgeois state and bourgeois property, against all kinds and forms of social and national oppression. Join us, proletarians in every country—flock to the banner of the workmen's councils, and fight the revolutionary fight for the power and dictatorship of the proletariat.'

Thus the new communist movement was born, directed by the Communist Third International and both inspired by the ideologues of the Soviet regime in Russia, changing its tactics, policies, slogans, theses and 'lines' as the needs of Soviet interest and Soviet diplomacy required. Flushed by success in Russia, the communists of Europe instigated revolts in Ger-

NOV

many, Bavaria, Hungary, Bulgaria and Italy, but with the exception of enjoying short-lived regimes in Hungary and Bavaria, they failed to sovietize Europe. The next 'line' was to smash the socialist movement and trade unions by 'boring from within' and by setting up rival organizations. This was attained rather 'efficiently' but with results entirely unexpected. In the United States the Socialist Party was split into factions, numerous 'left wings' fighting at the same time to gain control of its machine and press. When the communists were expelled, the Socialist Party was ruined, its former prestige, strength and political influence gone forever. In many trade unions where communists fought for ascendancy factional strife reigned for years, with many unions becoming crushed and others coming back to life only after the communists were removed. The Amalgamated Clothing Workers, the International Ladies' Garment Workers were among the trade unions which faced destruction as a result of the 'left wing' and 'right wing' struggles, but intelligent leadership succeeded in turning the rank and file against the disrupters and the unions were thus saved.

In Italy the socialist movement was split, the workers were confused, and Mussolini found his climb to power an easy affair. In Germany the communists divided the powerful social democratic movement into two fratricidal groups, and though both had a following running into millions, Hitler came into power virtually unopposed. The same process was repeated in all countries: workers instead of fighting their common enemy, the capitalist class, fought among themselves and as a result Fascist regimes proved victorious in many. In the '30's the communists set upon a new 'line.' Bourgeois democracy was suddenly discovered to have many virtues; 'united fronts,' and 'popular fronts' were launched to which liberals, the formerly despised socialists, capitalists and clerics of liberal convictions, were invited in a common fight against the world-threat of Fascism and Hitlerism. All of which was thrown overboard when Stalin signed a non-aggression treaty with Hitler on the very eve when the democracies of Europe were drawn into a life-and-death struggle with Hitler. Now the new 'line' is once more a reversal to the first 'line.' The capitalists of all nations are all alike; there is no difference between a democratic regime in Great Britain and a dictatorial regime in Germany, both being merely imperialistic cliques fighting for control of the world's wealth; and the workers were again called upon to turn the new World War into a series of revolutions. All of which proves that the official communist movement, once inspired by lofty ideals to reconstitute civilization on more humanitarian and equitable lines, has become principally the international agency of the Soviet Union, placing its needs and interests above those of the workers of all other countries.

Bibliography—H. W. Laidler, *A History of Socialist Thought* (1936); E. Burns, *Handbook of Marxism* (1936); Bukharin, etc., *Marxism and Modern Thought* (1935); L. Trotsky, *The History of the Russian Revolution* (1939); Wm. Z. Foster, *Toward Soviet America* (1932); E. T. Colton, *XYZ of Communism* (1936).

Michael B. Scheler.

Communistic Societies. See Communism; Fourier; Brook Farm; Shakers.

Commutator. See Dynamo.

Comnena, Anna. See Anna Comnena.

Comnenus. See Alexius; Andronicus; Isaac I.

Como, kō'mō, a province of Lombardy, in Northern Italy, ranging over the southern foothills of the Alps, and including within its confines nearly all of Lake Como, Lake Maggiore, Lake Varese, and part of Lake Lugano on the extreme west. Dense forests of rare beauty, intersected by fertile plateaus, cover a considerable portion of the territory. Wine, silk, corn, olives, fruits, fish and iron are among the natural resources, and silk, cotton, paper, iron, glass, hats, and lace are manufactured. Pop. (1936) 501,752.

Como (Lat. *Comum*), city, Italy, capital of the province of Como (q. v.) and an episcopal see, is situated at the southern extremity of Lake Como; 30 miles by rail north of Milan. The town, which still retains its rectangular plan from the time of Roman occupation, lies in a valley enclosed by sloping hills. The chief architectural features are the marble cathedral (1396–1519), with pictures by Luini, Gaudenzio, and Ferrari, the ancient town hall, the mediæval building called Il Broletto (1215), the ancient churches of San Fedel (10th century), and Sant' Abondio (11th century), and the ruins of the citadel of Baradello. The principal industries are the manufacture of silks, cotton and woolen goods, gloves, machinery, glass, statuary, and paper. Iron, lime, and other minerals have been discovered in the vicinity.

Como was the capital of the ancient Insubres and was made a Roman military post in the time of Julius Cæsar. It was destroyed in 1127, after a ten years' war with Milan, and was rebuilt by Frederick I (1158). It is the birthplace of Pliny the Elder and Pliny the Younger, the historian Giovio, Volta the physicist, Pope Innocent XI, and Clement XIII. Pop. (1936) 53,210.

Como, or Lario, Lake, a lake in Lombardy, in Northern Italy, at the foot of the Alps, into which its northern arm penetrates for 14 miles. It lies 650 feet above sea level; its greatest length (from north to south) is 43 miles, its width from ½ to 2½ miles, and its maximum depth 1,358 feet. It is extremely irregular in shape, dividing at Bellagio into two parts—the eastern section, called Lake Lecco, and the western, called Lake Como—between which lies the the fertile district of Brianza. The river Adda enters at the northern end of the lake, and emerges at the southern extremity of Lake Lecco. Lake Como has long been famed for the beauty of its scenery. It is everywhere hemmed in by hills and mountains, on the lower slopes of which are numerous beautiful villas and gardens and luxuriant groves of olives, figs, oranges, lemons, and mulberries.

Comorin, kom'ō-rin *or* kō'-mō-rēn', Cape, the southernmost point of the Indian peninsula.

Comoro Islands, kom'ō-rō, group of islands belonging to France, situated to the north of Mozambique Channel, between the northwest coast of Madagascar and the eastern coast of Africa, and including Great Comoro, Anjouan (or Johanna), Moheli (or Mohilla, commercially the most important of the islands), Mayotte, and several smaller islands, with a total area of about 800 square miles. The islands are of volcanic origin, and their surface is mountainous, Caratola in Great Comoro reaching 8,500 feet. The soil is fertile, producing cocoanuts, figs, oranges, sugar-cane, coffee, and vanilla. Some cattle are raised, and coarse cloth, jewelry, and cutlery are manufactured. Exports include sugar, copra, sisal and vanilla; imports include cotton fabrics, metals and rice. In 1843 Mayotte became a French possession, in 1886 the other islands were made a French protectorate, and at length in 1914 the whole group of islands was placed under the government of Madagascar. The capital is

Zandzi. Pop. (1936) 128,608, composed of natives of Malagasy and Arab or Negro origin.

Compagni, kom-pän′yē, Dino (*c.* 1275–1324), Italian chronicler and poet, was born in Florence. Entering the political life of the city he became prior in 1289, gonfalonier in 1293, and prior again in 1301. For some years before his death he lived in retirement, engaged on the *Cronaca delle cose occorrenti ne' suoi tempi,* which deals with the affairs of Florence from 1280 to 1312. The authenticity of the work was questioned by Fanfani in 1858, but was established by the *Dino Compagni e la sua Cronaca* (3 vols., 1879–87) of Del Lungo, who also published a critical edition of the *Chronicle* at Milan in 1891. That the kernel of the book is genuine, but that it was subsequently tampered with, is almost certainly the correct view. Dino is probably also the author of the *Intelligenza,* a poem of 303 stanzas in *nona rima.*

Companies, Chartered. See Chartered Companies.

Companies, City. The companies of the city of London originated in the guilds or crafts (see Guild). There are twelve great city companies—(1) mercers, (2) grocers, (3) drapers, (4) fishmongers, (5) goldsmiths, (6) skinners, (7) merchant tailors, (8) haberdashers, (9) salters, (10) ironmongers, (11) vintners, and (12) clothworkers—and between sixty and seventy minor companies. They have now little connection with trade; and their only connection with the government of the city is that the liverymen, or higher grade of members of the companies, annually elect the lord mayor, the sheriffs, and a few officers of the corporation, in the Court of Common Hall which is their general assembly. The large corporate incomes of certain of these large companies form the charitable or trust income, which is spent on the upkeep of almshouses, relief of poor members, and other charitable objects. Some of the companies hold ecclesiastical livings; and some do much toward the promotion of technical and higher education. Consult Unwin's *The Guilds and Companies of London.*

Company, a term of wide significance which may include any business association from the smallest partnership to the largest corporation. In the United States it is applied generally to a joint-stock association or a business or trading corporation. It is sometimes used also of a partnership of the ordinary type, and is popularly employed in firm names where the business is conducted under a designation either purely descriptive or which does not include, or includes something more than, the names of all interested therein. In Great Britain it is used almost exclusively of joint-stock companies operating under the Companies Act of 1908, and of public companies constituted by special act of Parliament for the conduct of some public utility. It has also special applications, as in the terms Chartered Companies (q. v.) and City Companies (see Companies, City). See Corporation; Partnership.

Company, in military usage, a body of men under the command of a captain, usually constituting a subdivision of a regiment or a battalion. In the U. S. Army a company is the smallest administrative unit in the Infantry, Engineers, Signal Corps, Chemical Warfare Service, Ordnance Department, Medical Department and Quartermaster Corps. Numerical strength varies within the different branches as is shown by the peace and war strengths (1940):

	PEACE		WAR	
	OFFICERS	MEN	OFFICERS	MEN
Infantry	4	129	6	188
Engineers	2	258	4	296
Chemical Warfare	2	84	6	178
Signal	5	101	8	204
Ordnance	1	49	7	143
Medical (Collecting)	6	150	7	165
Quartermaster	2	90	4	165

For purpose of drill, instruction, etc., a company is subdivided into platoons and the platoons into squads.

The captain (q. v.) is responsible for the appearance of the company, its discipline, and efficiency; for the care and preservation of its equipment; for the proper performance of duties connected with its subsistence, pay, clothing, accounts, reports, and returns. He selects the noncommissioned officers, who are appointed upon his recommendation and furnished with a warrant by the colonel of the regiment; appoints his first sergeant, supply sergeant and stable sergeant, as well as the cooks, farriers, blacksmiths, mechanics, artificers, saddlers, wagoners, musicians, trumpeters, and first class privates. He inspects his organization under arms weekly and the quarters and kitchens daily. He has charge also of the company fund, which he disburses solely for the benefit of the company, and of which he keeps an accurate and detailed account, which is audited by the company counsel, and inspected by the post-commander and the inspector-general. Each lieutenant has charge of a platoon which he leads in time of action. The mess sergeant is detailed in charge of kitchen, and is held responsible for the condition thereof and for the proper use of the ration. He personally supervises the cooking and messing of the men and has charge of the proper supply of necessary utensils and furniture.

Company, John, a nickname for the English East India Company (q. v.).

Comparetti, kōm-pä-ret′tē, Domenico Pietro Antonio (1835–1927), Italian philologist, was born in Rome. In 1859 he was given the professorship of Greek at Pisa, and later went in the same capacity to Florence. He lectured also on Greek antiquities at Rome. His masterpiece is the *Virgilio nel Medio evo,* one of the most fascinating among erudite works (1872; 2nd ed. 1896; Eng. trans. by Benecke, 1895). Together with D'Ancona, Comparetti edited the *Canti e Racconti del Popolo Italiano,* and after 1884 was editor of the *Museo italiano d'antichità classica.*

Compass, an instrument used by mariners for directing the course of a ship. It is of two types, Magnetic and Gyroscopic, the latter being a development of recent years.

Magnetic Compass.—The action of the magnetic compass depends upon the attraction of the earth's magnetic force. The earth is a great magnet, with one pole in the neighborhood of 70° n. lat. and 95° w. long., and the other near 72° s. lat. and 155° e. long. These poles are not points, but areas over which the vertical intensity of the magnetic force is practically the same; and they are constantly but slowly changing their positions. Within these areas a freely suspended magnet hangs nearly or exactly vertical.

As we recede from the magnetic poles, freely suspended magnets change from a vertical position until, on the magnetic equator (which is nowhere more than 15° from the geographic Equator) they are horizontal. A magnet which is constrained to move only in a horizontal plane will point nearly toward the magnetic pole. Its direction in different parts of the world has

NOV 19 1940

been carefully ascertained and tabulated; so that if we know the magnetic direction of the ship's course, we can ascertain the true geographical direction by applying a correction which is called the *Variation* or *Declination,* and which is the angle between magnetic north and true north.

In addition to the error due to the variation of the compass, there is another due to the ship. Steel ships are large magnets, and even wooden ships have enough iron or steel in them to affect the compass. The magnetization of the ship causes the compass to deviate from magnetic north by a certain amount, called the *Deviation,* and this is different for every change in the heading of the ship. The amount is ascertained by 'swinging ship'—*i.e.,* heading her on equidistant points all around the 360°—and embodied in a table. By combining the deviation and variation we get the *Compass Error* on each heading. Applying this to the compass course gives the true course.

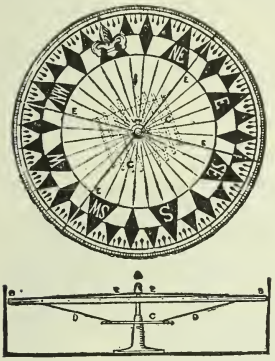


FIG. 1.—*Lord Kelvin's Compass*

A, Aluminum boss connected with aluminum rim B by silk cords E. The eight small magnets C are suspended from the rim by cords D.

In most ships it is convenient to 'compensate' for the deviation by means of magnets and soft iron correctors. These are so placed near the compass as to almost exactly counteract the ship's magnetism and reduce the deviation to zero. Compensation is never quite perfect, however, and the operation must be repeated and the magnets readjusted if the ship greatly changes her magnetic latitude because the earth's magnetic force changes as we recede from the poles, while the magnets do not.

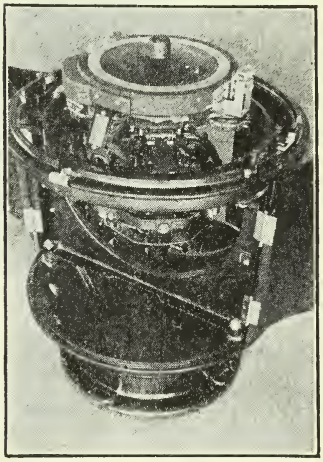
The early history of the magnetic compass is unknown. Many writers have stated that it was known to the Chinese before the Christian era, but the earliest definite reference to a magnetic compass is contained in a work written by Alexander Neckar in the twelfth century, and it was then apparently in use by many navigators.

As mounted on board ship, magnetic compasses are of two kinds, dry and liquid. The *Dry Compass* consists of a very light aluminum frame carrying several light compass needles (magnets), and supported on a pivot. On top of the frame is the compass card. The most common form of the dry compass is that devised by Lord Kelvin (see illustration). In the *Liquid Compass* the needles are carried by a buoyant frame in a non-freezing liquid (alcohol and water). The liquid is contained in a bronze bowl with a flat glass cover. The frame carries the usual compass card, which is visible through the glass top of the bowl.

Aircraft Magnetic Compass.—Aircraft compasses are of the liquid type and are usually mounted on the instrument panel. The card is in the form of a concentric ring, the outer circumference of which is graduated in degrees, zero to 360. A sector of the card of approximately 90° is observed by the pilot against a lubber line inscribed at the center of the instrument dial. These compasses are subject to the same errors as marine compasses, but in an airplane the situation is greatly aggravated because of the rapid accelerations, proximity of the engines, and vibration. The result is that although the magnetic compass is indispensable for air navigation, it can only be relied upon when the airplane is flying straight and level and has been flying in this condition long enough (several seconds) for the card to stop oscillating. For this reason the magnetic compass must be used in conjunction with the turn and bank indicator or with the directional gyro during instrument flying.

Gyro-Magnetic Compass.—A recent development has combined the magnetic compass and the directional gyro into a single instrument called the Remote Indicating Gyro-Magnetic Compass. The instrument consists of a master gyro-magnetic compass which operates a number of repeating compasses in much the same manner as a gyro-compass system on board ship. The master gyro-magnetic compass combines the north-seeking characteristic of the magnetic compass with the stability of the gyroscope to provide an accurate and steady indication of the magnetic heading. It is in effect a magnetically controlled directional gyro. Because it is controlled by the magnetic element, the gyro axle adheres to the magnetic meridian, and because it is stabilized by the gyro about its pivotal axis, the magnetic element is free from northerly turning error and remains uninfluenced by acceleration, dip components or friction. The repeater system makes it possible to install the master instrument near the tail of the airplane or elsewhere away from the engines so as to reduce the effect of magnetic disturbances. Directional indications supplied by the repeaters through a selsyn transmission system are available to the navigator as well as to the pilot, and at other stations as required.

Gyro-Compass.—The gyro-compass has come to be widely used since its introduction in the U. S. Navy in 1911. The gyro-compass is the basic direction indicator for the gun control systems in all warships, and is used extensively for navigation in the merchant marine. The theory and history of the gyro-compass is described in the section on Applications, under GYROSCOPE. The construction and the mechanical relation of the parts of a Sperry commercial type master compass are described as follows, see Figure 2: The gyro wheel or rotor, driven by a self-contained induction motor, spins in ball bearings in the rotor case, 10. The rotor case is supported on horizontal bearings in the vertical ring, 7. The vertical ring is suspended by steel wires from the hub of the compass underneath the suspension cap, 3, and guided about the vertical axis by means of ball bearings at



Courtesy of the Sperry Gyroscope Co.

Latest Model of Gyro-Compass, with the Binnacle Open.

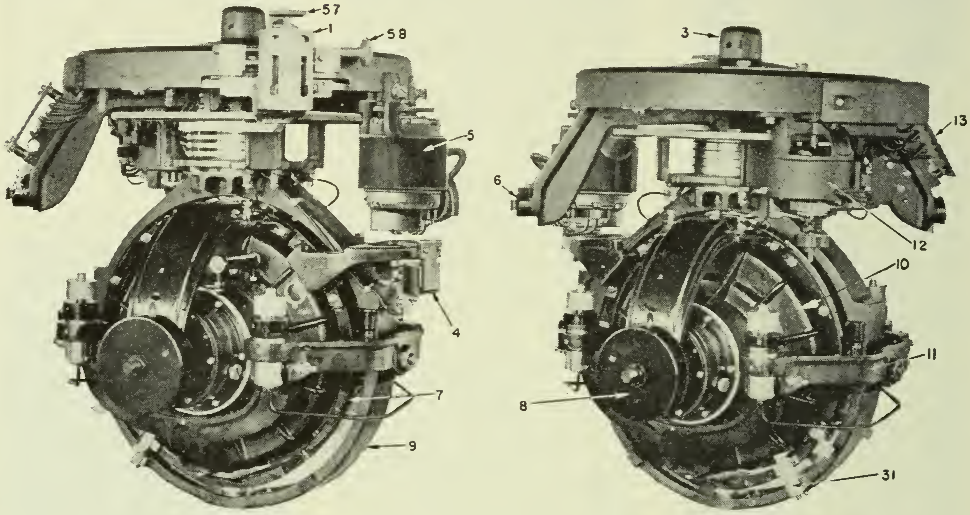
the top and bottom. The sensitive, gyro element thus has three degrees of freedom: 1, it is free to spin within the rotor case about a horizontal axis; 2, it can move freely about its horizontal bearings in the vertical ring (about an axis at right angles to the spinning axis), and 3, it can move freely about the vertical, suspension axis. Freedom about the vertical axis and prevention of twist in the suspension wires is obtained by means of the phantom ring, 9, which is integral with the compass card at the top, and the follow-up system. The follow-up transformer, 4, attached to the phantom ring, operates in conjunction with an armature attached to the vertical ring to actuate a thermionic control system which keeps the phantom ring (and the compass card) in exact alignment with the north-south axis of the gyro.

The power for operating this system is supplied by the azimuth motor, 12, which is geared to the phantom system. The gyro element is controlled by the mercury ballistic, 11, which is suspended in horizontal bearings at each side of the phantom ring and connected by an arm and link bearing to the bottom of the rotor case. When the rotor and case tilt, due to the earth's rotation, mercury flows from one side of the ballistic to the other and causes a pressure to be exerted against the gyro element through the connecting arm at the bottom of the rotor case. This pressure causes the gyro to precess about its vertical axis until it aligns itself with the geographic meridian. The compensator weights, 8, one at either side of the compass, effect a symmetrical distribution of weight about the vertical axis, and prevent errors when the compass is swinging in its gimbals. The speed and latitude corrector, 1, automatically introduces the necessary corrections for various latitudes and speeds, when the setting knobs, 57 and 58, are turned to set the scale on the corrector to the ship's speed and latitude. The transmitter, 5, geared to the follow-up member, transmits electrically the corrected indications of the master compass to the repeater compasses in various parts of the vessel. The trunnion bearings, 6, support the compass in a gimbal ring (not shown), which permits the assembly to remain approximately perpendicular as the vessel rolls and pitches. The gimbal ring is mounted in the binnacle as shown in the preceding illustration. The spider terminal block, 13, attached to the frame or 'spider' of the compass provides a junction point for the electrical connections of the gyro drive and follow-up circuits. A lock, 31, is provided in order to keep the rotor case from tipping over when the compass is not in use.

See Binnacle; Gyroscope; Magnetism; Navigation. Consult Bowditch, *American Practical Navigator*; K. S. Day, *Instrument and Radio Flying;* Evans, *Admiralty Manual for the Deviation of the Compass;* E. S. Ferry, *Applied Gyrodynamics;* Laning, *Practical Manual of the Compass;* Muir, *Navigation and Compass Deviation;* A. L. Rawlings, *The Theory of the Gyroscopic Compass.*

Some of the old works on this subject are still of interest, such as Peter Peregrinus, *Epistola de Magnete* (Augsburg, 1558; Eng. trs. 1902); W. Gilbert, *De Magnete* (1600), of which an English translation by S. P. Thompson appeared in 1900.

Paul W. Bigelow,
Technical Writer,
Sperry Gyroscope Company, Inc.



South View North View

Fig. 2.—*Sperry Master Gyro Compass* (*removed from Binnacle*).

1. Speed and latitude corrector; 3. suspension cap; 4. follow-up transformer; 5. transmitter; 6. trunnion bearings; 7. vertical ring; 8. compensator weight; 9. phantom ring; 10. rotor case; 11. mercury ballistic; 12. azimuth motor; 13. spider terminal block; 31. vertical ring and rotor case lock; 57. speed and latitude corrector setting knob; 58. auxiliary latitude corrector setting knob.

Compasses, instruments for transferring and marking off distances, or for drawing circles, or arcs. The common compasses are simply two rods or 'legs' joined at one end by a pivot joint, and pointed at the other. In spring dividers the legs are united by a strong steel spring to stretch them open; a screw passing between the legs regulates the degree of opening.

Beam Compasses consist of points sliding on a long bar, to which they may be clamped. They are used for greater open-

NOV 19 1940

ings than pivot compasses can safely span. (See GRADUATION.)

Proportional Compasses have a point at each end of each leg and the pivot between. The pivot is a clamping screw moving in an elongated slit. They are very useful in making reduced or enlarged copies of drawings.

Triangular Compasses have three legs, so that the points of a triangle may be all transferred at once.

For Caliper Compasses, see CALIPERS.

Compensation, as a legal term, always suggests the idea of balancing one thing against another. In Roman law and systems derived therefrom it means exactly what in Anglo-American law is called 'set off'—that is, the wiping out of a claim by means of a counterclaim. The canonists used the phrase 'compensation of offences' (*compensatio criminum*), when both husband and wife had been guilty of adultery, so that neither was in a position to sue for separation.

In the United States and Great Britain the word now generally denotes an equitable or statutory claim which one party has against another for loss arising either to property or person. Thus if land is taken compulsorily under statutory powers for the purpose of making railroads or erecting public works, the promoters of the undertaking have to pay *compensation* to the land owners. A landlord may have to give compensation to a tenant for improvements made by him to the property. Likewise modern legislation has provided that workmen injured in the course of their employment shall receive compensation from their employers (see EMPLOYERS' LIABILITY). The pecuniary award made to a plaintiff by a court of common law, on the ground of the defendants' legal liability, is not as a rule called compensation, but damages. See DAMAGES.

Compensation Pendulum. See HOROLOGY.

Compensation, Workmen's. See EMPLOYERS' LIABILITY.

Competence, in law. See EVIDENCE.

Competition, in economics, exists wherever one person contests with another for the advantage derivable from dealing with a third party, and may be defined as the unrestrained action of individual self-interest. There are two kinds, or, better, two degrees of competition—the one commercial competition, resulting in mere equality of price for the same goods in the same market at the same time; and the other industrial competition, resulting in a more fundamental equality of 'net advantages.'

Custom, which the early economists recognized as the only serious hindrance to the free play of competition, is by no means an extinct force even in modern times, although in many institutions regulated by custom there is an underlying and governing element of competition; and in more recent times combination of a commercial or of an industrial character has to a certain extent superseded competition as the regulating power in industry, although competition, *mutatis mutandis*, still exists between the bigger combinations.

Socialism (q.v.) renounces the advantages and denounces the evils and wastes of competition, rejecting it as a social ideal in favor of common regulation according to one or other of the principles of ideal distribution.

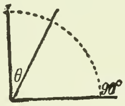
The chief argument in favor of competition is the difficulty of finding any system to replace it that will not tend to repress human energy. By what seems to be a strange paradox, competition tends to pass over into its opposite, combination. It first forces the weaker to the wall, and leads to the concentration of business and industry in a few strong hands; and these, being stronger, are also fiercer competitors, and in their struggle for success at the expense of one another are able to continue the fight longer. The result is what is called the waste of competition and a misdirection of energy, which is no sooner perceived than it suggests the possibility of combination to save the waste. But combination leads to monopoly, and the monopolist spirit is not usually content with the savings made by eliminating the wastes of competition, and readily seeks its gain by controlling prices, etc., and thus again provokes competition.

The system of free competition has been attended with enormous progress, and has acted as a powerful stimulus to human energy and the spirit of improvement. But the development of the system has brought with it most important limitations. Legislation has been obliged to provide special safeguards against the evils of competition, notably in the Factory Acts (q.v.). Trades unions (q.v.) are an attempt to regulate competition in the interests of labor. Employers' associations (q.v.) have a like object in the interest of the capitalist. In the United States, especially, the development of the trusts (q.v.) has tended to make competition a dead letter. But even yet custom is largely influential in many spheres, and not a few of the evils of competition are mitigated by the kindly feeling which prevails in all the relations of life. See ECONOMICS; LABOR LEGISLATION; MONOPOLIES.

Compiègne, kôṅ-pyen'y', town, department Oise, France, on the Oise and Aisne; 42 miles northeast of Paris. The most interesting building is the Castle, built by Louis XV., and used as a royal residence by Napoleon I., and again by Napoleon III.; it is now a museum of antiquities. There is also a fine Hôtel de Ville. A statue was erected in 1880 to Joan of Arc, who was captured here in 1430. The extensive and beautiful forest (30,000 acres) of Compiègne, between the Oise, the Aisne, and the Autonne, was a favorite royal hunting ground. There are sugar mills, tile works, roperies, and breweries. Pop. 14,000.

Complaint (legal). (**1.**) The formal allegation before a magistrate, grand jury, or other authority that an offence has been committed. (**2.**) The written statement of the plaintiff's case (see DECLARATION).

Complement of an angle is what it lacks to make up 90°; of an arc, to make up a quadrant; and hence the complement of a star is its zenith distance. In music, two intervals, which together make up an octave, are complementary. In arithmetic, the difference between any number and the next higher power of ten. In chromatics, red is the complement of green, orange of blue, and yellow of violet.



Complement of an Angle and of an Arc.

Complement (nautical), the full number of men that should be on board a ship to navigate and fight her. See SHIP'S COMPANY.

Complementary Colors. See COLOR.

Complex Number and IMAGINARY QUANTITY. The solution of the equation $x^2 = 1$ consists of the real positive and negative units $+1$ and -1. The equation $x^2 = -1$ admits of no 'real' solution, for the square of any real quantity, rational or irrational, is positive. To complete the system of numbers, mathematicians introduce the imaginary unit i (imaginary so far as real positive and negative numbers are concerned), and stipulate that it shall be subject to the laws of algebra by the principle of permanence. There thus arise the purely *imaginary* quantity ai and the *complex* quantity $b + ci$, where a, b, c are real.

It may be proved that the

operations of algebra upon the extended system of numbers give rise only to complex numbers, so that the set of units is complete. Thus the n values of x satisfying an equation in x of the nth degree are n real or complex quantities. The complex number is illustrated geometrically by the Argand diagram, a mode of representation first used, however, by Gaspar Wessel (1797). Take a system of Cartesian axes in a plane. If the co-ordinates of a point P are (x, y), the point represents the complex number $x + yi$ uniquely. P is called the 'affixe' of $x + yi$. Complex numbers are sometimes compared by the use of the *modulus*, which is defined as $+\sqrt{x^2 + y^2}$. To assign a definite continuous variation of $x + yi$, the equation to the path of P $f(x, y) = 0$ must be given.

The theory of functions of a complex variable forms one of the most important branches of the theory of functions.

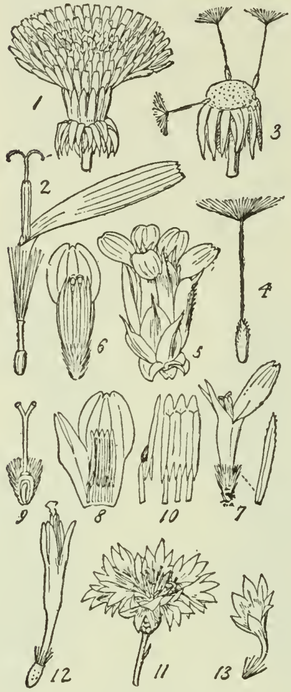
In analytical geometry a line is said to cut a curve (*e.g.*, a circle) in imaginary points when the equations for the co-ordinates of the intersection of line and curve have imaginary or complex roots. It is not easy to furnish a suitable geometrical representation for such imaginary points, and reasoning concerning them is mainly analytical. Consult A. R. Forsyth's *Functions of a Complex Variable.*

Compline, kŏm′plin, the *complement* of the vespers, is the last of the seven canonical hours in the Roman Catholic breviary. See Breviary.

Composing Machines. See Typesetting Machines.

Compositæ, kom-pŏz′i-tē, or compound flowers, form the largest of all the botanical orders. This order is also the most widely distributed through all regions of the globe, although most abundant in temperate and subtropical climates; and, furthermore, the richest in individuals, it having been reckoned that about every tenth plant on the earth's surface is a composite. In all of them the 'flowers' are really heads or capitula, composed of a number of florets densely packed together, the heads being each surrounded by an involucre of bracts. The calyx is superior, the corolla gamopetalous, the five stamens syngenesious (*i.e.*, united by their anthers), and the style single.

In the Compositæ the inflorescence is arrested into a head, the bract of each separate flower remaining in place; and in a Zinnia or Sunflower we find each floret with its separate bract throughout the whole capitulum; in most cases, however, these disappear. Those of the outermost florets, together with the immediately lower leaves of the flower axis (which bear no florets, and are thus in strictness not entitled to their common name of bracts) become usually crowded into an *involucre.* This subserves in bud the protective purposes of a calyx to the whole inflorescence at once, and thus the calyx of the separate florets become unnecessary. In its place we find at most a circle of fine downy hairs, which may be characteristically serrated or feathered, and which reach full development and usefulness only when the fruit has to be distributed.



Types of Compositæ.

1, Capitulum of dandelion; 2, floret; 3, receptacle with fruits adhering; 4, single fruit; 5, capitulum of nassauvia; 6, flower; 7, flower, palæ removed; 8, corolla and andrœcium opened; 9, fruit; 10, stamens; 11, capitulum of cornflower; 12, floret; 13, neuter floret.

The stamens grow upon the united corolla and themselves unite by the anthers, thus forming a ring or rather pollen-bearing tube, up through which the style grows, all much as in bells. The style bears two stigmas, indicating an originally two-carpelled arrangement, but the ovary is one-celled, and contains only a single ascending ovule. The ovary hardens as a nutlet, which is commonly floated away upon the wind when ripe by help of its pappus; it may be anchored where it descends by its minute grappling hooks or serrations. In this way it is conveyed to new soil, it may be at a great distance, an obvious advantage, alike to the species or the individual, when germination takes place.

Although many composites are cultivated and useful plants, none attain the highest economic importance; yet the artichoke and Jerusalem artichoke, salsify, lettuce, endive, etc., are familiar inmates of the kitchen garden, while chicory is extensively cultivated as a substitute for coffee, and even sometimes, as well as Jerusalem artichoke, for feeding domestic animals. Other members of the order are the sunflower, dahlia, thistle, wormwood, southernwood, dandelion, cardoon, tarragon, and camomile.

Composite Order. See Architecture.

Composition (legal) denotes any settlement of a dispute between two parties, or any arrangement as to the liability of the one to the other. In the law of insolvency and bankruptcy, it signifies a partial payment accepted by a creditor in full discharge of his claim. See Bankruptcy.

Composition of Forces. Under the title composition of velocity and forces we deal with one of the fundamental problems in mechanics.

If a point is moving with two independent velocities in any direction, it moves in some one definite *direction* with a definite *speed.* This single velocity is equivalent to the two *component* velocities, and is termed their *resultant.*

When the two components are in the same straight line, their resultant is equal to their algebraic sum. In the case of velocities in different directions, the magnitude and direction of their resultant are obtained by the following theorem, known as the *Parallelogram of Velocities:* If a point A move with two velocities, represented in magnitude and direction by AP and AQ respectively, their resultant will be similarly represented by AR, the diagonal of the parallelogram of which AP and AQ are conterminous sides. Similarly, we may compound any number of velocities in one plane into a single resultant.

The resolution of velocities is exactly the converse problem; for where a directed length such as AR can be made the diagonal of a parallelogram, then the conterminous sides are the components. Since forces can be graphically represented in the same manner as velocities, all that has been said of velocities applies equally well to forces. See Dynamics; Kinematics; Statics.

MAY 2 6

Compos Mentis. See Insanity.

Compostella. See Santiago de Compostella.

Composts are kinds of manure consisting of mixtures of substances adapted to the fertilization of the soil, which, being allowed to ferment for a considerable time in heaps, become more valuable than they were at first. Road scrapings, peat moss, leaves, and clearings of ditches, as well as farmyard manure, form materials for the purpose. By allowing these to lie for six months in heaps of from 3 to 4 feet in depth, food is prepared for plants. The use of guano and other light manures has superseded in a great measure the necessity of this laborious process. See Fertilizers.

Compound is the usual name in India for the enclosure in which a house stands.

Compound Dislocation. See Dislocation.

Compound Engine. See Steam-engine.

Compound Fracture. See Fracture.

Compounding a Felony is the offense of taking a reward for forbearing to prosecute a felony or withholding evidence thereof. It is defined as an agreement with the criminal not to prosecute him. An agreement or understanding to conceal the crime is an essential ingredient of the offense. The practise of advertising for the return of stolen goods with 'no questions asked' was declared to be a sort of compounding a felony.

Compound Interest. See Interest.

Compound Microscope. See Microscope.

Compounds, in Chemistry, are a class of substances formed by the union of two or more elements, and recognized by the following features: (1) The components of a compound cannot be separated by taking advantage of the differences in their properties unless they are first set free from each other by the action of such agencies as heat or the passage of electric currents; (2) the components unite only in fixed proportions; (3) the properties of a compound are not intermediate between those of its components, but are usually quite different.

To illustrate these points, water, which is a compound of oxygen and hydrogen, may be taken as an example. In the first place, the hydrogen cannot be separated from the oxygen by subjecting water to a process of diffusion, though hydrogen, being much lighter, should diffuse more quickly than oxygen, and, in fact, can be separated from it if the two are first split apart by electrolysis. Secondly, the proportion of oxygen to hydrogen in water is as eight parts by weight of the former to one part of the latter, whatever the source or method of preparing the water. Thirdly, the properties of water, which is a colorless liquid that freezes at 0°c., is incombustible, etc., are in no way like those of the gases oxygen and hydrogen, which only liquefy at the lowest temperatures, and of which one burns in air, while the other is a vigorous supporter of combustion.

Besides the criteria of compounds mentioned above, there are other striking characteristics in the proportions by weight and volume in which compounds are formed, and in the energy changes accompanying their formation. See Chemistry; Combustion.

Com'prador', Portuguese word, usually signifying Chinamen in Hong-kong and the treaty ports who act as agents of foreign business houses in dealing with natives, and in the management of business affairs. As a rule, the Chinese compradors are distinguished for their honesty. The term is also used for a storekeeper or ship's chandler in the Philippines and other Eastern ports; also for the butler or steward in a private family.

Compress in medical language is a bandage. Compresses are of two kinds—*cooling compresses,* consisting of some wetted material left exposed for evaporation, and used in local inflammations and fevers; and *heating compresses,* which are covered with waterproof material, and are used in cases of congestion, external and internal. Poultices of hot bread, linseed, bran, etc., serve the same purpose as heating compresses.

Compressed Air, Air Compressors and Air-Operated Machinery. ***Air Compressors.***—While the use of air under pressure to do certain work has been described in ancient works like Hero's *Pneumatics* (200 b.c.), the modern use of true compressed air is generally conceded to have had its commercial beginning with the air drills employed in the Mont Cenis tunnel (1861). The use of compressed air as a motive power for machines is closely allied to that of steam, the methods of application differing only in mechanical details. Theoretically, steam may be regarded as the more efficient of the two, as it is produced by the direct application of heat to water, whereas the compression of air can be effected only through the intermediate agency of some form of engine involving loss of power. In practise, however, compressed air has great advantages for the driving of certain forms of machinery, chief among these advantages being its adaptability to transmission, with no loss of power from radiation, and, in underground work, the fact that the discharge is a healthful instead of a noxious addition to the atmosphere.

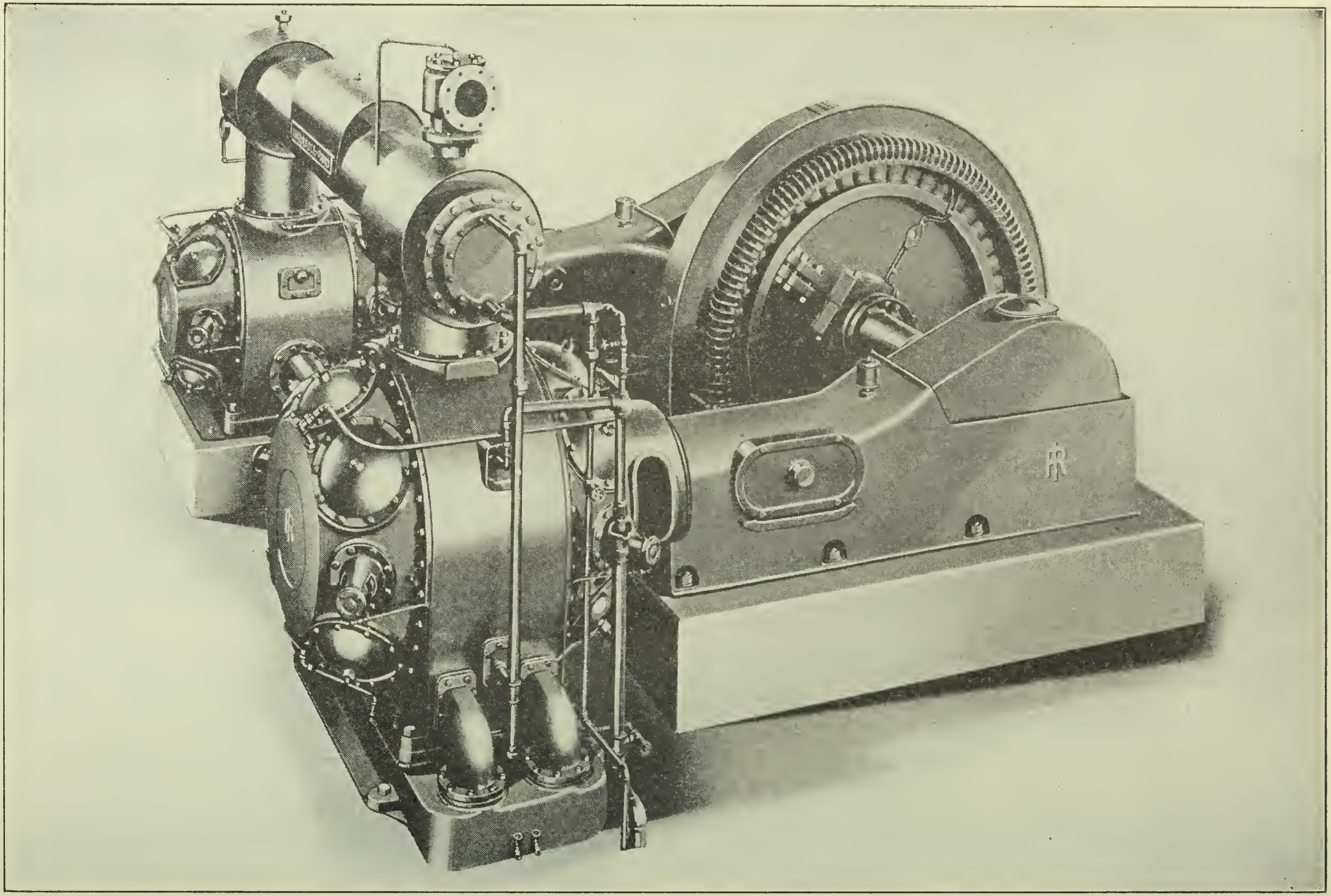
In the United States several large forge shops use air-operated forging hammers exclusively. One such installation requires an air compressor plant totalling 4500 horsepower.

In compressing air, the temperature rises with the forced decrease in volume and the resulting increase in pressure. The heat burden of the compressed air, shown by the temperature rise, should be taken up by absorption in the compressing machinery, cooling coils, storage tanks, and transmission pipes. If the air is not cooled during compression, it later contracts, the pressure falls in the storage tanks or conveying pipes, and some of the work done in compressing the air is wasted. Moreover, the capacity of the compressor, measured in terms of pressure and quantity of cooled air delivered at the far end of the system, is decreased. Maximum efficiency of compression is secured if the temperature of the air remains constant; and this is the widely adopted commercial plan known as *isothermal compression,* though attained only more or less imperfectly.

Some machines using compressed air for motive power have a self-contained storage vessel charged with high-pressure air (1000 to 4000 pounds per square inch) from whence it is admitted to the engine cylinders or turbines at 100 to 150 pounds working pressure. Such machines as torpedoes, industrial trucks and tractors, and mine car locomotives find this a satisfactory power-storage when limitations of weight, exhaust gases, and fire hazard are controlling factors.

Practically all pneumatic machines, however, are continuously supplied with compressed air through pipes or flexible hose connected to a stationary or portable compressor. Compressed air machinery in shops, mills, shipyards, etc., and most mines and large construction projects have permanent or semi-permanent compressed air plants and distribution systems. Smaller construction projects and practically all construction carried on in conjunction with transportation routes require portable air compressors.

Most compressed air is used in the class of small machines which

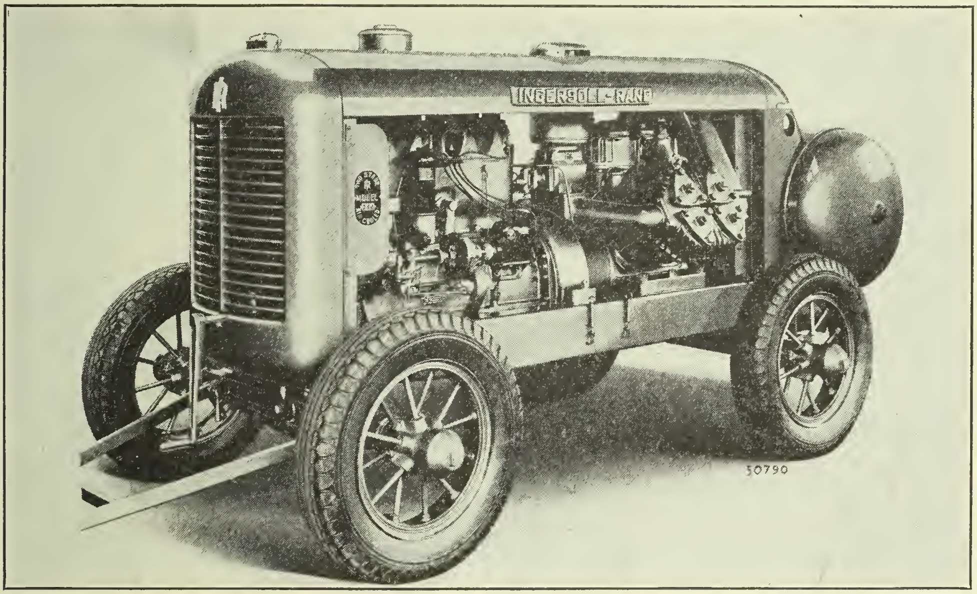


Courtesy Ingersoll-Rand Co.

An Industrial-Type Synchronous-Motor-Driven Two-Stage Stationary Air Compressor, 700 H.P.

MAY 2 6 193

must be easily moved about, handled and controlled. This particularly includes all percussion tools. Among these may be mentioned rock drills, riveting hammers, sand tampers, saws, crane hoists, air-lift pumps, sculptor's chisels, paint sprays, etc. (See Pneumatic Appliances.) In drills the compressed air is supplied through a flexible hose, and admitted into a small cylinder, just behind the piston which drives the tool. At half stroke a valve automatically cuts off the supply, and, just before the end of the stroke, admits air in front of the piston, cushioning it against shock, and driving it back into position for another stroke. The waste air, which escapes through an outlet valve, is considerably reduced in temperature, and serves to keep cool the cutting or striking head.



Courtesy Ingersoll-Rand Co.

Two-Stage, Air-Cooled Portable Compressor, Powered by a 4-Cylinder Gasoline Engine.

Conversely, if the air is heated before being admitted to a machine, its expansive power is increased (by 35 per cent at a temperature of 360°F.). This quality may be taken advantage of in air motors where increased size and weight are admissible.

Classification.—Air compressors may be first classified according to use, as follows: (a) stationary, which includes all units on more or less permanent foundations in mining, industrial or construction sites. Small compressors driven by electric motors, internal-combustion engines, etc., on trains and aboard ship fall into this classification. (b) Portable compressors, which are mounted on wheels or skids. The portable compressor 'follows the work,' and may be moved every day or two, or several times a day. Truck-mounted compressor units provide the utmost in portability, although pneumatic tired trailer mountings permit towing speeds up to 35 miles per hour.

Air compressor design provides the second classification. The various types in commercial use (in approximate increasing order of size) are:

(1) Small single-stage (compression to final discharge pressure in one piston stroke in one cylinder), single-acting, air- or water-cooled. (2) Two-stage (compression to three atmospheres—25 to 30 pounds pressure—in a first-stage cylinder and to six atmospheres—90 to 100 pounds—in a second-stage cylinder), single-acting, air- or water-cooled. (3) Single-stage, double-acting (compression taking place on each side of the piston on each stroke), water-cooled. (4) Large two-stage, double-acting, water-cooled compressors.

The use of air-cooled cylinders on the smaller machines results in a reduction of weight and the elimination of water piping and all danger of freezing on portable units. Two-staging is usually accompanied by intercooling (cooling the air between stages) which increases by nearly 25% the amount of air delivered by a machine of a given piston displacement.

When pressures of 200 pounds and over are required, multi-stage compressors employing up to 8 compression cylinders, piped in series, are used. By this means industrial compressors for 5000 pounds have been successfully built, and in isolated cases air pressures of 15,000 pounds have been produced by multi-stage compressors.

Air compressors may be direct-connected or belted to electric motors, internal combustion engines, or other sources of rotative power. When steam is available, machines using opposed steam and air pistons (the earliest form of commercial air compressors) are still favored. Internal combustion cylinders have also been used on engine-compressor units since the early part of the century, but since 1935 most large gas- and oil-engine-compressor units have been built with two or more vertical power cylinders for each compressor cylinder.

Sir Charles A. Parsons (1854–1931) made a successful turbine compressor which is essentially an inverted Parsons turbine, and in which the impeller blades throw the air along the axis through expanding-passage guides between impeller discs. Professor Rateau has devised what is probably the most successful and popular turbine compressor, which follows closely the high-speed turbine (hydraulic) pump. In the Rateau compressor, air entering the impeller is thrown radially outward, and on reaching the casing diffuser vanes its velocity energy is changed to pressure energy. As a single-stage impeller can produce only a few pounds air pressure, for commercial machines it is necessary to make the runner virtually a series of impellers, discharging into one another. By this means, 150 pounds per square inch and over has been attained.

There are various positive-pressure rotary displacement air pumps, quite similar to those of hydraulic types (see PUMPS, section on *Rotary Pumps*), but of comparatively small size. In these the pressure rises as the demand for air falls, and continues until the casing or pipes break or the engine is stalled. In turbine types the pressure rises to a given point, and the air not delivered is churned up in the pump casing with small power loss.

Hydraulic Compressors.—Air can be compressed directly by falling water. The present efficient machines, which have existed in a primitive form for many years, entrap air bubbles, sweep them along in a descending column of water, compress them as the head increases, and then allow the bubbles to be disengaged from the water and collected under this pressure. Good efficiency is secured by the absence of mechanical friction, freedom from a multitude of moving parts, the precipitation and disposal of moisture during compression, and on practically isothermal action. The best known and most efficient hydraulic compressors are those designed by C. H. Taylor. See PNEUMATIC APPLIANCES.

Compression AND Compressibility. When a body is subjected to the action of any force which causes it to occupy less volume, it is said to be compressed, and the diminution of volume is termed *compression.* The term compressibility is frequently used to signify that property of bodies whereby they yield to pressure; but more strictly the *compressibility* is the ratio of the amount of compression per unit volume to the compressing force applied. The unit of pressure generally used is *one atmosphere.* Its actual value in pounds-weight per square inch is nearly 14.7.

In gases the relation between pressure and volume is given by Boyle's Law—*viz.,* the volume of a given mass of gas is inversely proportional to its pressure (see GASES, LAWS OF). From this it follows that the compressibility is inversely proportional to the pressure. The behavior of a gas under pressure is affected by the proximity of its temperature to the critical point (see CRITICAL TEMPERATURE).

Under a pressure of 100 atmospheres, air will be compressed to one-hundredth of its original volume, and the average compressibility (if the temperature be kept constant) is measured by the number which measures the final pressure—*viz.,* 100. Water, on the other hand, when subjected to the same pressure, will have its volume diminished by the fraction $\frac{1}{20}$ at ordinary temperatures, so that the average compressibility will be measured by the fraction $\frac{1}{21600}$. The compressibility of mercury is about one-sixteenth of that of water, and is the smallest known for fluids. For the solid metals the compressibilities are still smaller, that of steel being about $\frac{1}{70}$ that of water. Except from a theoretical point of view, the values of the compressibilities of solids are of little importance.

In order, however, to make accurate determinations of the compressibilities of fluids, it is necessary to know the compressibility of the substance of the vessel in which the fluid is compressed. This is generally of glass, for which accordingly careful measurements have been made. The values differ with the different kinds of glass, but they generally average about one twentieth of the compressibility of water. At a depth of 26,400 feet (nearly 4,000 fathoms) the sea water is under a pressure of about 400 atmospheres. The compressibility of sea water is roughly 10 per cent smaller than that of fresh water; hence the whole vertical column of this depth is shorter than it would be if water were incompressible by the fraction of its length given by 200 times the quantity $\frac{1}{24000}$—*i.e.,* about 220 feet.

The measurement of the compressibility of liquids is usually made in a glass vessel termed a piezometer (see PIEZOMETER).

Compromise Measures of 1850, variously known as the OMNIBUS BILL, a series of measures passed by Congress during 1850, the chief points of which were the admission from time to time of the new States formed in Texas, the immediate admission of California with the boundaries proposed, and the Territorial organization of Utah and New Mexico without the Wilmot Proviso (q.v.). What, however, proved to be the real question at issue was contained in clauses enacting the return of fugitive slaves escaping into the free States, and the total abolition of the slave trade in the District of Columbia, under heavy penalties.

On Jan. 29, 1850, Henry Clay introduced in the Senate a series of resolutions calling for the settlement together of all the principal questions at issue on the basis of mutual concession. These resolutions were laid (April 18) before a Committee of Thirteen of which Clay was chairman, and on May 8 he reported from it two bills, for the abolition of the slave trade in the District of Columbia and for the settlement of the principal pending controversies. The latter was known as the 'Omnibus Bill.' The introduction of these bills gave rise to one of the most famous debates in Congress, Clay, Webster, Calhoun, Benton, Seward and Chase taking part. The sections were eventually passed as separate acts, collectively known as the 'Compromise Measures of 1850.'

California was admitted as a free State; New Mexico and Utah organized as Territories without mention of slavery; Texas boundaries were established as they are now, and $10,000,000 paid Texas for relinquishment of boundary claims and claims on the United States for payment of her public debt; slavery was prohibited in the Capital District, and a stringent Fugitive Slave Act passed. (See FUGITIVE LAWS.) Both parties proclaimed their adherence to the settlement of the chief points then at issue between North and South, and it was hoped that pacification had been accomplished. Yet neither side was satisfied, the North being angered by the Fugitive Slave Law, and soon the whole slavery question was re-opened in 1854 by the Kansas-Nebraska Bill (q. v.).

Compton, ARTHUR HOLLY (1892–), American physicist, was born at Wooster, Ohio, and educated at the College of Wooster, Princeton, and Cambridge, England. He was instructor in physics at the University of Minnesota (1916–17); research physicist, Westinghouse Lamp Co., East Pittsburgh (1917–19); research fellow at Cambridge (1919–20); professor of physics, Washington University (1920–23), and professor at the University of Chicago from 1923. He also lectured at the University of Lahore, India, 1926–7, and was honored by numerous scientific bodies. He was awarded the Nobel Prize for Physics, 1927.

Compton, Karl Taylor (1887–), American physicist, brother of the above, was born in Wooster, Ohio, and studied at Wooster, Princeton and Lehigh. He was instructor in chemistry at Wooster (1909–10); professor of physics at Reed College, Portland, Ore., 1913–15, and president of the Massachusetts Institute of Technology from 1930.

Comptroller, or Controller, an officer whose duty is to check accounts by keeping counterrolls or counterfoils; hence a steward or treasurer. In the United States the term is applied to various financial officers of the central and of the local governments. Thus the Controller General of the United States is the head of the auditing department of the Federal Government; he passes upon the validity of claims against the Treasury and hears appeals from the decisions of the auditors. The Comptroller of the Currency has for his chief function the supervision of the national banking system. He is a member of the Federal Reserve Board and has supervision of the reserve system. In some of the larger cities the comptroller, as the chief financial authority, has large powers in determining the legality of disbursements authorized by the city council.

Compulsory Insurance. See Insurance.

Compurgation, an ancient legal term denoting a method of proof of the innocence of a defendant by the oaths of a certain number of persons acquainted with him. Trial by combat, or the ordeal of fire and water, represented a great advance in law and order over the primitive blood feud, and a further stage was reached when, as was customary amongst the early Teutonic races, and especially among the Anglo-Saxons down to the time of the Conquest, the accused could purge himself of an offense by bringing forward a certain number, generally twelve, of good men and true to testify that they believed he was innocent. These were called compurgators. They were not exactly witnesses, nor must they be confused with the jury, which was a device of the central authority for securing its own ends (chiefly of revenue). The presence of the compurgators implied no more than that the accused had twelve friends who were prepared to vouch for him. Compurgation was finally abolished in 1833.

Comstock, Ada Louise (1876–), American educator, was educated at the University of Minnesota, at Smith College, and at Columbia University, and was successively assistant, instructor, assistant professor and professor of rhetoric, and dean of women at the University of Minnesota (1898–1912). In 1912–23 she was dean at Smith College and from 1923 president of Radcliffe College.

Comstock, Anthony (1844–1915), American reformer, served in the Union army from 1863 to 1865, and afterward settled in New York City, where he became secretary and chief special agent of the New York Society for the Suppression of Vice. He published *Frauds Exposed* (1880), *Traps for the Young* (1883), *Gambling Outrages* (1887), *Morals versus Art* (1887).

Comstock, Cyrus Ballou (1831–1910), American military engineer, was born in West Wrentham, Mass. He came from West Point in 1855, and in the Civil War won distinction as a military engineer on the Federal side. He was chief engineer of the Army of the Potomac (1862–3), senior engineer under General Grant at the siege of Vicksburg, chief engineer in the operations against Fort Fisher, and took part in the capture of Mobile. Between 1864 and 1870 he was aide-de-camp in turn to General Grant and General Sherman. He was for some time president of the Mississippi River Commission and a member of the permanent Board of Engineers for Fortifications. He wrote *Primary Triangulation of the United States Lake Survey.*

Comstock, George Cary (1855–1934), American astronomer, was born in Madison, Wis. After serving as professor of mathematics and astronomy in the Ohio State University he became associate director of the University of Wisconsin observatory, and subsequently was director, as well as professor of astronomy until 1922. In 1906–20 he was dean of the Graduate School of the University of Wisconsin. He was an organizer of the American Astronomical Society and served as its president in 1925–8, and was a member of many learned societies. He published *Method of Least Squares* (1890), *Text-Book of Astronomy* (1900), *Field Astronomy for Engineers* (1902), *The Summer Line as an Aid to Navigation* (1919), etc.

Comstock, John Henry (1849–1931), American entomologist, was born in Janesville, Wis. He was graduated (1869) from Cornell University, where from 1875 to 1914 he was instructor, and later professor, of entomology and invertebrate zoology, excepting the years 1879–81, during which he was United States entomologist at Washington. For some time he was also non-resident professor of entomology at Leland Stanford University. In 1914 he became professor emeritus at Cornell. Besides his other numerous contributions to scientific periodicals, he published *Introduction to Entomology* (1888), and, with his wife, *A Manual for the Study of Insects* (1895), *How to Know the Butterflies of the Eastern United States* (1904), *The Spider Book* (1912).

Comstock, Theodore Bryant (1849–1915), American geologist, was born in Cuyahoga Falls, O. He was graduated (1870) from Cornell University, and after several years of teaching was acting professor of geology and palaeontology in Cornell, 1875–9, professor of mining engineering and physics in the University of Illinois, 1885–9, and founder and director of the Arizona School of Mines, 1891–5. In 1893–5 he was president of the University of Arizona. He also filled State positions as geologist, and was consulting mining engineer for several large companies. He published *Outline of General Geology* (1878).

Comstock Lode, a remarkable ore-deposit in western Nevada on the eastern slope of the Virginia Range, an offshoot of the Sierra Nevada. It was discovered in 1859 and mining at once was commenced under great difficulties due to lack of good water and fuel. The ores are high-grade silver and gold in quartz, occurring in great 'bonanzas' in the great vein which extends for four miles along the mountain side. The yield now is much smaller than formerly. The ratio of gold to silver was about 2 to 1 (value). The foundations of several great American fortunes were laid here. Mining was carried to great depth, and one of the famous peculiarities of the Comstock Lode is its floods of hot waters in which temperatures of 170° F. were reached. Under such circumstances ventilation and protection from water became serious questions. At a cost of more than $2,000,000 the Sutro Tunnel was constructed for nearly 4 miles through the mountain side to drain the mines.

The lode occurs in igneous rock walls. Its origin has been the subject of much discussion, among which some form of igneous activity usually is given much prominence.

A complete and entertaining description is given by Eliot Lord, *Comstock Mining and Miners,* U. S. Geological Survey, Monograph iv (1883), and a scientific discussion of the lode by Geo. F. Becker, *Geology of the Comstock Lode,* U. S. Geological Survey, Monograph III (1882).

Comte, kônt, Isidore Marie Auguste François Xavier, generally known as Auguste (1798–1857), French positivist philosopher, was born in Montpellier. In 1816 he went to Paris to earn his living as a teacher of mathematics, and made the acquaintance (1818) of Saint Simon, a social thinker who greatly influenced his mental development. Failing to make a living by private tutoring, he resolved to come before the public as a lecturer (1826). During the course Comte was attacked by brain fever, becoming the victim of melancholy so severe that he threw himself into the Seine. Happily he was rescued, and after a period of retirement regained his sanity and resumed his lectures (1828). Two years later the first volume of the *Cours de philosophie positive* was issued, and in 1842 appeared the sixth and last. The interval between the conception and completion of his great work was occupied by painful efforts to make ends meet, during which time he received help from J. S. Mill, Sir W. Molesworth, Grote, and others. After the completion of his *Positive Philosophy,* Comte started upon his second great work, *Système de politique positive* (1851–4), to which the earlier work was only an introduction. Of the *Cours de philosophie positive* the 4th edition appeared in 1877, with a preface by Littré; and a condensed English translation by Harriet Martineau, in 2 volumes, came out in 1853 and a new edition, in 3 volumes, in 1896. Of the *Système de politique positive* a third edition was published in 1890–5, and an English translation in 1875–9.

In 1848 he formed the Positivist Society, the aim of which was to undertake the reorganization and direction of society—to constitute, in fact, a real providence over humanity; and for this he wrote the *Catéchisme positiviste* (1852; Eng. trans. 1858, 3rd ed. 1891), in which are detailed the creed, ritual, and ceremonial of the new religion of humanity. Comte died of cancer in 1857, and the anniversary of his death (September 5) is commemorated by gatherings of his French and English disciples, who look upon him as the founder of a new religion. He was a thinker of vast ambition, whose desire was to construct a creed in which would be clearly defined man's relation to the universe and to society.

Since the reformation, according to Comte, humanity has been given over to anarchy. Men's conceptions are intellectually incoherent, and consequently their actions are morally unstable. He believes that a careful study of the laws of the universe and of human nature would reveal the fundamental laws of progress; and these truths, properly systematized, would form a creed, a philosophy, a religion. This scientific synthesis he called positivism, or, when viewed from the standpoint of feeling, the Religion of Humanity. According to Comte, the human mind, in its search for a theory of experience, passes through three stages—theological, metaphysical, and scientific. Theology failed in its interpretation of the universe because it attributed phenomena to personal causes. This stage corresponds with belief in the supernatural. The metaphysical method also failed, because, though setting aside personal wills as the cause of phenomena, it postulated essences and entities—it personified abstractions. Science, in Comte's opinion, holds the key of the temple of truth, because, setting aside supernatural agencies and metaphysical abstractions, it abides rigorously by fact: it confines itself to the study of phenomena on the basis of observation, verification, and experiment. The more influential supporters of positivism in England were Beesly, Bridges, Congreve, and Frederic Harrison. See Positivism. Consult J. S. Mill's *Auguste Comte and Positivism;* Herbert Spencer's *Reasons for Dissenting from the Philosophy of Comte.*

Co'mus ('revelry'), the god of festal mirth, represented as a winged youth.

Comyn, kum'in, Cumming, or Cumyn, a family originating in the French town of Comines, who became powerful in Scotland. (See Comines, Philippe de.) Robert de Comines, accompanying the Norman conqueror, became earl of Northumberland, and perished in trying to hold Durham. William, his nephew, became chancellor of Scotland; and Richard, grandnephew, linked the family to Scottish royalty by marrying the granddaughter of Donald Bane. John Comyn (d. 1300), lord of Badenoch, competed with Baliol and Bruce in claiming the crown; and his son, the Red Comyn, met Robert Bruce to discuss proceedings against the English, when he was stabbed by the future Scottish king before the altar of the Minorite Friary, Dumfries (1306). In the blood feud that followed Bruce was victorious and the Comyn family was crushed.

Conant, James Bryant (1893–), American educator, 23rd president of Harvard University (elected 1933), was born at Dorchester, Mass., and educated at Harvard. He had degrees conferred upon him by numerous universities, including Columbia, Yale, Oxford, Princeton, etc. From 1916 he lectured on chemistry at Harvard, and was appointed a director of the Rockefeller Institute in 1930. He served in the Chemical Warfare Service of the U. S. Army in 1917 and published several books on chemistry.

Conant, kō'nant, Thomas Jefferson (1802–91), American Hebrew and Biblical scholar, was born in Brandon, Vt. He became professor of Greek, Latin, and Hebrew at Waterville College (now Colby University), Me. (1827–33). He was professor of Biblical literature and criticism at the Baptist Theological Seminary at Hamilton, N. Y. (1835–50) and at Rochester Theological Seminary (1851–7), resigning from the latter position to become reviser of the common English version of the Bible for the American Bible Union. He was a member of the American committee for the revision of the Old Testament, and himself prepared new versions of both Testaments. He also translated Gesenius' valuable *Hebrew Grammar* (1839).

Concealment. The term conceal implies something more than mere failure to disclose. The concealment of facts by a party to a contract, which amounts to fraud or purpose and mere silence itself is not concealment. To 'conceal' means purposely to keep from sight of discovery. Where an application for a life insurance policy expressly made a part of the policy, contained a stipulation limiting the time within which any action should be brought, a complaint in an action on the policy, alleging that insurer 'purposely and wilfully concealed' from plaintiff the contents of the application to induce delay in bringing suit until after the expiration of the time limited, was insufficient for failing to aver facts on which to predicate relief from the consequences of the delay; the words 'purposely' and 'wilfully' adding nothing to the charge that the insurer concealed the contents of the application.

The word 'conceal' as used in the provision of the Bankruptcy Act subjecting any person to criminal prosecution for 'having knowingly and fraudulently concealed while a bankrupt or after his discharge from his trustee

MAY 2

any of the property belonging to his estate in bankruptcy' is of plain import, and when coupled in an indictment with the words 'unlawfully, knowingly, and fraudulently,' clearly excludes unintentional acts.

A 'concealment' when applied to insurance, is the designed and intentional withholding of any fact material to the risk which insured in honest and good faith ought to communicate. A concealment involves not only the materiality of the fact withheld, but the design and intention of insured in withholding it. A concealment, within a fire policy stipulating that it should be void if insured conceals any material fact concerning the insurance or the subject-matter thereof, involves not only the materiality of the fact withheld, and which he ought to have communicated, but also the design of insured in withholding it, and the facts alleged to have been concealed must be material and insured must have intentionally and fraudulently concealed them.

Ordinarily, to constitute legal 'concealment of a material fact' to the risk, such as would avoid a policy of insurance, there must be something more than the mere existence of such fact and failure on the part of the insured to disclose it. Where no specific inquiry has been made touching facts material to the risk, and there is no misrepresentation respecting the same on the part of the insured, and no intentional concealment thereof, their existence will not invalidate the policy. When the insurer issues the policy without inquiry, he assumes the risk, unless some unusual fact exists which affects the risk.

BENJAMIN WERNE, *S.J.D.*

Concepción, kon-sep-syōn', town, Argentina in the province of Entre Rios, on the Uruguay River; 150 miles north of Buenos Aires. It has trade in wheat, cattle, wool, and timber.

Concepción, province, Chile, lying between the Argentine and the Pacific, with the provinces of Nuble and Maule on the north and Bio-Bio on the south; area 2,212 square miles. It is mountainous in the east, an arid plateau in the center, and a rich fertile plain in the west. There are extensive forests and abundant coal deposits. Grapes, from which an excellent wine is made, form an important crop. The capital is Concepción. Pop. (1936) 289,825.

Concepción, town, Chile, capital of the province of Concepción, is situated on the River Bio-Bio, 12 miles from its mouth. It is the center of a coal-mining and agricultural district and has fine buildings and good markets. Pop. (1930) 77,589.

Concepción, or VILLA CONCEPCIÓN, city, Paraguay, on the left bank of the Paraguay River; 125 miles northeast of Asunción. It is the chief commercial center for the export of maté tea. Pop. (1936) 14,122.

Concepción, town, Luzon, Philippine Islands, in the province of Tarlac, on the Paruao River; 13 miles southeast of Tarlac. It produces rice, sugar, and tobacco. Pop. 17,487.

Concepción de la Vega, town, Santo Domingo, capital of the province of La Vega; 65 miles northwest of Santo Domingo. It is the successor to an old town founded by Bartholomew Columbus in 1495 and destroyed by earthquake in 1564. The present city is regularly laid out, has wide streets, and a fine plaza. It is a flourishing center for tobacco, cocoa, and coffee. Desultory excavations have revealed many small objects, and there are remains of foundation walls and towers.

Con'cept and Concep'tualism. A concept is an idea which has been formed by thought and permanently embodied in language by a word or other symbolic expression. In the case of the concept of a particular thing, the object represented is obvious and unquestionably real. Whether this holds in the case of the general concept is a debatable question. In fact, one of the great controversies of medieval philosophy had this problem for its theme. To the concept of a particular thing this particular thing itself is the object corresponding in reality; but is there a general thing, so to speak, corresponding in reality to the general concept—an objective essence identically present in all the things of which the concept may be predicated? Or, on the other hand, is there no generality in the case save that which arises from the same term or name being applied to several things, and being thus a common or general *name?* The doctrine of conceptualism, which is specially connected with the name of Abélard, sought to mediate between these two extreme doctrines of realism and nominalism, maintaining that while universals, as such, exist only for thought and in the mind, yet they are based upon an objective resemblance of nature in things, and thus do not depend upon any such arbitrary distribution of names as the doctrine of nominalism seems to suggest. See NOMINALISM.

Conception, in human physiology, the impregnation of the ovum. See EMBRYOLOGY; FERTILIZATION; REPRODUCTION.

Conception, Immaculate. See IMMACULATE CONCEPTION.

Concertina, kon-ser-tē'na, a portable musical instrument, invented by Sir Charles Wheatstone in 1829. It is hexagonal in form, and the sound is produced by expansible bellows operating on free metallic reeds. There are tenor, bass, and double-bass concertinas; but the common instrument is the treble concertina which has a compass of four octaves, including a complete chromatic scale. The three instruments first named produce the sound only on pressing the bellows; the treble concertina produces the same note both on drawing and pressing the bellows. Some good classical music has been written for the concertina in combination with other instruments—notably by Molique, Sir George Macfarren, E. Silas, and Signor G. Regondi, who was the first to make it known.

The common German concertina is constructed on another principle, producing one note when the bellows are drawn out, and another when they are contracted. See also ACCORDION.

Concerto, kōn-chĕr'tō, a musical composition, generally designed for a solo instrument—usually the piano or violin—with an orchestral accompaniment. Notable exceptions are Bach's concertos for two, three, and four pianos, and for two violins; Beethoven's triple concerto for violin, piano, and 'cello; and Mozart's concerto in E flat for two pianos. The creator of the concerto was Giuseppe Torelli, whose concertos date from 1686; but the form was developed by Corelli, Geminiani, Tartini, Bach, and others. The modern form was settled by Mozart, though Beethoven introduced several important modifications. It consists of three movements, its form resembling that of the sonata, upon which it is founded.

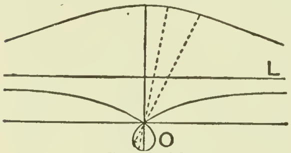
Concert of Europe, a term given to a system of international control on the part of Great Britain, Russia, Austria, and Prussia established at the Congress of Vienna in 1815. The year 1822 saw its break-up when Great Britain, having protested in vain at the Congress of Verona regarding interference in Spanish affairs, withdrew from the congress.

Conch, kongk, the name given to various carrion-feeding molluscs found on reefs in tropical seas. They belong to the family Strombidæ and have heavy, thick shells with a conical spire, a foot narrow in front and broad behind, and a head with a contractile snout. The shells are used in the manufacture of porcelain and lime and in cameo cutting. The best known species is the Queen Conch (*S. gigas*), sometimes attaining a length of 10 to 12 inches, with a handsome shell having a polished rosy lip and lining. Pink pearls are sometimes found within its mantle folds. The majority of the queen conchs are found among the reefs of Florida, the West Indies, and the Bahamas, and to the inhabitants of these regions, who make a precarious living by gathering them, the term *Conchs* is sometimes applied.

Conch (*Strombus gigas*)

The name conch is also given, improperly, to the East Indian gasteropod Triton (q. v.), and to certain univalves of Long Island and New Jersey (*Fulgur canaliculatus* and *F. carica*), which do great damage to oyster beds.

Conchoid, kon-koid', a curve invented by Nicomedes for solving the famous problem of the ancients, the duplication of the cube. It may also be used to trisect an angle. To describe it, let a set of straight lines be drawn through a point O, and cut a given straight line L. Mark off on each of these lines the two points which are at a given distance from the point of section with L. The points so obtained lie on the conchoid, which therefore consists of two branches, to which the line L is an asymptote. The curve may be traced mechanically by a very simple combination of rulers.



Conchoid

Conchology, kongk-ol'ō-ji, a branch of zoölogy dealing with molluscs, particularly with reference to their shells. See Mollusca.

Conchos, kon'chōs, river, Mexico, rising in the Sierra Madre in the southern part of Chihuahua and flowing in a north-easterly direction through that state, 350 miles to join the Rio Grande at Presidio del Norte.

Conciergerie, kon-syār'zh'rē', a famous prison in Paris occupying the lower floor of the north wing of the Palais de Justice, originally the residence of the 'concierge' of the Parlement. During the Revolution Marie Antoinette, Danton, Mme. du Barry, Camille Desmoulins, Robespierre, and other famous persons passed their last days here. It is now used for prisoners awaiting trial.

Conciliation, International. See Arbitration, International.

Conciliation Boards. See Arbitration, Industrial.

Concini, Concino. See Ancre.

Con'clave, an apartment in the Vatican in which the cardinals, who are to elect a new Pope, are housed until the election is completed. It comprises a chapel and a suite of halls in which cells are fitted up for the lodging of the cardinals and their attendants. The cardinals occupy this apartment on the eleventh day after the death of a Pope and may not leave it until the new Pope is named. The term conclave is also applied to the body of cardinals so assembled. See Cardinal.

Concord, in music, is a combination of notes satisfying in itself, and not requiring other chords to precede or follow it. See Harmony.

Concord, town, Massachusetts, Middlesex county, on the Concord River, and on the Boston and Maine Railroad; 18 miles northwest of Boston. It is famous both as a literary shrine and for its patriotic associations. The rude wooden bridge spanning the river, now replaced by a cement structure, was the scene of the first battle of the American Revolution, April 19, 1775, when a hundred minute men, under Captain George Minot, fired 'the shot heard round the world.' As the home of Emerson, the Alcotts, Thoreau, and Hawthorne, Concord holds a significant place in American literature. Pop. (1930) 7,477.

Concord, city and capital of New Hampshire, county seat of Merrimac county, on the west bank of the Merrimac River, and on the Boston and Maine Railroad; 70 miles N.W. of Boston. Memorials are the Hannah Dustin Monument, the Bradley Monument in memory of Samuel Bradley and others massacred by the Indians, Aug. 11, 1746, and statues of Franklin Pierce, Daniel Webster, John Stark, John P. Hall, and Commodore Perkins. Manufactures include textiles, leather belting, flour, silverware, electrical supplies, and a large printing plant (the Rumford Press). Concord was known as Pennacook, from its founding, 1725, until 1733, and then as Rumford until 1763. It became the capital of the State in 1816. Pop. (1930) 25,228.

Concord, city, North Carolina, county seat of Cabarrus county, on the Southern Railroad; 22 miles N.E. of Charlotte. Industries include cotton mills, a furniture factory, foundries and machine shops. Pop. (1920) 9,903; (1930) 11,820.

Concor'dance, a dictionary or index of the Bible, in which the leading words are listed alphabetically, giving the book, chapter, and verse in which each is to be found; also a similar index to any other work or collection of works, as the plays of Shakespeare or the writings of Chaucer. The compiler of the first concordance was probably Cardinal Hugo de St. Caro, who about 1230 completed at Paris 'a short concordance' of the Vulgate, enlarged and perfected twenty years later by three English monks. In 1438–48 Rabbi Mordecai ben Nathan made a Hebrew concordance, published at Venice in 1524. Marius de Calasio and others made a concordance of Hebrew, Latin, and Greek Scriptures in two columns, published at Rome in 1621, and in 1632 the elder Buxtorf published his Hebrew concordance, in which the references were made by Hebrew letters, and to the rabbinical divisions of the Old Testament. Dr. John Taylor's valuable Hebrew concordance, issued in 1754–7, under the patronage of the English and Irish bishops, was based upon Buxtorf's work. The most complete and accurate concordance of the Greek Septuagint is that of Trommius (1718); while the best concordance of the Greek New Testament is probably that of Schmidt (1638). The first concordance to the English New Testament—before the King James version—was printed by Thomas Gybson, previous to the year 1540, and the first to the entire Bible by John Marbeck in London in 1550. Till modern times the most complete concordance was that of Alexander Cruden, first published in 1737, and issued in a corrected form in 1810 and 1824. But for arrangement and accuracy, no concordance to the Bible in English can equal *The Analytical Concordance* of Robert Young (7th ed. 1900), in which the words are classified under their Hebrew and Greek meanings. Other excellent concordances are Walker's (1894) and Strong's (1894). *A Concordance to the American Standard Version* by M. C. Hazard appeared in 1922.

NOV 1 9 1940

Of concordances to the works of British authors, the principal are Mrs. Cowden Clarke's *Concordance to Shakespeare,* first published in 1847, but eclipsed by the monumental work of an American, John Bartlett (1894). Useful concordances have also been published to the works of Chaucer, Milton, Pope, Cowper, Burns, Shelley, Tennyson and others.

Concordat, the name given in French history to arrangements made between the monarchy and the papacy for defining and determining the duties and rights of the clergy with respect to these two powers respectively. Of such arrangements there have been three specially notable. In 1516, Francis I, after his great victory at Marignano in the previous year, met Pope Leo X at Bologna, and drew up the first concordat. It was the complete abolition of the pragmatic of 1438. By the new arrangement the appointment of all ecclesiastical dignitaries was to be by the king subject to a nominal acceptance by the pope; and the payments to the papacy, cancelled by the pragmatic, were restored. This concordat governed the relation of France to the papacy down to the revolution, when it was superseded by the civil organization of the clergy by the Constituent Assembly in July, 1790. But a new concordat was made between Napoleon and Pius VII in 1801. By it the election of all the bishops was again conferred upon the head of the French government, and the pope only granted them 'canonical installation.' The pope also promised not to reclaim the property of the church which had been confiscated by the government. In 1904, consequent on the suppression of teaching by the religious orders and the dismissal of a bishop by Cardinal Vannutelli, friction arose between the Vatican and the government. A rupture of diplomatic relations followed, and in October the premier declared that since 1870 there had been deliberate disregard and violation of the concordat by the Vatican. A movement was set on foot to separate church and state, and the concordat was abrogated in 1905.

What may well rank as the most important and permanent concordat in history was concluded in 1929 between the Vatican and the kingdom of Italy. For details of this see CHURCH, STATES OF THE; ITALY (vol. VI, p. 530A); also VATICAN.

Concordia, town, Argentina, in the province of Entre Rios, on the Uruguay River; 240 miles north of Buenos Aires. The exports are meat, hides and tea. Pop. 27,300.

Concordia, city, Kansas, county seat of Cloud county, in the Republican River valley, and on the Burlington Route, the Union Pacific, the Atchison, Topeka and Santa Fe, and the Missouri Pacific Railroads; 111 miles W.N.W. of Topeka. The manufactures include ploughs, flour and cement products. There are coal mines and stone quarries in the vicinity. It is the seat of Nazareth Academy. Pop. (1930) 5,792; (1940) 6,248.

Concrete is an artificial stone formed by mixing cement, which will harden in the presence of water, with aggregate composed of sand or crushed stone of a similar fineness and gravel, broken stone of similar hard, inert material of coarse grading. The term originally applied to an artificial stone made up of smaller stones mechanically joined together by any cementitious material such as lime, but is now used entirely to designate a compound in which hydraulic cement produces the cohesion. It is a plastic material, changing from an original semi-fluid to a hard, compact substance, and can, therefore, be molded into any desired shape. Since it is made from a hydraulic cement it possesses the quality of hardening under water, and this property has led to some of its wide uses. In breakwaters, river piers or foundations, or any location where exposed to water, it is probably the leading building material in use. An important use which has developed along with the automobile is in the construction of hard surfaced permanent highways.

While it has been used as a building material since the earliest times with a crude sort of cement as a binder, its growth has been most marked in the 20th century, particularly since the development of reinforced concrete, a combination of steel and concrete in which the concrete is utilized to resist the compressive stresses and the steel the tensile stresses. This combination thus has the qualities of steel and wood in resisting strains and can be used in many structures where ordinary masonry cannot be used. Extensive studies have been made of the materials used and the effects of various factors in its production so that the practice in making it has developed to the point where concrete can be made with the qualities required to meet almost any condition.

Composition.—The ingredients of concrete are cement, water and aggregates. Any kind of hydraulic cement (*i. e.,* one that will set hard under water) may be used, but as a rule only portland cement is used, an artificial cement produced by the calcination and subsequent pulverization of a carefully proportioned mixture of carbonate of lime and clay or slag. It is made in mills and is sold in sacks weighing 94 lb. net, or in bulk. Although the manufacturers are careful to turn out a product up to standard specifications some of the larger users test cements according to standard tests (see CEMENT) either at the mill or upon arrival on the job. Since portland cement must be made to meet certain specifications most users now accept it without making these tests. As cement hardens upon application of water care must be taken to keep away all moisture while it is in storage.

Water is necessary to produce the chemical reactions causing the paste of cement and water to harden. The process of hardening is referred to as hydration. The other ingredients of concrete are known as 'fine aggregate' and 'coarse aggregate.' The first consists of sand, crushed stone, or gravel screenings which will pass through a small screen usually having four meshes to the linear inch. It should be clean, coarse and free from vegetable loam. The grains should be graded in size, and material predominantly of fine particles should be avoided. A fine aggregate mostly under 1/32 in. diameter, for example, requires nearly double the cement necessary with a sand graduated up to ¼ in. diameter. Sand should be tested for cleanness, gradation of size, and strength on important work.

Coarse aggregate may be gravel, broken stone, blast furnace slag, or other inert material. It should be hard, durable, clean, and of a fairly uniform shape. Its maximum size will depend on the job but in general it should be graded up to the largest size that the conditions will warrant. For reinforced concrete, material graded up to ¾ or 1 in. is often used. For ordinary concrete the size is usually somewhat larger and may be up to 3 in. diameter for foundations and similar work, while material up to 6 in. or more is used in mass work such as large dams. As in the fine aggregate, a gradation of size from the smallest to the largest of the coarse aggregate is desirable. When using the larger sizes, the material should be supplied to the job in separated sizes and reproportioned for each batch to give uniform results. Special types of aggregates are used to produce concrete of lighter weight. These may be burned clay or shale or powerhouse cinders. Ashes from domestic furnaces should not be used.

Proportions.—In earlier uses concrete was specified by arbitrary mixes giving the volumes of fine and coarse aggregates to be used with each volume of cement. The mixes varied, depending on the use of the concrete. It was later found that the strength, watertightness, durability, and other qualities of the concrete were related to the amount of mixing water. These qualities are improved with reductions in the mixing water so long as workable mixes are maintained to allow proper placing. It has, therefore, become good practice to specify the maximum amount of mixing water permitted for all concrete to be exposed to the elements. Minimum strengths may also be specified on such concrete and may be the only requirement for concrete that is not exposed. In the latter case the contractor uses the amounts of mixing water that will produce the specified strengths. In either case the contractor is given considerable leeway in proportioning the fine and coarse aggregates to give the consistency and workability of the mixture required by the conditions of placing.

Maximum water contents for exposed work will depend on conditions of exposure and the type of structure. In practically all concrete that is to be watertight the total mixing water should not exceed 6 gallons per sack of cement. In heavy dams in climates where there is no freezing this might be increased to as much as 7½ gallons. In thin sections exposed to severe climates not more than 5½ gallons should be used. Most concrete should have water contents between these extremes, depending on whether the climate is severe or moderate. The proportions of fine and coarse aggregate with given water and cement contents should be such as to produce a workable mixture which can be placed without segregation of the materials. They will vary with the type of work, size and grading of aggregates, and other factors. Specifications usually require that the amount of fine aggregate be not less than one-half the amount of coarse nor more than equal to the amount of coarse aggregate.

Mixing.—Concrete is nearly always mixed in power mixers, practically all specifications now prohibiting hand mixing except for very small quantities. Most mixers are of the batch type consisting of a drum in which the dry materials and water are poured and mixed by rotation. The drum is filled and dumped for each batch. These mixers come in capacities ranging from ½ to 4 cubic yds. of concrete. A more recent development is the transit mixer consisting of a drum mounted on a truck. The dry ingredients are placed in the drum at a central plant and upon delivery at the job water is added and the drum rotated to mix the concrete.

Strength.—The manufacture of cement has so improved that high strengths are now secured. The relation of average 28-day compressive strengths to water contents is shown in the following table:

Water Content Gallons per Sack of Cement	Compressive Strength at 28 days Lb. per sq. in.
5	6,000
6	5,000
7	4,200
8	3,300

While these strengths may be expected when using good materials they should not be depended upon without making check tests with the materials to be used. If such tests are not made the strengths should be assumed to be about 1,000 lb. per sq. in., lower when used for design purposes. The strength of concrete is variable. In addition to water content, other factors which have important influences on strength are age of specimens, conditions of curing, and quality of materials. Strength increases with age, rapidly at first and then more slowly. If the concrete is not permitted to dry the strength will increase almost indefinitely although the rate of increase will be very slow after the first few weeks. Low temperatures reduce the rate at which strength increases, and below freezing it practically ceases. For these reasons concrete is kept wet for at least the first week after placing and is protected against low temperatures for several days or a week or more. Designs are usually based upon safe working stresses. These are proportioned to the ultimate compressive strength of the concrete. Where f'_c represents the ultimate compressive strength, the following working stresses are usually permitted:

Direct bearing	$0.25\ f'_c$
Flexure	$0.40\ f'_c$
Shear	0.02 to $0.12\ f'_c$ depending upon amount and location of shear reinforcement
Bond	$0.04\ f'_c$ plain bars $0.05\ f'_c$ deformed bars

Durability.—Concrete can be made to withstand the most severe conditions of weathering. Dams and other hydraulic structures have withstood 40 years and more of alternate wetting and drying, freezing and thawing, without appreciable signs of wear. There are records also of structures exposed to sea-water for long periods without deterioration. On the other hand, structures which are improperly built may show deterioration in a relatively short time. For severe conditions it is essential to provide a dense concrete and sufficient coverage of such concrete over all steel reinforcement. Mineral oils do not affect concrete though some vegetable oils sometimes produce injurious results. Acids will attack concrete, and it is usually necessary to protect it against direct contact with most acids.

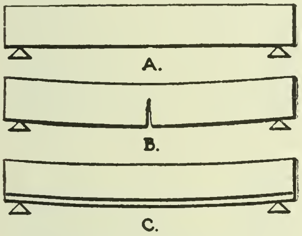
Forms.—As it is deposited in a semi-fluid state concrete must be placed within confining molds made to the size and shape desired for the hardened mass. These molds are known as 'forms' and their proper design and construction are important features of concrete work. They are usually made of lumber in boards or large sheets of plywood closely joined and backed against studs and struts which are braced together so as to resist the weight and hydraulic pressure of the wet concrete. Steel is sometimes used for forms especially on structures where they may be re-used a large number of times. The important requirements of forms are: they should be tight so that none of the cement can leak out; they should be strong enough to prevent not only collapse but also bending which leaves unsightly curves in the finished concrete; they should be true to line; they should be clean; they should be easily removed without damage to the face of the concrete. The forms should not be taken down until the concrete has become strong enough to carry its own weight and any working loads put upon it; this time varies from a day to two weeks,

NOV 29 1946

depending upon many conditions.

Classification. — Broadly speaking, concrete in construction is divided into three classes—mass concrete, reinforced concrete, and precast concrete. In the first two the concrete is cast *in situ,* that is, in the location where it is to be left. Precast concrete is made in a factory or casting yard and then moved to the location where it is to be used.

Mass Concrete.—Mass concrete is usually plain concrete in large masses although in some cases reinforcement may be used to take up shrinkage and temperature stresses but not to assist in carrying applied loads. The large gravity dams constructed by the U. S. Bureau of Reclamation and the Tennessee Valley Authority are good examples of mass concrete. Boulder Dam, for example, contains over 3,000,000 cubic yards of concrete, is over 700 feet high and nearly 1,200 feet long. Foundations, heavy retaining walls and piers are other examples of mass concrete.



Reinforced Concrete is concrete in which steel has been embedded to take the tensile strains. If a beam of plain concrete such as is shown in the figure at A be placed on two supports and loaded, as the load is increased, the beam will bend. This produces tensile stresses in the lower part and compressive stresses in the upper part of the beam. The tensile strength of concrete is relatively low so that as the load is increased the lower part of the beam becomes over stressed and a crack as shown in B will appear. If a steel rod is placed in the lower part of the beam when the concrete is placed in the mold in the location shown in C the concrete in hardening will bond to the rod. Now when a load is placed on this beam it tends to bend in the same manner as before but the tensile stress will be taken up by the steel rod. This principle is used in reinforced concrete although the method of applying the steel is not always so simple as described in the example.

Reinforced concrete is widely used in building construction in a variety of ways. Skeleton construction in which a frame consisting of reinforced concrete columns, beams, and floor slabs is erected, is used for many buildings. Exterior walls are suspended on the frame and may be of concrete or masonry. Exterior walls in which decorative features are also cast in concrete are referred to as 'architectural concrete.' They first became popular in California and other locations subject to earthquakes; because of their rigidity they can withstand the action of earthquakes and there is nothing to shake loose. The effects of architectural concrete are so attractive that its use has spread widely.

Bridges, trestles and grade separations, water tanks, grain storage tanks and elevators, sewage disposal plants, water pumping and filtration plants, hydraulic structures of all kinds, such as various types of dams, are only a few of the other applications of reinforced concrete. Steel used in reinforced concrete is usually in the form of rods in sizes from ¼ in. to 2 in. in diameter. The rods are generally of deformed section with projections of various designs to improve the bond between the concrete and steel. Woven or welded wire mesh or expanded metal mesh are also used. In some instances structural steel shapes have been used but this is protected steel work rather than reinforced concrete.

Precast Concrete.—A wide variety of precast concrete units are in use. Masonry units in a range of sizes for building construction, floor joists and floor slabs, bridge slabs, bearing piles and sheet piles, burial vaults, septic tanks, sewer and drain pipe, cast stone for facing of buildings and other structures, lighting standards, garden benches, are examples of precast concrete. Masonry units are in the form of blocks of various sizes, the most frequently used size being 8 × 8 × 16 in., and are cellular containing one or more vertical openings or air spaces. They are laid in cement mortar in approved masonry practice for walls in house construction, garages, industrial buildings and other structures, also for backup for other masonry such as brick or stone. Most blocks are now made with a plain face instead of the imitation rock face used when they were first introduced. They are made on power operated machines, a fairly dry mix being placed in a mold of proper shape and size, the concrete being compacted by tamping, jogging, and vibration. The block and a pallet on which it rests are then removed to a curing room where the concrete is kept moist and warm for several days and the blocks are then stored until ready for use. The curing is sometimes accelerated by the use of a steam bath. Precast piles up to 24 in. square and over 100 ft. long have been used for bridges and other structures. They are heavily reinforced and are handled by a crane using a sling with 2, 3, 4 or more points of suspension to distribute stresses during handling. They are driven into place by large pile drivers. Some of the railroads use precast piles of even larger cross-section for trestle construction. Precast pipe is used in a wide range of sizes from drain tile of 4 in. diameter to pressure pipe up to 12½ ft. in diameter used for water supply or sewage.

Finish.—With the great growth in the use of concrete has come an improvement in form materials, form construction, and methods of placing concrete so that good looking surfaces are produced which require little if any treatment after stripping the forms. On buildings the concrete can be cleaned after the walls are completed. This is usually done by brushing on a cement grout much of which is scraped off with a trowel immediately after placing and the remainder is rubbed off with burlap after it has dried. This leaves uniformly colored surfaces with pits and holes filled. Other finishes are produced by rubbing the concrete to a smooth surface with carborundum stone, exposing the aggregate by removing the surface film of cement and tooling the surface to give effects similar to dressed stone. Aggregates may be exposed by removing the forms before the concrete has thoroughly hardened and brushing it with wire brushes, by washing with acid, or by casting the concrete in forms surfaced with a special material which prevents the cement coming in contact with it from setting. Concrete is also painted with cement or oil paints. Floors are usually finished by troweling to a smooth surface. Roadways are given a rougher finish by floating, belting, or brushing with a broom.

Orientation.—Concrete may be cast in glue or plaster molds to reproduce decorative details. In architectural concrete, plaster waste molds for some of the details which are difficult to produce in wood are often inserted in the wood forms. When the concrete has hardened the plaster is broken off. In this manner the ornamentation is cast integrally with the wall. Precast stone used for building ornamentation is cast in plaster molds if it involves intricate details. Mantel pieces, garden ornaments, statues, and similar work are other ornamental uses for concrete.

Fire Resistance.—Concrete possesses marked fireproof qualities. Experiments have shown it to have a low conductivity so that heat takes a long time to reach the interior of the mass. Except in the most severe fires the only damage to concrete has been surface spalling which is easily repaired by plastering. Fire resistance ratings have been established for concrete and concrete units both for protection for structural steel and as a structural material itself. For fireproofing structural steel the concrete is coated on the steel from 1 to 3 inches thick, usually with a reinforcement of wire mesh to help hold it to the metal.

Waterproofing.—Well made dense concrete is watertight against high hydrostatic pressures. Poorly made concrete on the other hand may leak, especially through construction joints and porous areas resulting from use of lean, harsh mixtures improperly placed. Finely divided powders are sometimes used as an admixture in concrete mixtures to improve watertightness. Their effect is to improve workability which can also be done by improving the grading of the aggregates and by use of a richer mix. Concrete may also be waterproofed by the application of exterior coatings, usually of bituminous materials. Membranes are sometimes built up by embedding cotton fabric in the bitumens.

Rev. by PORTLAND CEMENT ASSN.

Concretion, a term applied in medicine to any abnormal solid or semi-solid mass formed in the human body from any of the natural secretions—*e.g.*, a gallstone, or a stone in the bladder.

Concretions, in the sense in which that term is used by the geologist, are masses of rounded or irregular form which occur in sedimentary rocks, more particularly in sandstones, shales, clays, and impure limestones. They have been formed, after the deposit was laid down, by the aggregation of certain chemical substances around centers, such as fragments of bone, wood, shells, or other materials. Some are siliceous (*e.g.*, flint nodules), others calcareous, or contain carbonate of iron (septarian nodules); others are phosphatic. The *Challenger* expedition found that in the mud of the present sea-bottom dead fishes were being surrounded by a deposit of calcium phosphate. In clays and loams siliceous concretions ('fairy stones') are often found of remarkable shapes. A classification of concretions based upon origin and structure is given by J. E. Todd, *Concretions and their Geological Effects,* Bull. Geol. Soc. of America, vol. 14, pp. 353–368 (1903).

Concubinage marks a stage in the development of the institution of marriage towards definite and consistent monogamy. It was recognized by law as at least a permissible practice, but it was of inferior sanctity and bindingness as compared with regular marriage. However, when the regular marriage had yielded no heir, concubinage was not only permissible but laudable under the patriarchal or family religion of classical times. The institution existed in Old Testament times, but it had its widest extension in Rome. Before the end of the republic it had spread so much that Augustus, to check licentiousness and to promote stability in the marriage relation, forbade or at least materially restricted it by legally degrading the position of a concubine by the Lex Julia. The practice continued, however, and concubinage as a legal institution was not abolished in Germany, for instance, till 1577. Hand-fasting and many other forms of irregular marriage were in reality simply concubinage. The question of the celibacy of the clergy had much to do with the continued toleration of the practice of concubinage by nobles and other powerful persons. Compare also MORGANATIC MARRIAGE.

Concussion of the Brain, the stunning effect produced on the brain by a fall or a blow. The immediate result is stupor, varying in degree with the force of the blow; the symptoms of concussion generally pass off in a few minutes. If they recur, compression of the brain, either by indented bone or by cerebral hemorrhage, is the probable cause. The treatment is complete rest for at least 2 to 5 days as slight trauma may have serious effects and much depends on proper care during the acute stage; no alcohol should be given. Strychnine may rarely be necessary to revive the paralyzed nerve-centers for heart and respiration. Cold applications of evaporating lotions to the head, with warmth to the feet, will relieve congestion.

Condé, HENRY I DE BOURBON, DUC D'ENGHIEN, PRINCE DE (1552–88), son of Louis I, took part with his cousin, Henry of Navarre, afterward Henry IV of France, at the battle of Arnay-le-Duc (1570), under the command of Admiral Coligny. After the massacre of St. Bartholomew, in order to save his life, he became a Roman Catholic; but at the death of Charles IX (1574) he returned to Calvinism, and took a prominent part in the subsequent religious wars, especially at the battle of Coutras (1587), which was won through his bravery.

Condé, HENRY II DE BOURBON, DUC D'ENGHIEN, PRINCE DE (1588–1646), posthumous son of Henry I, was brought up in the Roman Catholic faith. His ambition and intrigues disturbed the first years of Louis XIII's minority, until finally the regency imprisoned him in the Bastille (1616), and kept him there for three years. After his liberation (1619) he became a docile instrument of Richelieu; fought against the Protestants; and on the death of Louis XIII (1643) became president of the Council of Regency. He left two sons—the elder, Louis II, 'the Great Condé'; and the younger, Armand, the founder of the second house of the princes of Conti.

Condé, LOUIS I DE BOURBON, PRINCE DE (1530–69), was the first of his line to assume the title of Condé. He adopted a military career, fighting in Piedmont under Brissac, opposing Charles V at Metz (1552) and on the Meuse (1554). He was a staunch supporter of the Huguenots, took part in the conspiracy of Amboise (1560), and again in a second revolt against Catherine de' Medici, which resulted in the Edict of Amboise (1563). The 1568 peace ended another Protestant rising; and Catherine's subsequent attempt to seize Condé and Coligny led to their flight, and to Condé's death at the battle of Jarnac.

Condé, LOUIS II DE BOURBON, PRINCE DE (1621–86), 'the Great Condé,' at an early age gave signs of the quick intellect, extraordinary courage, excessive haughtiness, and hardness of heart which afterward distinguished him. Compelled by an ambitious father to marry Richelieu's niece (1641), his influence —already immensely strengthened by his victories over the Spaniards at Rocroi (1643), over Mercy at Nördlingen (1645), and at Dunkirk (1646) —became, on his succeeding to his father's principality in 1646, so excessive as to constitute a danger to the realm. He supported the court against the Fronde, until his attitude towards Mazarin and Anne led to his imprisonment (1650); however the union of the Old and New Frondes led to his release. Appointed to command in the

NOV 1 4 1945

Low Countries (1648), he won the battles of Lens. An indecisive attempt on Paris was followed by flight when he entered the service of Spain, and commanded the Spanish armies until his defeat before Dunkirk (1658). Restored to his rank in France (1659), he subsequently reduced Franche-Comté (1668), and fought the Dutch at Seneffe (1673), and Montecuculi in Alsace (1675). See CONTI.

Condé, LOUIS JOSEPH DE BOURBON, PRINCE DE (1736–1818), son of the Duke de Bourbon, was born in Paris. He fought with distinction in the Seven Years' War, winning the battle of Johannisberg (1762). He afterward commanded the 'army of Condé' against the revolutionists, served with the Austrians and the British till the peace of 1797, with the Russians in Poland (1799), and later with the British in Bavaria. He retired to England (1800), but returned to France at the Bourbon restoration. He wrote *Essai sur la vie du grand Condé.*

Condenser, an apparatus for changing a vapor, such as steam, to a liquid by removing its latent heat of vaporization. This change of state is called condensation and the volume of the substance and the pressure in the condenser are materially reduced. In steam engine or turbine installations, the reduction in back pressure increases the pressure range through which the steam can be used and thus increases the thermal efficiency and power output of the engine or turbine per pound of steam. There are two main types of condensers: the jet type in which the condensation takes place with the steam and condensing water in direct contact and the surface type in which steam and condensing water are in separate circuits.

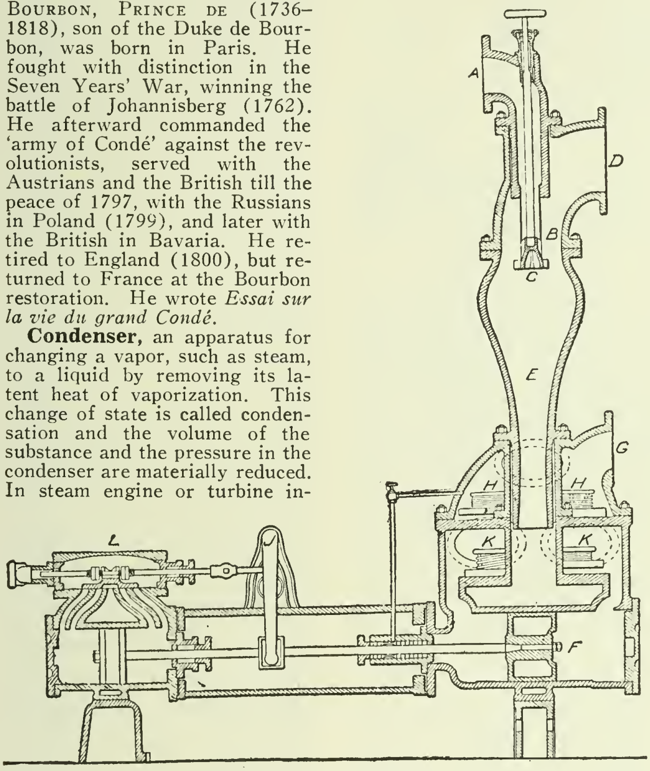


FIG. 1.—*Jet Condenser*

The earliest type jet condenser is shown in Fig. 1. The steam is led to the condensing chamber where it is mixed with water from a single spray or rose. The condensing water and condensed steam, together with the air that was mixed with the steam passes through the throat and is removed by a steam-driven combined air and condensate pump. The condensing chamber is fitted with a relief valve or vacuum breaker so that if, for any reason, the water builds up in the condensing chamber, and renders spray inoperative the steam will exhaust to atmosphere and the water will not flood the engine or turbine. A later development of the jet condenser is the low-level type which differs from that in Fig. 1 by having multiple spray nozzles around the condensing chamber, a centrifugal motor driven water removal pump, and a separate pump to remove the air from the top of the condensing chamber. This type produces higher vacuum than that shown in Fig. 1 but needs the same flood protection device. Another variation of the low-level type is the syphon or injector type shown in Fig. 2. In this type both air and water are removed by the kinetic action of the steam. The steam is condensed and entrained along with air in the high velocity water jets and the mixture discharged against atmosphere. This type requires a large quantity of cooling water and also flood protection device.

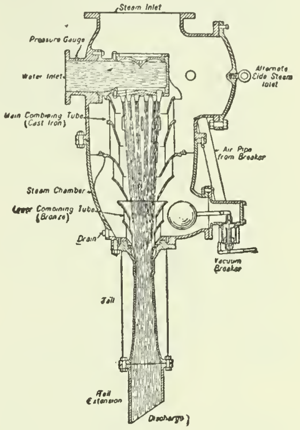


FIG. 2

The barometric jet condenser shown in Fig. 3 eliminates the danger of flooding the engine or turbine if the pump fails or the relief valve or vacuum breaker fails to operate. In this type the condenser is elevated at least 34 feet above the level of water in the discharge well and the water drops to the well by gravity. The tail pipe must be submerged in the well to prevent air from the atmosphere passing into the pipe and breaking the vacuum. In the low-level jet condenser, the water is lifted into the condenser by the vacuum in the condenser. But since the limit of lift is only about 20 ft. because of water vapor formed at normal water temperature, it is necessary with the barometric condenser to furnish a pump to overcome pressure difference. The disadvantages of jet-condensers are the loss of the con-

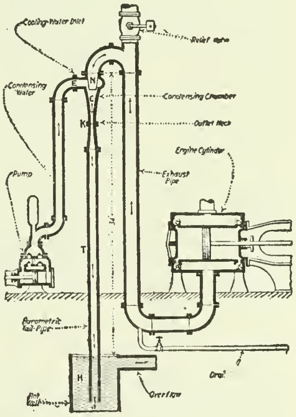


FIG. 3

densate and the limit on size in which they can be built and still accomplish efficient mixing of steam and water.

Because it has been found more economical in power plants to increase unit capacity and operate at higher pressures and temperatures, jet condensers have been replaced by surface condensers for this service. Large quantities of boiler feed water are required. This boiler feed water must be de-aerated to prevent boiler and turbine corrosion under high pressure and temperature conditions. It is therefore essential that de-aerated condensate from the condenser be saved for re-use and this can only be done in a surface condenser. The surface condenser (Fig. 4) consists of a cast iron or plate steel shell fitted at the ends with tube sheets into which tubes are fastened in somewhat the same manner as in a tubular boiler. Water boxes or heads are fitted over the tube sheets to provide chambers at each end. Steam from the engine or turbine enters the shell where it is condensed by coming in contact with the tubes through which a supply of relatively colder water is flowing. The condensate falls to the bottom of the shell and then into a hot well connected to the bottom of the shell, from whence it is removed and returned to the boiler feed system by a condensate pump. The air inleakage into the condensing system is removed from the condenser shell by an air pump.

The design and internal construction of surface condensers vary considerably. The most efficient design is one which condenses the steam with the lowest pressure drop and delivers de-aerated condensate to the boiler feed system at the highest possible temperature. Fig. 5 shows a cross-section of an efficient condenser. The steam enters at the top and flows into the tube banks from the sides and center where auxiliary entrance lanes facilitate entrance and shorten the path of travel to the exit lanes in the center of each tube bank. Air and non-condensible gases are removed from the banks through the exit lanes which lead directly to the internal air cooler sections where vapors are condensed and the gases cooled before they go to the air pump. The baffles over the air cooler sections are of the thermos type consisting of double plates with dead air section between them. The impeded path of travel for the steam is short from entrance to exit side of tube bank and therefore pressure drop is very low. Condensate falls to the bottom of the shell and to the hot well where it is de-aerated and reheated up to or above the temperature corresponding to the absolute pressure of the steam entering the condenser. The reheating is accomplished by converting energy of velocity to energy of pressure through a venturi-shaped central lane and thus building up a higher pressure and equilibrium temperature in the bottom of the condenser and in the hot well than exists at the steam entrance to the condenser.

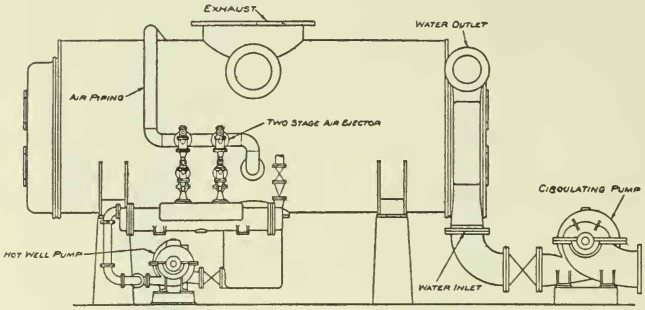


FIG. 4

Since steam flow from a turbine exhaust nozzle is stratified, it is essential in a well designed condenser to provide for transverse and longitudinal redistribution of steam by opening up support plates wherever possible. The amount of heat that the cooling water will abstract from the steam can be computed from the formula:
$H = W(H_s - T_c + 32)$ where H = heat abstracted;
W = weight of water; H_s = heat in the exhaust steam at the condenser pressure and T_c = temperature of condensate. The empirical value for H for engine units is 1,000 and for turbine units is 950 BTU per pound. The amount of circulating water required can be computed from the formula:
$Q = \frac{W_s \times H}{500 \times T_r}$ where W_s = pounds of steam condensed per hour; H = heat abstracted per pound; 500 = conversion factor from pounds per hour to gallons per minute and T_r = circulating water temperature rise. The amount of surface can be computed from the formula:
$S = \frac{W_s \times H}{U \times \theta_m}$ where S = exposed surface in sq. ft. measured on the outside of the tubes between tube sheets; U = heat transfer rate in BTU per sq. ft. per degree logarithmic mean temperature difference per hour, and θ_m = logarithmic mean temperature difference in degrees Fahrenheit.

Water velocity through the tubes should be kept between 3 and 8 ft. per second. Tube diameters should be from ⅝ to 1 inch. Heat transfer rates should be from 20 to 700 BTU for normal condenser designs depending upon circulating water temperature and velocity and upon tube cleanliness. Temperature difference between steam and circulating water inlet should be about 20° F. for economical design. Temperature difference between steam and circulating water outlet should be about 10° F. for economical design.

For large power plants, surface condensers are almost universally used because of their economy and the necessity for large quantities of de-aerated condensate for boiler feed. For small power plants, barometric and low level jets can be used where condensate recovery is not important, but even in this field, surface condensers are more widely used. Barometric and low level jets are, however, widely used in industrial plants in process work as steam killers, heaters, and condensers for ejector steam because of low first cost, space conditions, and operating economy and because steam contains elements which make condensate unfit for boiler feed.

In the refrigerating plant the condenser is used solely to remove the latent heat in the ammonia gases coming from the compressor at a high pressure, to enable the resulting liquid ammonia to pass through a refrigerating valve into the evaporating coils whereby its evaporation refrigeration is effected. The heat transfer ranges from 60 to 300 BTU per square foot per degree of temperature difference per hour. All tubes and piping must be of metals other than those containing zinc, upon which ammonia acts readily; steel is the universal metal employed.

NOV 19 1948

Condensers for refrigerating work may be divided into types as follows: Submerged coil; atmospheric; atmospheric-counterflow; double-pipe; multi-coil; and vertical shell-and-tube.

The early condensers consisted of pipe coils placed in a tank of water. The ammonia flowed downward through the coil while the water was introduced at the lower part of the tank and overflowed through a connection near the tank top. This was a cheap condenser to build, but had several objectionable features.

The most serious fault was that only a small part of the water touched the pipe coil. As a consequence, the amount of heat removed per gallon of water was very low, and to obtain a given condenser capacity the size of the condenser tank was necessarily large. In addition, there was a tendency for the water along the coil to be more or less stagnant and this layer or film of water interfered with the transfer of heat from the ammonia vapor to the coil, K, the BTU transferred per square foot per degree of temperature per hour being about 30.

These objections led to the virtual abandonment of the submerged condenser in favor of the atmospheric type. The majority of the atmospheric condensers are made up of a vertical row of pipe lengths, generally from 8 to 20 in number, with the ends connected by return bends, forming a continuous pipe through which the ammonia passes. The ammonia enters at the top from a header connecting two or more of the rows of pipes and flows downward, losing its heat to the water on the outside of the pipe in its downward travel. The ammonia liquid settles in the bottom coils and passes off to the receiver or storage tank. The water is fed into a trough placed over the top pipe and, overflowing, drops onto the top pipe and thence successively flows over each pipe and drops into a basin beneath the coil.

It will be noted that both the ammonia and water flow downward; that is, the flow is parallel. As a result, the coldest water, that coming onto the condenser, first touches the pipe containing the hottest ammonia gas, that is, the top pipe; and the hottest water, that leaving the condenser, is on the pipe containing the ammonia after condensation. It is obvious that the condensed ammonia cannot be lower in temperature than the temperature of the off-going water. To reduce the ammonia temperature on leaving the condenser, condensers are designed with the gas inlet at the bottom where it meets the hottest water and the discharge higher up along the condenser where the water is cooler.

In its passage upward through the coils it is obvious that the ammonia upon condensing will have a tendency to trickle downward in opposition to the overflow of gas. If this were permitted, the bottom coils would soon fill up with liquid. Consequently, at several points connections are made to permit the liquid to drain off to the receiver, a trap arrangement being used.

The desirability of having a condenser suitable for locations where the splashing of water by an atmospheric condenser could not be permitted led to the use of the double-pipe condenser. In this type of machine, there are two pipes placed one within the other. The inner one is usually 1¼ inches in diameter and is filled with cooling water. The outer pipe is 2 inches in diameter, and the ammonia gas flows between the inner and outer pipes. Suitable connections permit the water to flow from one inner pipe to the next lower one, while at the same time the ammonia gas can pass in the opposite direction. The inner pipe extends through the fitting and through two stuffing boxes which seal the connection against leakage.

Rev. by C. L. Waddell, *Worthington Pump and Machinery Corporation.*

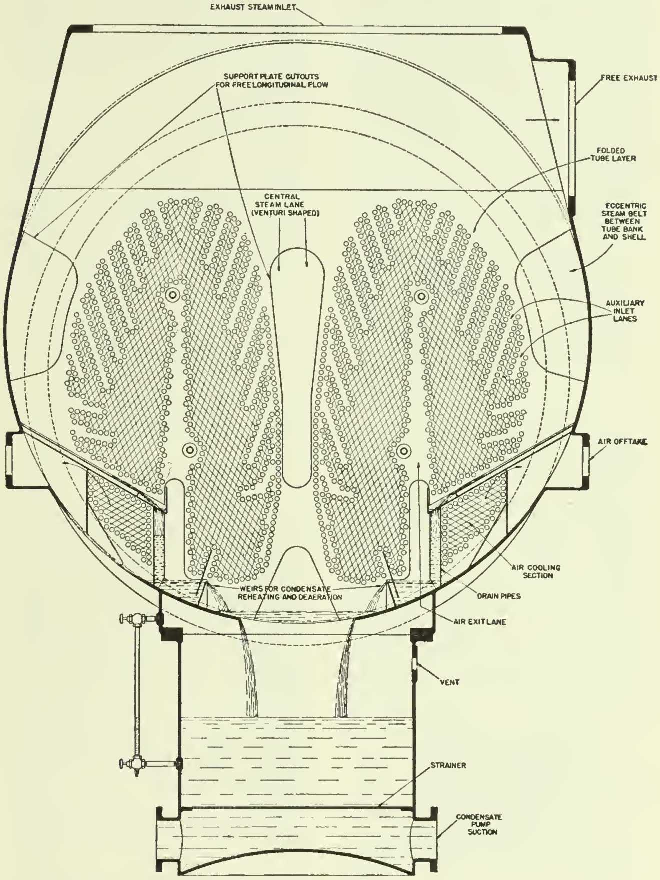

EXHAUST STEAM INLET
SUPPORT PLATE CUTOUTS FOR FREE LONGITUDINAL FLOW
FREE EXHAUST
FOLDED TUBE LAYER
CENTRAL STEAM LANE (VENTURI SHAPED)
ECCENTRIC STEAM BELT BETWEEN TUBE BANK AND SHELL
AUXILIARY INLET LANES
AIR OFFTAKE
AIR COOLING SECTION
WEIRS FOR CONDENSATE REHEATING AND DEAERATION
DRAIN PIPES
AIR EXIT LANE
VENT
STRAINER
CONDENSATE PUMP SUCTION

Fig. 5

Condenser, a form of electrical apparatus, also called capacity, capacitor, or capacitance, the terms being equivalent. The term condenser is commonly understood to refer to stationary devices, as described in this article; however, there is also a kind of condenser, the synchronous condenser, which is a rotating machine. The basic function of an electrical condenser is the storage of electrical energy. Although condensers may be built in many forms, the essential parts are always two electrically-conducting surfaces, called the plates, separated from each other by a non-conducting medium called the dielectric, which is the energy storing medium, and may be a material substance, such as air, oil, or glass; or it may be simply a vacuum.

Originally, condensers were known as Leyden jars, because the first one was built at the University of Leyden by Musschenbroek in 1746. It consisted of a glass jar with two tin-foil coatings extending upwards about two-thirds its height, one coating being inside and the other outside the jar. Leyden jars of this kind are still used in laboratory work. The simplest forms of condenser are those called plate, cylindrical, and spherical, the names being descriptive of the physical shapes. The first two of these are sketched in Fig. 1, in which M and N are the conducting surfaces and D is the dielectric.

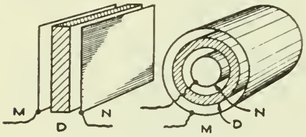


Fig. 1

Many types of condensers have been devised in order to achieve various objectives, such as the following: high ratio of plate area to condenser volume; simple variation of plate area; and ability to withstand high plate-to-plate voltages without puncturing. A high ratio of plate area to condenser volume may be obtained, for example, with the multiplate arrangement shown in Fig. 2, in which sets of plates are connected to the terminals M and N, and both sides of each plate are used effectively. A condenser of this type may be made by rolling together two sheets of tin-foil, insulated from each other by paraffin-impregnated paper dielectrics, both inside and out. In order to permit variation of the plate area, as in radio applications, a condenser arrangement like that of Fig. 2 may be used in which one set of plates is moved from under the other by rotation about an axis, such as p-q. The electrical strength required to withstand high plate-to-plate voltages is obtained by proper choice of the dielectric medium and proper design of the plate shapes.

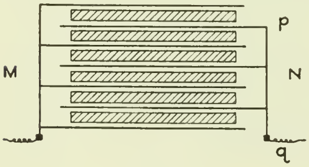


Fig. 2

It is found experimentally that the charge on a given condenser is proportional to the voltage across its plates; the ratio of charge to voltage, which is called the capacitance, is an important characteristic of the condenser: $C = Q/V$, where C is the capacitance in farads, Q the charge in coulombs, and V the voltage between the plates. The energy stored in the condenser is given by the expression $E = 0.5\ CV^2$ where E is the stored energy in joules.

Regardless of their physical arrangements, all condensers are electrically similar; their action may be explained by considering the hydraulic analogy to a simple electrical circuit. Suppose that a condenser C is connected in series with an ammeter A and a switch S across the terminals of a battery B, as in Fig. 3. When the switch is closed, a momentary current is noted in the ammeter. The switch may then be opened and closed at will and no further currents are observed. If, however, the battery is removed from the circuit while the switch is open, and a conducting wire is inserted in place of the battery, another momentary current is obseved in the ammeter when the switch is closed. This current flows in the direction opposite to the original one.

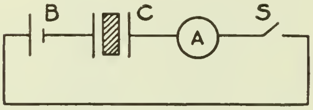


Fig. 3

The analogous hydraulic circuit is shown in Fig. 4. A pump P corresponds to the battery, a flowmeter F to the ammeter, a valve V to the switch, and the connecting pipes to the electrical conductor. A box B represents the condenser, this box being divided into two compartments by the elastic diaphragm D. The whole system is filled with water.

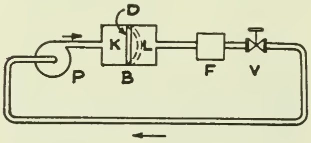


Fig. 4

When the pump is not working, the diaphragm is in the position shown by solid lines, because there is no difference in pressure between the chambers K and L. This corresponds to an uncharged condenser. When the pump is working, trying to force water in the direction shown by the arrow, the pressure in chamber K is greater than that in chamber L, so that the elastic diaphragm moves toward the position shown by the dotted lines. The motion of the diaphragm, and hence the flow of water, is only momentary. This corresponds to the charging of a condenser by a battery. If the pump is stopped suddenly, the stress in the distorted diaphragm will cause a momentary flow of water back through the pump from chamber K to chamber L, until the pressures in the two chambers are equal. This corresponds to discharging the condenser by disconnecting it from the battery and then short-circuiting the condenser plates.

In the hydraulic analogy, the elasticity of the diaphragm determines the amount of water which surges from chamber K to chamber L when the pump is stopped. Similarly, the nature of the dielectric between the condenser plates of Fig. 3 determines the ability of the condenser to store electrical charge. This elastic characteristic of the dielectric is called the specific inductive capacity or dielectric constant. It is observed, in the case of solid dielectrics like glass, that if the condenser is charged the glass may be removed, the two metal plates touched together, and the glass replaced between them, and the condenser will still be fully charged. This indicates that the charge, and consequently the energy, is actually stored in the dielectric. During storage of this energy, mechanical strains are set up in the glass, and these have actually been measured physically.

The energy storing capacity, or capacitance, for a group of plates in general is a function of the physical dimensions and may be obtained by field mapping, experimental measurement, or calculation. Field mapping consists of a graphical representation of the electro-static field; measurement of capacitance involves the use of auxiliary apparatus and instruments. These two methods are described in listed references. Direct calculation has so far been used mainly for regular shapes, such as planes, cylinders, and spheres. The following expressions have been calculated for these shapes:

NOV 19 1940

Parallel plate $$C = \frac{KA}{36\pi d \times 10^5}$$

Co-axial cylinder $$C = \frac{Kl}{18\left(\log_e \frac{r_2}{r_1}\right)10^5}$$

Concentric sphere $$C = \frac{r_1 r_2 K}{9(r_2 - r_1)10^5}$$

where

K = dielectric constant of the material between plates
A = plate area, square centimeters
d = distance between plates, centimeters
r_2 = inside radius of outer sphere or cylinder, centimeters
r_1 = outside radius of inner sphere or cylinder, centimeters
l = axial length of cylinder, centimeters
C = capacity in microfarads

When two or more capacitances are used in a circuit, they may be connected in series or parallel (or combinations of the two) in much the same way as batteries. As with batteries, the voltage across a series of capacitances equals the sum of the individual voltages; the voltage across a group of capacitances in parallel is the same for all the capacitances. From those relations the net capacitance of a combination may be found. If the net capacitance is denoted by C, it is $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \frac{1}{C_4}$ for a series connection, and $C = C_1 + C_2 + C_3 + C_4$ for a parallel connection. The choice of arrangement for any given case depends on the voltage stresses or charges desired. For a given applied voltage, a series arrangement places the lowest voltage stress on the individual capacitances; a parallel arrangement gives the greatest total charge, equal to the sum of the individual capacitance charges. (See also ELECTROSTATICS).

Consult Atwood, *Electric and Magnetic Fields;* Campbell and Childs, *Measurement of Inductance, Capacitance, and Frequency;* N. E. Gilbert, *Electricity and Magnetism.*

GENERAL ELECTRIC CO.

Condillac, ETIENNE BONNOT DE (1715–80), French philosopher, was born at Grenoble. As a psychologist he ranks high. His *L'Origine des Connaissances Humaines* (1746) outlines his system, and, with the *Traité des Systèmes* (1749), is in opposition to the work of Descartes, Spinoza, and Leibniz. His own system is developed in *Traité des Sensations* (2 vols. 1754) and *Traité des Animaux* (1755), in which he postulates sensation as the only source of knowledge, and to it traces the origin of all intellectual processes. For the son of the Duke of Parma he wrote the *Cours Complet d'Instruction* (1775). Among his other works are *Logique* (1780), and an important work on political economy, *Le Commerce et le Gouvernement considérés relativement l'un à l'autre* (1776). His *Œuvres Complètes* appeared in a new edition in 16 vols. 1821–3. Condillac exercised great influence in the 18th century, and was severely criticised by the eclectic school of the first half of the 19th century, until Taine showed that his philosophical ideas are in agreement with modern psycho-physiological discoveries.

Condition, in law, is something inserted in a deed for the benefit of a grantor giving him the power on default of performance to destroy the estate if he will and revest the estate in himself and his heirs. A condition not only depends on the option of the grantor, but is controlled by equity in any case where the grantor attempts to make an inequitable use of it. Condition is created by mutual agreement of parties, and is binding upon both. It may be express or implied, precedent or subsequent. It is precedent if the estate depends upon the occurrence or non-occurrence of the contingency. It is subsequent if the estate is to be defeated upon the occurrence or non-occurrence of the contingency. The law inclines to construe conditions as subsequent rather than precedent, and to be remedied by damages rather than by forfeiture. The term condition is frequently used synonymously with qualification or restriction, and at times interchangeably with warranty, as in insurance cases. The term has been used in conjunction with estates, as where a grantor conveys the fee (absolute title), reserving a certain rent on condition that, if it is not paid, he or his heirs may re-enter the estate. No precise form of words is necessary in order to create a condition; it may be inferred from the context as in the case of condition attached to a testamentary disposition (will). (See REAL PROPERTY).

Conditional Immortality, an eschatological theory which maintains that the soul is naturally mortal and that immortality is only to be obtained as the gift of God. The doctrine appears to be that, even if all men must rise again and be judged, such a resurrection does not imply the perpetual existence of the wicked. They are to suffer such penalties as their offenses may merit, 'many or few stripes' according to their deserts. In due time annihilation follows, and thus the wicked are 'blotted out of the book of life.' On this theory, the term 'everlasting,' as used of future punishment in Scripture, applies only to the eternal exclusion from life, and not to an eternity of conscious suffering. It is, moreover, urged that as fire, though it cannot actually destroy matter, yet so disintegrates it that all individuality is destroyed, so the eternal fire will consume every individual, and cause the sinner to cease to exist as a person. The case of Sodom and Gomorrah is adduced as an example.

Conditional Limitation, in the law of Real Property, is distinguished from an 'estate upon condition' in that the estate terminates upon the happening of the event expressed, while in the case of an estate upon condition, the estate is not defeated until the person who has the right to avail himself of the condition, does so by entry. A limitation marks the period which determines the estate without any act on the part of the one who has the next expectant interest. The provision for re-entry is the distinctive characteristic of an estate upon condition. In determining whether, in the case of estates greater than estates for years, the language constitutes a 'condition' or a 'conditional limitation,' the rule applied is that where an estate is so expressly limited by the words of its creation that it cannot endure for any longer time than until the condition happens on which the estate is to end, this is a limitation. When, however, the estate is expressly granted on condition in deed, the law permits it to endure beyond the time of the contingency happening unless the grantor takes advantage of the breach of condition by making entry.

Condonation, in divorce law, means the blotting out of the offense imputed to a spouse, and a restoration of the offender to his or her former position. The mere fact that a wife continues to live with her husband after he has committed acts giving her grounds for divorce does not constitute absolute condonation of such offenses. If she is induced to condone by the express or implied promise of her spouse to amend his ways, or if she concludes to suffer in silence and endure past offenses in the reasonable hope that they will not be repeated, rather than to sever the marital ties, she is not thereby barred from bringing forward past offenses in a suit for divorce. Condonation is merely forgiveness upon condition of subsequent fidelity. Cohabitation, after the offense, is sufficient evidence of condonation if the injured spouse had knowledge of the facts.

Condor (*Sarcorhamphus gryphus*), a very large S. American vulturine bird of prey, found up to a height of 16,000 ft. on the Andes, but coming down to sea-level in the southern part of its habitat, which is the west mountain axis of S. America. The head and neck are bare, and separated by a white ruff from the black plumage. Condors attack old horses, cows, and smaller domestic animals, but rarely man, and can be caught with the lasso while gorging themselves. Some of the largest show a spread of wing of 11 ft.; and no bird seems to have more powerful eyesight.

Condorcet, Jean Antoine Nicolas Caritat, Marquis de (1743–94), French philosophical writer; became a freethinker, D'Alembert and Clairaut being his guides. He then distinguished himself in mathematical science at the College of Navarre, and produced his *Essai sur le Calcul Intégral* (1765), which led to his election to the French Academy of Sciences (1769), of which he afterwards became perpetual secretary (1777). In 1782 he was also elected a member of the French Academy. He was one of the *Encyclopédistes.* During the revolution he espoused the cause of the people, and was elected president of the Assembly in 1792. He voted for the punishment of the king, but not for the capital penalty. Returned to the National Convention for the department of Aisne, he gave a general support to the Girondins. Proscribed at length by the extremists, he found refuge in the house of his friend Madame Vernet. During his retirement he wrote his most important work, *Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain* (1794; Eng. trans. 1795). In this treatise he taught the perfectibility of man, considered both in his individual and social capacity, and the perfect equality of civil and political rights for both sexes. Among his other books should be mentioned *Reflexions on the English Revolution of 1688 and that of the 10th August 1792* (1792), and a little book, *Moyen d'apprendre à compter sûrement et avec facilité* (1799; of which a new English version was printed in 1882). Driven from his first place of concealment, where he lay eight weeks, he was finally captured at Clamart, and died in prison at Bourg-la-Reine, April 6, 1794, having, it is believed, taken poison to avoid the ignominy of the scaffold. D'Alembert described him as 'a volcano covered with snow.' His title to fame rests on his application of philosophy to subjects connected with the happiness of mankind and the amelioration of social institutions. The works were published in 1804, in 21 vols., and again in 1849, in 12 vols., with a Memoir by Arago. See also *The Centenary of Condorcet,* by Ellis (1894).

Condottieri, mercenary soldiers hired (*condotti*) by the Italian lords and unwarlike burghers to fight for them. In the 14th century they were foreign adventurers who, in the intervals between the wars, lived by plundering the country, the most noted of them being an Englishman, Sir John Hawkwood, or L'Acuto, who fought in Italy between 1360 and 1394. In the 15th century the profession passed into the hands of adventurous Italians whose object was, if possible, to carve out a principality for themselves. One of them, Francesco Sforza, was fortunate enough to secure the duchy of Milan (1450). The smaller Italian lords also often augmented their incomes by serving the greater States as condottieri. As they had no interest in the cause for which they fought, their object being rather to prolong war than end it by decisive victory, they protracted their campaigns by much marching about and little real fighting, and often changed sides for higher pay. Hence there was constant distrust between them and their employers, one of them, Carmagnola, being executed (1432) by Venice on suspicion of treachery. The whole system of war degenerated into a farce, which was speedily exposed by the Ultramontane invaders. See J. A. Symonds, *Renaissance in Italy: Age of the Despots* (1875).

Conduction, one of the important modes in which heat or electricity is transmitted through matter. The material substance which transmits the heat or the electricity is called the conductor. Heat conduction takes place when neighboring parts of the same substance are at different temperatures, the heat flowing always from the warmer part to the colder part. The greater the difference of temperature, other conditions remaining the same, the greater the amount of heat which passes in a given time. In any particular case the temperature generally changes gradually from point to point, so that there is at each point a certain 'gradient of temperature' or rate of change per unit length. This gradient is one of the factors which determine the flow of heat across unit surface at the position considered. The other important factor is the conductivity of the substance. In short, the product of the gradient and the conductivity measures the amount of heat which flows across unit surface in unit time. If we can measure this flow of heat by some experimental method, we can calculate the conductivity. By such means we compare the conducting powers of different materials, and find that, of all substances, metals conduct best, silver and copper being specially good conductors. Wood, stone, glass, crystal, leather, cotton, wool, etc., are comparatively poor conductors—a fact which has important applications.

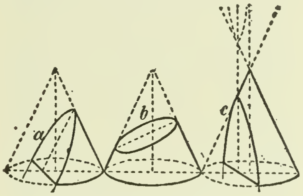
In the case of electrical conduction, the condition which determines the flow of current is the difference of electrical potential along a conducting channel. The laws governing the relation between current and potential difference are similar to those governing the relation between flow of heat and difference of temperature, and are particular cases of the mathematical theory first given by Fourier in his *Théorie de la Chaleur* (1822). In the case of ordinary steady electrical flow the law takes a very simple form known as Ohm's law (q. v.). According to this law, the conductance is defined as the ratio of the current passing along a conductor to the potential difference acting along it. The conductivity is calculated from the conductance by multiplying by the length of the conductor and dividing by the cross-section; it measures the conductance of a portion of the material which has unit length and unit cross-section. In a rough way, good conductors of heat are also good conductors of electricity, and non-conductors of electricity are poor conductors of heat. The conductivity of materials, both for heat and for electricity, is influenced by various physical conditions, such as pressure, temperature, strain, magnetic state, etc.

Conductor, in music, is the leader who conducts or directs an orchestra. He usually stands in front of the performers, either facing them or with his back to them, and beats time with a baton. The present method of conducting was introduced into England in 1820 by Spohr. Formerly the conductor, with his score before him, sat at a harpsichord or piano, and played only as occasion required, the orchestra taking its time from the leading violinist. Compared with this system, the advantages of conducting with a baton were obvious, and its use soon became general.

Great conductors are born, not made; but outstanding essentials are an intimate knowledge of the capabilities of all orchestral instruments, the magnetic quality of enthusiasm, and highly developed interpretative powers. The theory, frequently advanced, that great composers seldom or never make good conductors is untenable. Von Bülow introduced the practice of conducting without score—a method which has been largely adopted by recent eminent men. Among famous conductors past and present are Modest Altschuler, George Barrère, Sir Thomas Beecham, Artur Bodanzky, Hans von Bülow, Albert Coates, Edouard Colonne, Michael Costa, Frederick Cowen, Leopold Damrosch, Walter Damrosch, Ossip Gabrilowitsch, Rudolph Ganz, Wilhelm Gericke, Eugene Goosens, François Habenek, Sir Charles Hallé, Henry K. Hadley, Sir George Henschel, Alfred Hertz, Willem Van Hoogstraten, Louis Antoine Jullien, Sergei Kussewitzky, Charles Lamoureux, Gustav Mahler, Sir Augustus Manns, Felix Mendelssohn, Willem Mengelberg, Bernardino Molinari, Pierre Monteux, Felix Mottl, Karl Muck, Artur Nikisch, Jules-Etienne Pasdeloup, Emil Paur, Henri Rabaud, Hans Richter, Sir Landon Ronald, Wassily Safonoff, Johann Peter Salamon, Fritz Scheel, Ernest Schelling, Anton Seidl, Sir George Smart, Nicolai Sokoloff, Fritz Steinbach, Frederick A. Stock, Leopold Stokowski, Johann and Richard Strauss, Theodore Thomas, Arturo Toscanini, Henri Verbrugghen, Richard Wagner, Bruno Walter, Felix Weingartner, Sir Henry Wood, Josef Stransky, Wilhelm Furtwängler.

Condylomata, moist, flat, elevated patches occurring on the skin in secondary syphilis.

Cone, a surface generated by a straight line which constantly passes through a fixed point, called the vertex, and is subject to some other condition. This is the most general form of a cone, but the term is usually applied to the case where the generating line passes through a fixed point and moves round the circumference of a circle. This is technically called the cone of the second degree, and includes the case most commonly treated, where the line from the vertex to the centre of the circle is perpendicular to the plane of the circle. This latter is the right circular cone, and is defined by Euclid as the solid generated by the revolution of a right-angled triangle about one of the sides containing the right angle, which remains fixed. The fixed line is the axis of the cone. When the volume of a cone is considered, the cone is supposed to be terminated by its vertex, and by a plane section of it. The volume is in this case one-third of the area of the base multiplied by the perpendicular height, the cone being supposed to rest on its plane section. In studying the geometrical properties of its surface, the generating lines are supposed to be produced infinitely on either side of the vertex, giving two similar branches. The various figures obtained by sections of the cone of the second degree by a plane are as follows:—If the cone is cut by a plane parallel to any generating line, the section is a parabola; if by any other plane which cuts only one branch of the cone, the section is an ellipse, and in two particular cases circles; and if by a plane cutting both branches, a hyperbola. These curves, called conic sections, were first discovered by Greek mathematicians when studying the right circular cone. In this latter case the two series of circular sections merge into one—*viz.* the circles perpendicular to the axis.



Sections of the Cone.
a, Parabola; *b*, ellipse; *c*, hyperbola.

Conegliano, tn. and episc. see, prov. Treviso, Italy, 17 m. by rail N. of Treviso; the birthplace (1460) of Cima da Conegliano, and famous for its wine. It possesses a cathedral, and carries on silk industries.

Cone-shells (*Conus*), gasteropod molluscs which chiefly inhabit tropical seas. The shell is inversely conical, the spire being very short, and the smooth body-whorl tapering from above downwards, and often very gaily colored in red bands, etc. These molluscs dwell on sandy bottoms near shore, feed upon flesh and carrion, and some species are poisonous.

Conestoga Indians, an important Iroquoian tribe that formerly lived on the Susquehanna River and its branches. When first met by Captain John Smith (1608) and until their conquest by the Iroquois confederation in 1675, they were in alliance with the Algonquian tribes on the east shore of Chesapeake Bay and at war with those on the west shore. They were warlike and possessed a physique far superior to that of all the neighboring tribes. By conquest they claimed the lands on both sides of Chesapeake Bay, from the Choptank and Patuxent north to the territory of the Iroquois. In 1675, after their defeat, they established themselves on the east bank of the Potomac, in Maryland, immediately north of Piscataway creek, below which the Doag were then living. They formed a close alliance with the Dutch and Swedes, and with the English of Maryland.

The Iroquois had carried on relentless war against them which reduced their number of warriors from about 3,000 in 1608 to some 550 in 1648; while their allies brought the aggregate to about 1,250. Champlain says that in 1615 they had more than 20 villages, of which only three were at war with the Iroquois. The latter drove the Conestoga down on the tribes to the south and west, who were allies of the English, a movement which involved the Conestoga in a war with Maryland and Virginia in 1675. Some of them took refuge with the Occaneechi on Roanoke River, while the others remained in Pennsylvania. A quarrel occurred soon with the Occaneechi; these made common cause with the whites against the fugitive Conestoga, who were compelled to return to the Susquehanna River and submit to the Iroquois. According to Colden they were all finally removed to the country of the Oneida, where they remained until they lost their language, when they were allowed to return to Conestoga, their ancient town. Here they rapidly wasted, until, at the close of the year 1763, the remnant, numbering only about 20, were massacred by a party of rioters inflamed by the accounts of the Indian war then raging along the Pennsylvania frontier. The Swedes and Dutch called them Menqua, from the Delaware name applied to all the tribes of the Iroquoian stock; the Powhatan tribes called them Susquehannock, which was adopted by the English of Virginia and Maryland. The names of their palisaded villages were Attaock, Carantouan, Cepowig, Quadroque, Sasquesahanough, Testnigh and Utchowig. The Meherrin, on the river of that name in south-east Virginia, were officially reported to be a band of the Conestoga driven south by the Virginians during Bacon's rebellion in 1675–76. The interesting details here recorded were taken from *Handbook of American Indians* issued by the Bureau of American Ethnology, Washington, D. C., edited by F. W. Hodge.

Conestoga Wagon, the 'Ship of Inland Commerce,' has been described as 'the highest type of commodious freight-carrier by horse-power that this or any country ever produced.' According to John Omwake's valuable work, *Conestoga Six-Horse Bell Teams of Eastern Pennsylvania: 1750–1850* (1930), this wagon was a high, boat-shaped body with curved canoe-shaped bottom, which fitted it especially for mountain travel. The advantage of the latter feature was that freight remained firmly in place at whatever angle the body might tilt. The body was usually painted a blue or slate color, and the sideboards vermilion. The rear end could be lifted from its sockets. The wheels had broad tires, sometimes almost a foot broad. Six or eight bows were arched over the body, the middle ones lower than those at both ends, and over these was spread stout white hempen cloth, strongly corded down at the sides and ends. The vehicle could be loaded up to the top of the bows and could carry from four to six tons. Six or more Conestoga horses were attached in teams.

The top of the front hoop was eleven feet from the ground; the white cover was 24 feet long. The top ends of the wagon bed were 16 feet apart and the rear wheels five or six feet high. When the six-horse team was pulling, team and wagon stretched to 60 feet. From Baltimore ran wagons with 12 horses. The heavy, broad harness was made of the best leather and trimmed with brass plates. Bell-teams were common; a metal arch was attached to the harness and bells fastened thereto.

The drivers of the Conestoga wagons rode the left wheel horse. Passing to the right was more convenient in spite of the fact that it was the custom to pass to the left, as in England. Drivers riding the 'lazy board' of the wagon—a board between the two left-side wheels that pulled out and could be ridden when driving from the side of the wagon—preferred passing traffic to the right. The deep wagon ruts in the single-track roads made by the Conestoga drivers were followed by other traffic. This explains why vehicles now pass to the right in the United States. This information was published by the Bureau of Public Roads.

The Conestoga trail was the road from Philadelphia to Pittsburgh where in 1830 more than 3,000 of these wagons were constantly running. The Conestoga breed of horses had short, arched necks, full manes, strong legs, and weighed 1,400 pounds or more. They had remarkable endurance and were a distinct breed in the Conestoga Valley, Lancaster county, Pennsylvania. They may have been bred from Flemish stallions or English draught horses. They and their wagons were a famous feature of the Pennsylvania landscape. The name originated from the village of Conestoga, now a township, pop. (1930) 1,487. At times as many as 100 wagons would be strung along the road in close procession between Philadelphia and other Pennsylvania towns. They conveyed families and their household goods westward to their frontier homes; also provisions and necessaries for the western country and 'backloaded' with furs, skins, wheat and flour from the west for eastern markets. Consult J. T. Faris, *On the Trail of the Pioneers* (1920); *idem, Old Trails and Roads in Penn's Land* (1927).

Coney. One of the English names of the European rabbit, the source of domestic rabbits. The word thus translated in the Old Testament probably refers to the small rabbit-like animal called by naturalists *Hyrax syriacus.* (See HYRAX.)

Coney Island, isl. and resort, bor. of Brooklyn, N. Y., extending from the entrance to N. Y. Harbor 5 m. along the s. shore of Long Island, being the first of a chain of sand bars. Manhattan Beach, at the E. end, with Brighton Beach between, are suburbs of cottages and apartment houses. The extreme western section is Sea Gate, also residential. Coney Island, the most popular portion, is filled with places of amusement, probably on the most extensive scale in the world, attracting over a million visitors on a single summer holiday.

Confarreatio, the highest and most solemn form of marriage among the ancient Romans, made before the *pontifex maximus* or a *flamen dialis* and ten witnesses, in which certain words were used, and *panis farreus* (bread made of spelt) eaten. Certain priestly offices could only be held by the children of those thus married.

Confectionery. Confectionery represents a wide variety of factory prepared candies and sweets which are rich in sugar, from chewing gum, bonbons, lozenges, etc., to ices and candied fruits. The American people are enormously fond of candy, doubtless because of its quickly assimilated energy (98.9% of total energy is available immediately after being taken into stomach). Sugar is next to flour perhaps the cheapest food, on the basis of calories supplied; a pound of sugar yielding 1,750 calories, which at 6 cents per pound means 3¼ cents per thousand calories. Corn syrup (glucose) very extensively used in the manufacture of the cheaper candies today, is a product made by converting corn starch into sugar. Clean shelled corn is soaked in warm water until soft, the germ and hull are removed. The corn starch is then mixed with acidulated water and cooked in a 'converter'; the resulting syrup being passed through a charcoal filter clarifying and further purifying it; after which it is cooked to the desired consistency in large vacuum pans. Glucose has been certified by U. S. Government departments as readily digestible, and has 1,559 calories per pound. It is used particularly in gum drops, hard candies, taffies, lozenges, etc.

Chocolate, molasses, fruits, nuts, honey, milk, are other ingredients extensively used in confectionery manufacture, which in the U. S. has grown to enormous proportions, averaging between 1925 and 1934 about $400,000,000 per year (wholesale) or one and one-half billions retail. This huge volume is broken up into the following manufacturing classifications: Fancy package chocolates 18½%; bulk chocolates 11%; hard candy 9%; pan work 2½%; chocolate covered bars 12½%; all other bars 6½%; miscellaneous 40%. Another broader reclassification estimate is bar goods of all types 30%; penny candies 13%; hard, bulk and miscellaneous 30%; chocolates and bonbons 27%. Candy consumption was only $300,000,000 in 1880 (retail) reaching the billion mark in 1923. Per capita expenditure for candy in the U. S. was only 13 cents in 1852, but had reached $1.79 by 1880, and touched $10 by 1924. In the years up to 1934 it hovered between $12 and $14. This represents about half a pound per week per person. Of the total food expenditure of the average American person 87.7% is for non-sweet goods, 3.6% for candy, ½ of 1% for chewing gum, 1% for chocolate products, 2.7% for ice cream, 2.2% for bakery cakes, pies, etc., and 2.3% for sweet beverages.

Up to about 1910 a great deal of candy was in one-cent, uncovered, cheap and dangerously colored and adulterated candies. Pure food agitation changed the scene, and then slowly developed the 5-cent wrapped package candy which by the application of modern mass production factory technique and quality standards has altogether revolutionized the candy field. Chain store distribution methods have also aided in this, making candy of good quality available at very low prices. In particular the 5 and 10 cent wrapped package market has become a predominant factor, in some years as many as 15,000 new varieties being put on the market for trial. There is of course a high "mortality" among such brands, but much ingenious invention by the 2,500 or more candy manufacturers.

The flavored lozenge has had a wide vogue, giving the palate the taste of sweetness while not delivering to the stomach any considerable amount of sugar. Such lozenges are made by reducing granulated sugar to powder, mixed with corn syrup, flavored, regranulated, and then pressed, shaped and stamped on a rotary machine. The resulting tablets are automatically packaged in rolls of 14 tablets and labelled and then carried on a running belt to cartoners who box them. These, like a great many other cheap packaged candies of quality, are never touched by human hands.

The largest of the chocolate bar making companies (Hershey) has turned out chocolate bars at the rate of 100,000,000 per year. This huge organization has owned its own huge sugar and cocoa bean plantations. Another huge candy bar plant (O Henry) has standardized like Ford on one item, and as a result during the 1920's was foremost in lifting the 5-cent candy business from a predominately child's item to an adult item.

As an example of cost analysis of mass produced candy, a box of Hershey's ten cent bars, containing 12 bars, cost at a certain time as follows: raw materials (cocoa, butter, milk, almonds) 36 cents; manufacturing process up to wrapping point 5 cents; tinfoil, labels, box, etc. 5 cents; factory overhead, .097 cents; total 55.7 cents.

There is a seasonal variation in candy consumption; Winter 40%, Summer 15%, Spring 21%, Fall 25%. Candy is exceedingly widely distributed, there being in the metropolitan district of New York alone about 35,000 outlets, and in the country as a whole about 500,000 outlets. Candy stores sell 55%, grocery stores 12%, drug stores 10%, chain stores 8%; stationery stores 8%, cigar stores 3%; 'holes in the wall' 1%; the rest straggling.

From a manufacturing viewpoint candies are classifiable as follows:

Hard-boiled candies, cooked to high degree of temperature such as stick candy, lemon drops, etc.

Open cooking and fire candy cooked in open kettles over furnace first and pulled over hooks or on pulling machines, such as molasses taffy, cream taffy, etc.

Pan work: This includes various forms of candy, nuts, etc. coated with sugar, such as sugar coated almonds, jelly beans, burnt almonds, burnt peanuts, etc.

Gums: These are candies cooked in large melting kettles then moulded in impressions made in starch, dried, separated from the starch and sugared, such as gum drops.

Chocolates: various kinds of candies dipped in chocolate, such as chocolate creams, chocolate almonds, chocolate chips, etc.

Creams: Sugar cooked low and beaten to a creamy consistency, moulded in impressions made in starch, dried, separated from starch and crystallized.

Caramels: Sugar and corn syrup cooked to a proper consistency in open stirring kettles, run out in big sheets on marble slab tables and cut in squares when cooled.

The cold water test in candy making means dropping the cooked candy into a bowl of cold water. A temperature of 236–240°F makes a 'soft ball'; of 242–248°F a 'firm ball'; of 250–270°F a 'hard ball'; of 290–300°F becomes brittle and cracks; of 310° very brittle.

Candy was first made about 2000 B.C., from honey combined with figs, dates and nuts; 'wafers made with honey' being mentioned in the Bible (Exodus XVI, 31). Marzipan sweetmeats were common in the 11th Century, but not until the 16th Century did candy arrive in any modern sense; candy manufacture began in the 18th Century.

Chewing gum is an extraordinary item in the candy field in America, about sixty million dollars' worth being sold annually; far more than in any other part of the world. America sells a considerable amount of it, as well as other candies abroad—a total of about $4,000,000 annually. Imports of foreign candies amount to less than a million dollars.

Bibliography. — Matthew Berman, *How and Why of Candy Manufacture;* Dr. Stroud Jordan, *Confectionery Problems* and *Confectionery Standards* and *Chocolate Evaluation;* H. W. Bywaters (London), *Modern Methods of Cocoa and Chocolate Manufacture;* A. G. Woodman, *Food Analysis;* U. S. Department of Commerce, *Candy Distribution in the U. S.;* Business Bourse (New York), *Candy Industry Market Research.*

Confederacy, United Daughters of the. A society organized at Nashville in 1894 whose objects are historical, educational, benevolent, and social. The membership is composed of widows, wives, mothers, sisters, nieces, grandnieces, and descendants of men who served in the Confederate Army, Navy, or Civil Service.

Confederate States of America, the federal union of the eleven southern States which seceded from the U. S. in 1860–1 and tried unsuccessfully in the war of 1861–5 to establish a permanent independent government. The eleven States (in the order of the dates of their secession, Dec. 1860—June, 1861) were South Carolina, Mississipi, Florida, Alabama, Georgia, Louisiana, Texas, Arkansas, North Carolina, Tennessee, and Virginia. On Feb. 4, 1861, at Montgomery, Alabama, a provisional Congress of the States which had then seceded (South Carolina, Louisiana, Mississippi, Georgia, Alabama, and Florida, the Texas delegates being appointed later) met, and four days later adopted a provisional constitution for the Confederate States. On Feb. 9, Jefferson Davis of Mississippi was chosen provisional president, and Alexander H. Stephens of Georgia provisional vice-president, and on the 18th these two officers were formally inaugurated. On Mar. 11 a permanent constitution was adopted; under this constitution Davis and Stephens were reelected (Nov. 16, 1861), and on Feb. 22, 1862, they were a second time inaugurated, this time at Richmond, Va., which on July 20, 1861, had supplanted Montgomery as the capital of the Confederate States. Meanwhile the Congress, elected at the same time, had assembled (Feb. 18) replacing the provisional Congress. The heads of executive departments constituting the president's cabinet were, during the history of the Confederacy, as follows: State Department, Robert Toombs, Feb.–July, 1861; R. M. T. Hunter, July, 1861–Feb., 1862; Judah P. Benjamin, March, 1862–1865;—War Department, L. P. Walker, Feb.–Nov., 1861; J. P. Benjamin, Nov., 1861–March, 1862; George W. Randolph, March–Nov., 1862; J. A. Seddon, Nov., 1862–Feb., 1865; J. C. Breckinridge, Feb.–April, 1865;—Treasury Department, C. G. Memminger, Feb., 1861–June, 1864; G. A. Trenholm, June, 1864–April, 1865;—Navy Department, S. R. Mallory, March, 1861–April, 1865;—Attorney-

General, J. P. Benjamin, Feb.–Sept., 1861; T. H. Watts, Sept., 1861–1864; George Davis, 1864–5;—Post Office Department, H. J. Ellett, Feb.–March, 1861; J. H. Reagan, March, 1861–April, 1865.

The Confederate Constitution was in large part identical with that of the United States, a majority of the sections being textually the same except for the substitution of the words 'Confederate States' for the words 'United States.' Certain important changes were, however, introduced. In the first place, naturally, these changes emphasized the rights of individual states and secured to slaveholders rights which the South had long contended for before the war. Thus, the preamble began, 'We, the people of the Confederate States, each State acting in its sovereign and independent character, in order to form a permanent federal government,' etc., and legislative powers were spoken of as 'delegated,' not as 'granted.' The House of Representatives was, as in the United States, to have the sole power of impeachment, 'except that any judicial or other Federal officer, resident and acting solely within the limits of any State, may be impeached by a vote of two-thirds of both branches of the Legislatures thereof.' Each State was specifically permitted to lay duties 'on sea-going vessels, for the improvement of its rivers and harbors, navigated by the said vessels, but such duties shall not conflict with any treaties of the Confederate States with foreign powers, and any surplus revenue thus derived shall, after making such improvement, be paid into the common treasury.' The Federal government was prohibited from granting bounties, enacting any protective tariff, or appropriating money for any internal improvement intended to facilitate commerce, 'except for the purpose of furnishing lights, beacons, and buoys, and other aids to navigation upon the coasts and the improvement of harbors and the removing of obstructions in river navigation.' As regards slavery, Congress was prohibited from passing any law 'denying or impairing the right of property in negro slaves'; citizens of any State or Territory were to have the right to take their slaves freely into any other State or Territory without impairment of their property right in such slaves; and in any new Territory acquired by the Confederate States 'the institution of negro slavery as it now exists in the Confederate States shall be recognized and protected by Congress and by the territorial government.' The importation of 'negroes of the African race from any foreign country other than the slave-holding States or territories of the United States' was expressly forbidden, and power was conferred on Congress to prohibit *all* importation of slaves, should it see fit to do so.

Other important changes were as follows: The President and Vice-President were to be elected for six years, and the President was to be ineligible for re-election. The President was empowered to veto separate items of appropriation bills. The heads of executive departments were to be allowed, should Congress so enact (as it did), to sit in either House and discuss any measures appertaining to their departments. The President was specifically empowered to remove, at pleasure, 'the principal officer in each of the executive departments and all persons connected with the diplomatic service,' and to remove all other civil officers of the executive department 'when their services are unnecessary, or for dishonesty, incapacity, inefficiency, misconduct, or neglect of duty,' such removals to be reported to the Senate with the reasons therefor. No period of residence was required of members of the House or of the Senate. As regards the adoption of Amendments the Constitution prescribed that, 'Upon the demand of any three States, legally assembled in their several conventions, the Congress shall summon a convention of all the States to take into consideration such amendments as the said States shall concur in suggesting at the time when the said demand is made; and should any of the proposed amendments to the Constitution be agreed on by the said convention—voting by States—and the same be ratified by the legislatures of two-thirds of the several States, or by conventions in two-thirds thereof—as the one or the other mode of ratification may be proposed by the general convention—they shall thenceforward form a part of this Constitution.'

This Constitution is interesting from various points of view, and in some respects (*e.g.* in giving to the President power to veto separate items of appropriation bills) it was probably superior to the U. S. Constitution, but it was of course never put to a test under normal conditions. The exigencies of a long and stubborn war inevitably caused centralization, the government of the Confederacy developed into a sort of military autocracy, and it was impossible for the administration to be over-nice in its choice of means at a time when the Confederacy was fighting a losing fight for its very existence. Such things, however, as the suspension of the writ of *habeas corpus,* and the passage and enforcement of conscription acts aroused much opposition, and over the question of State rights Pres. Davis was brought into somewhat acrid controversy with the governors of Georgia and North Carolina. The economic weakness of the Confederacy, moreover, as compared with the United States, soon became apparent; her industries were not greatly diversified, and manufacturing, formerly neglected, could not be developed sufficiently to meet the new demands created by the virtual isolation resulting from the ever more efficient Federal blockade. The finances of the government inevitably fell into disorder; little money was raised by internal taxation, and the enormous issues of paper money brought demoralization and depreciation in their train. At Richmond, early in 1864, flour sold for $300 a barrel and shoes for $150 a pair in Confederate currency. The Confederacy, moreover, was unable to secure expected recognition and the expected financial assistance abroad; though, early in the war, it was recognized as a belligerent by Great Britain and other European governments. Only one loan (of $15,000,000) was obtained abroad during the war, this one being managed in Europe by the French firm Erlanger et Cie. At the close of the war, therefore, the Confederate States were thoroughly exhausted, and with the surrender of Gen. Lee the government immediately collapsed.

Jefferson Davis fled southward to Greensboro, N. C., then moved to Washington, Georgia, where he abdicated the rôle of president. While making his way to the coast with his family and a few adherents, he was captured near Irwinsville, by detachments of cavalry sent by General Wilson from Macon. His family was liberated at Savannah, but he was held a prisoner for two years at Fortress Monroe, then released on bail, but was never brought to trial.

(See SECESSION; CIVIL WAR; UNITED STATES.) Consult Jefferson Davis, *Rise and Fall of the Confederate Government* (2 vols. 1881); A. H. Stephens, *Constitutional View of the War Between the States* (2 vols. 1870); Horace Greeley, *The American Conflict* (1864–66); Pollard, *The Lost Cause* (1886), and *Life of Jefferson Davis and Secret History of the Con-*

federacy (1869); Schwab, *The Confederate States of America* (1901), essentially an economic history; Callahan, *Diplomatic History of the Southern Confederacy* (1901); Curry, *The Civil History of the Government of the Confederate States* (1901); Richardson (ed.), *Messages and Papers of the Confederacy* (1905); and Rhodes, *History of the United States from the Compromise of 1850* (1893–), especially vol. v.

Confederate Veterans, United Sons of. An organization formed in 1896 in Richmond, Va., with objects similar to those of the United Confederate Veterans. Male descendants of Confederate veterans only are eligible for membership. The association has camps in various sections of the South.

Confederate Veterans, United. An association organized in New Orleans in 1889 to unite all associations of Confederate veterans, soldiers, and sailors, to gather authentic historical data of the war, to preserve records and relics, to aid widows and dependants, the disabled and the needy, and to cherish the ties of friendship. There are 1,600 camps with a total membership in 1905 of about 75,000.

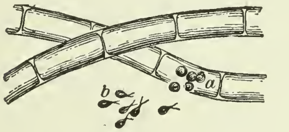
Confederation, strictly used, implies the loosest form of bond or union into which communities, large or small, enter for the purpose of forming one state, the individual communities retaining the largest possible measure of sovereignty. The state thus formed acts only through the governments of the component states. The North German Confederation was a union of this loose character; and the United States has gradually evolved from a loose confederation to a strong union, where the central government has extensive powers of direct control over the individual citizens of the component states. The use of the term as applied to the formation of the Dominion of Canada in 1867 is, strictly speaking, a mistake: the government of Canada has subordinated the provinces to the Dominion in a much greater degree than the United States has subordinated the component states.

Confederation, ARTICLES OF. See ARTICLES OF CONFEDERATION.

Confederation of the Rhine, an alliance of smaller German states, formed, under the instigation and protection of Napoleon, after the supremacy of Austria in the German world had been destroyed by him in 1805. It ultimately included four kingdoms (Saxony, Bavaria, Würtemberg, and Westphalia), five grand-duchies, eleven duchies, and sixteen principalities, with an area of 125,000 sq. m., and a population of 14,608,877. The armies of the confederation served in Napoleon's campaigns; but the disasters of the Russian war, and the sudden growth of German national feeling, caused the break-up of the confederation, which lasted from 1806 till 1813. See also GERMANY—*History.*

Conference is an assembly of delegates from a number of states for the purpose of deliberation regarding questions of common interest. As its name implies, its functions are deliberative rather than executive; but the distinction between a conference and a congress which is executive in character is not easily drawn or always observed. Thus the peace conference at The Hague was nominally deliberative only, but public opinion has in some degree changed its resolutions into executive degrees. The name is also applied in a general way to representative assemblies: for example, the supreme synod of the various Methodist churches is called a Conference.

Conferva, a genus of green algæ, having the thallus many-celled, thread-like, and unbranched. The protoplasm is homogeneous, or nearly so, forming a continuous green mass in each cell. Reproduction is effected by swarm-spores furnished with cilia, by means of which they swim about. These plants are common in ponds and ditches, attached to other aquatic vegetation, submerged stones, wood, etc., and often occur on the shells of fresh-water molluscs. The name is also used for any species or plant of this genus.



Conferva.

a, Spores escaping; *b*, with cilia developed.

Confessio, CONFESSION, CONFESSIONAL, OR CONFESSIONARY, the tomb of a saint or martyr. The name originated in early Christian times, when the relics of those who died for the faith were regarded by their fellow-Christians with deep and reverential affection. The belief in a certain efficacy in the touch or presence of relics was widely entertained. A confessio is the grave over which an altar was erected, the chamber in which it stood, or a niche in the body of an altar for the purpose of containing relics; later, the entire building erected over such a grave, with all that it contained, was called a confessionary or confessio. These buildings were always of the basilica plan, and contained a high altar.

Confession, in religious usage, commonly means a declaration of sins to a priest to obtain absolution. Public or open confession (*i.e.* before the entire congregation) was a practice of the early church. Private confession probably originated in the monasteries and spread thence to the laity gradually and not without opposition. When it had become a general custom the fourth Lateran Council (1215) made it a law of the church by enacting that every mature Christian should confess at least once in each year to a properly approved priest. The Council of Trent declared the three 'acts of the penitent' which constitute the sacrament of penance to be contrition, confession, and satisfaction. Confession is included in the ritual of the Greek and other Oriental churches. The Reformers abolished its compulsory character and in general it may be said that private confession has no place in Protestantism, though a tendency appeared among the Lutherans to retain it in modified form preparatory to the Lord's Supper, and there have always been individuals who have considered it helpful to the sinner under certain circumstances. The Church of England has a general confession followed by a form of absolution in the order of both morning and evening prayer, and countenances private confession in the visitation of the sick. The Protestant Episcopal Church retains the general confession only.

Confession. In law, either a voluntary statement by one person to another private individual to the effect that he has committed a crime, or of his connection with one; or the admission of a prisoner, charged with crime, that he is guilty. A confession is not admissible in evidence against a prisoner, if it was procured by an officer of the law under threats, or false promises of favor. Otherwise a voluntary confession of crime is admissible, whether made to an officer or any other person. On a trial a prisoner cannot be convicted on his confession alone; there must be some evidence, however slight, tending to corroborate his statements. However, a prisoner charged with crime may plead guilty when arraigned, and will be sentenced without trial, except in capital cases.

Confession and Avoidance, an old form of plea by which the defendant admitted or confessed the facts alleged by the plaintiff in his statement of claim, and then alleged some fresh facts which, if true, would constitute a good defence to or 'avoid' the claim. The new facts were of two kinds—(1) pleas in justification or excuse; as where one, sued for breach of contract, admits he did not perform, but alleges, as an excuse, that the plaintiff made it impossible for him to do so; (2) pleas in discharge; as where one, sued on a bond, admits he executed it, but alleges that the plaintiff gave him a general release under seal. To-day such pleas are known as affirmative defences.

Confession of Faith. Confessions of faith do not differ essentially from creeds. Both are a sort of authorized programme setting forth the opinions of a church or section thereof. A distinction might be made in respect of time, confessions being the later documents; or in respect of form, the confession being a longer document. Both take their rise in times of doctrinal strife, and are designed, in subordination to Scripture, and as summaries of its teaching, to produce unity and peace. The great confessions are closely connected with the Reformation.

The *Augsburg Confession*, drawn up by Melanchthon from Luther's materials, was presented at the Diet of Augsburg in 1530. A Romanist counterblast occasioned the *Apology of the Augsburg Confession* (1532). Luther himself prepared the *Articles of Schmalkald* (1537). Internal controversies caused the issue of the *Formula Concordiæ* (1576–7). These documents, with Luther's Catechisms (1529), were printed as the *Liber Concordiæ* (1580). Saxony and Würtemberg presented confessions to the Council of Trent (1551): these do not count as standards.

Reformed confessions have somewhat intimate relations with Lutheran. The two parties conferred before the Augsburg Diet (1530), but could not agree on the eucharist. Accordingly, a reformed confession was presented by the four towns of Strassburg, Constance, Memmingen, and Lindau (*Confessio Tetrapolitana*). A short one by Zwingli was also handed in. The *First Confession of Basel* (1534) and the *Second Confession of Basel* (*First Helvetic Confession*, 1536) drew nearer to Luther's views. The latter was laid before the Lutheran divines at Schmalkald. Calvin now came forward with a doctrine advancing towards Luther's position; but attempts at union failed. Calvinism, however, first mastered Switzerland and then the reformed churches elsewhere, invading even Germany. The *Consensus of Zürich* (1549) united the Swiss reformers under Calvin's standards. The *Consensus of Geneva* (1552) expounded his doctrine of predestination. The *Second Helvetic Confession* (1566) is thoroughly Calvinistic, and so are the *Scotch Confession* (1560), inspired by John Knox, and the confessions of Hungary (1557), and, in less degree, Poland (1570), all three being derived from the *Second Helvetic Confession*. Equally Calvinistic is the last Swiss confession, the *Helvetic Consensus Formula* (1675). The *French Confession* (1559), reaffirmed at Rochelle (1571), is printed among Calvin's works. The *Belgic Confession* (1561) is virtually a copy of the French, and was reasserted at Dort (1618) against the Arminians. In the controversies circling round the *Formula Concordiæ*, several German states—Hesse, Anhalt, Bremen, the Palatinate, etc. — withdrew, and adopted Calvinist confessions.

The two great English confessions are the *Thirty-nine Articles* of the English Church and the *Westminster Confession*. The former had been preceded by the *Ten Articles* (1536) and the *Six Articles* (1539), in which Henry VIII. had a hand, and by the *Forty-two Articles* (1549–53), mainly by Cranmer. In the *Thirty-nine Articles* (1562–71) the doctrine mediates between Luther's and Calvin's. The *Lambeth Articles* (1595) never had authority, and the *Irish Articles* (1615) were set aside in 1635. The *Westminster Confession* was drawn up (1643–7) by an assembly of divines sitting at Westminster. Its work, with slight modification, was approved by Parliament. The Confession, with the larger and Shorter Catechisms, passed the Scottish General Assembly in 1647–8, and was sanctioned by the Scottish Parliament in 1649, and again, after the revolution, in 1690. It is in thirty-three chapters, and contains a doctrine of divine and human nature and their relations, a doctrine of sacraments, a system of church governments, a theory of the relations of church and state. It is Calvinistic, but has borrowed some phrases from the *Irish Articles*. Only the portions summarized in the Shorter Catechism, which has been taught in schools, can be said to be well known. The *Westminster Confession* is recognized by all English-speaking Presbyterian bodies—in some cases with modifications.

Protestant activity stimulated the older churches to redefine their position; hence the Romanist *Canons and Decrees of the Council of Trent* (1564), and, in the Greek Church, *Mogila's Confession* (1643), modified and adapted in 1672. Confessional literature is in Germany a special branch of study, under the name of *Symbolik*. See Kattenbusch's *Lehrbuch der vergleichenden Confessionskunde* (1892); Schaff's *Creeds of Christendom* (3 vols. 1877–84), and *Harmony of Reformed Confessions* (1877); and Hetherington's *History of the Westminster Assembly of Divines* (1843; New York, 1856).

Confidential Communications. See PRIVILEGE.

Confirmation, in religious usage, signifies (1.) the acceptance and ratification in proper form of the choice of a certain person for a church office. For example, in England, after the election of a bishop by the dean and chapter of his diocese, the sovereign grants his assent, under the broad seal, directed to the archbishop, together with a mandate to confirm and consecrate the bishop-elect. At the confirmation objectors are invited to come forward, and proof is given of the due election and royal assent. The oaths and office are then formally administered. (2.) The confirmation of the baptized is a very ancient custom, and may be said to be apostolic (Acts 8 : 14–17; 19 : 5; Heb. 6 : 2; Eph. 1 : 13, 14; 4 : 30; 2 Cor. 1 : 21, 22, etc.). It is one of the seven sacraments of the Roman Catholic Church, and is performed by the bishop, who makes the sign of the cross on the forehead of the candidate with the chrism and gives him a slight blow on the cheek, signifying that he must suffer buffeting for Christ; the age is usually seven or eight. In the Greek Church the rite may be administered by any priest and follows baptism. In the churches of the Anglican communion it is administered by the imposition of the bishop's hands upon those who are presented to him by their pastors as prepared to receive it, and is necessary for admission to the holy communion; those who are confirmed renew the vows made for them at baptism by their sponsors. Lutheran churches have a similar custom. In other Protestant churches a public confession of faith before the first communion takes the place of the rite.

Confiscation. In law, taking a person's property, without adequate compensation, under the authority of the state. By the ancient common law of England the term was applied almost exclusively to the seizure by the state of stolen goods, stray cattle, and the goods of a traitor. However, both in England and the United States the term is now most commonly used to denote the act of the government in seizing goods on which import duty or other revenue has not been paid under circumstances which prove that the owner intended to defraud the government. It is also sometimes applied to the sale of real property by the state for the collection of taxes. In international law, it denotes the taking of the property of an alien enemy found within the country in time of war (which right is seldom exercised to-day); and also the capture and appropriation of contraband of war and neutral vessels on which it is carried. This latter right is generally exercised in modern warfare.

Conflict of Laws. A variance or opposition of the laws of different nations or states in cases where, by reason of the residence of the parties to the controversy in different jurisdictions, the situation of the subject-matter of the action, or for some other reason, it becomes necessary to determine whether the laws of one state or country or another shall be applied to the facts before the court. Where the laws of two or more nations differ upon certain points there is a conflict of law. The question then is in a given controversy, which law will prevail? In the United States there is a constant conflict between the laws of the different states, and this conflict often causes great confusion. The same is true of foreign nations. Certain well-defined rules are recognized by all nations and the subject is becoming clearer year by year. A will, for instance, must be executed according to the law of the place where the testator was domiciled at the time of his death if the matter of disposition of personal property is involved, but according to the law of the place where his real property is situated, if that is included, and in order to perfect the devise, the will must also be probated in the court having jurisdiction over the property. In contracts the law of the place where the contract is entered into governs the making of the contract, the legality of the subject-matter, etc., but the law of the place where it is to be performed must be considered in performing it. So, too, rules of evidence and procedure must conform to the law where the trial takes place. But in certain cases one state must always recognize the laws of every other state. A marriage, for instance, legal in one jurisdiction will be recognized in every other state whether it would have been legal there or not. The same, generally speaking, is true of divorce, except where the court did not have jurisdiction over the defendant in person, as where service is made by publication. See INTERNATIONAL LAW.

Confocal, a term applied to certain curves and surfaces of the second order (conics and quadrics) having the same foci. Curves or surfaces forming a confocal system cut orthogonally—*i.e.* at right angles. A confocal system of conics may be represented by $x^2/(a^2+\lambda) + y^2/(b^2+\lambda)=1$, where λ is a variable parameter. We pass to the confocal surfaces by adding the term $z^2/(c^2+\lambda)$ to the left-hand side, x, y, z being rectangular Cartesian co-ordinates. These surfaces have important uses in the theory of stream lines and of attractions.

Conformable Strata. When a series of deposits has been laid down in uninterrupted succession on the bottom of a lake or of the sea, the beds will rest upon one another, as a rule, in a quite regular and uniform manner. Each layer will be spread over that which preceded it, and the planes of bedding will be parallel throughout. Such a succession is said to be 'conformable,' and indicates the continuous prevalence of similar conditions during the time occupied by the formation of the strata. When, on the other hand, the sediments gathering on the sea-bottom have been uplifted, converted into dry land and eroded, before subsidence, followed by renewed deposit, ensued, the bedding of the earlier and the later strata is, as a rule, discordant. See UNCONFORMABLE STRATA.

Confronte, in heraldry, the term describing the position of two animals when facing each other.

Confucius (551–479 B.C.), the Chinese sage, born at the modern Sze-chuen, in Shan-tung province. 'Confucius' is simply a Western corruption of 'K'ung fu-tsze'—*i.e.* the *fu-tsze*, or 'philosopher,' whose family name was K'ung. He married at the age of eighteen, and at the age of twenty was given by the duke a public post as grain distributor in his native state of Lu. In personal appearance the philosopher was a heavy, ungainly man; but even in early youth he seems to have had a strong predilection for courteous and ceremonious manners. He lost his mother at the age of twenty-four, and had in consequence to retire for three nominal years (twenty-seven months) from the public service. After this Confucius resumed his archæological, musical, historical, and official studies. In order the better to balance his thoughts, he even paid a visit to the imperial court (modern Ho-nan-fu, in Ho-nan province), the keeper of the archives being the celebrated mystic Lao-tsze, whose somewhat incomprehensible philosophy was then the 'religion' of the better educated classes throughout the Chinese state system: the vulgar were mostly then, as they are now, animists and nature worshippers. It appears that Lao-tsze's obscure exhortations were not found convincing by Confucius, who had now set up a 'school of thought' of his own, the essence of which seems to have been 'how to get through life like a courteous gentleman.' When the rising teacher had attained his thirty-sixth year, he found it necessary to fly from home in order to avoid political disputes dangerous to his mental and physical well-being. After some years' residence in the neighboring duchy of Tsi, he resumed his scholastic teaching in his native land, and at the age of forty-seven again accepted public office under a new duke. His administration proved so sagacious and successful that the contiguous states gradually grew uneasy. Intrigues were accordingly set on foot, and Confucius went into voluntary exile for thirteen years. At the age of sixty-eight slight amends were made to the philosopher by his own duke (son of the one whose weakness had sent him away), and on his return, Confucius found congenial employment in composing a history of Lu from B.C. 722. This is the first known attempt at systematized Chinese history, apart from myth and vague tradition. Confucius also collected the poems, folk-lore, annals, songs, and rites then in vogue in various parts of the empire. Editing and pruning these, he produced what are still known as the 'classics'—*i.e.* the *Book of History* (or Tradition), the *Book of Odes*, the *Book of Changes* (or Oracles), the *Book of Rites*, and so on. To these his pupils and descendants subsequently added Confucius's own apothegms, and one or two works on ethical philosophy. The sage died in his seventy-third year, his last words being an expression of regret that no rulers existed with sufficient sagacity to appreciate his teachings properly.

It is not easy for Europeans to understand exactly why Confucius's influence over Chinese thought has been at once so great and so unshaken. The immense influence in the west of Buddhism and Christianity, apart from the obscurities of dogma, may be defined as the sympathetic effect of gentleness, mercy, equality, and self-denial upon a world—or two worlds—groaning under the harshness, selfishness, lust, and cruelty of privileged class rule. *Mutatis mutandis*, in a Chinese world of greed, self-indulgence, intrigue, and disloyalty, Confucius pleaded for truth, industry, justice, moderation, and public duty. His doctrines are naturally best appreciated in their native garb.

Confucius was not officially honored at his death. It was not until the old feudal empire had been destroyed that, in B.C. 195

the founder of the Chinese political system visited the philosopher's tomb. Since then dynasty after dynasty has striven, by heaping honors, titles and privileges upon the family and upon the district to do retrospective justice to Confucius's great name. Indeed, until the Japanese invasion (1938–9) Mr. and Mme. Kung Teh-chen had lived in the ancestral home, morally reigning over a small city enclave of their own, where most of the population bore the name of Kung. To the Kung couple was born, in November, 1939, a son who was the 77th lineal descendant of Confucius. This happened in Chungking. Consult E. H. Parker, *Life and Labors of Confucius;* C. Crow, *Master Kung* (Confucius: 1938). Various works of Confucious were translated into English by J. Legge in *Sacred Books of the East* (1879–1885); see also his *Chinese Classics.*

Congé d'élire (Nor. Fr. 'leave to choose') in England is the sovereign's writ to the dean and chapter of a diocese to choose a bishop when the see is vacant. Before the Norman conquest it was customary for king and Witenagemote to appoint bishops. Later the chapters of cathedrals elected, their choice being subject to the king's approval. Before Henry I the kings invested bishops with the ring and staff. But Henry I, as the result of his controversy with Anselm, so far ceded his right as to grant *congé d'élire* to deans and chapters. Henry VIII added letters-missive, nominating the bishop, whom he required to be elected under penalty of *præmunire.* Edward VI abolished the *congé d'élire.*

Conger, or CONGER EEL, a genus of bony fishes, remarkable for the exclusively marine habitat, the large size (up to eight feet), the scaleless skin, and the large gill openings. Four species are known, and the common form (*C. vulgaris*) is almost cosmopolitan.

Conger, EDWIN HURD (1843–1907), American diplomatist; born in Knox co., Ill.; was graduated at Lombard Univ. in 1862; immediately entered the Union army; at the close of the war studied law; began practice in Galesburg; and settled in Des Moines, Ia., in 1868. He was a representative (Rep.) in Congress in 1885–91; minister to Brazil in 1891–93 and 1897–98 and China in 1898–1902, and to Mexico in 1905; was besieged with the other diplomatists in Peking during the Boxer outrages in 1900; and was chief of the commission which negotiated a commercial treaty with China in 1902.

Congestion, or HYPERAEMIA, a term used in medicine to denote an excess of blood in any particular part of the body. It must be distinguished from plethora, in which the excess of blood is not local, but general. Congestion is commonly divided into two classes—active or arterial, and passive or venous. Active or arterial hyperæmia is produced by disturbances of various parts of the nervous system, due to various causes, or may be the mechanical result of increased cardiac action, which is itself produced by nerve stimuli. Thus, arteries may be dilated through paralysis of the vasomotor nerve-fibers, or through stimulation of vaso-dilator fibers, and this dilatation leads to a congestion of the part affected. Hurried muscular exertion or sudden emotion may increase the rapidity of the heart's action, and cause temporary congestion in the form of a flush. Collateral congestion may be set up by the stoppage of circulation through one artery (*e.g.* when the vessel is tied), compensation being established by dilatation of neighboring arteries, and consequent congestion of the part. Local heat, whether dry or moist, will produce active congestion; instances of this are the effect of a poultice, or of exposure of a part to the fire. Active congestion, if on the surface of the body, is shown by redness and local heat; throbbing follows if the congestion continues, and pain may come still later. There may be visible swelling; but this is not common in active hyperæmia, and, when present, is due to a simple dilatation of the arteries, and not to transudation of serum. There is, therefore, no pitting on pressure, as there may be with the swelling of venous congestion. Hypertrophy of a part may follow frequent arterial hyperæmia; indeed, muscular hypertrophy (*i.e.* the increase of size in a muscle consequent upon continued exercise) is due to the increased supply of arterial blood drawn to the muscle by its increased use.

Passive or venous congestion is caused either by a lack of driving-power in the heart, or by an obstacle which dams the current at some point. When a tight bandage is applied to a limb, congestion soon arises in that part of the limb which is away from the trunk. The surface becomes blue and cold, and if the bandage be retained the limb swells, and presently local degeneration sets in, followed by death of the part. Thus, active congestion is a hurried oncoming of blood, but passive congestion is a delay in going. This delay in going may be increased by gravitation. A weakened heart which has to drive blood through a body that is in the upright position contends at a disadvantage against gravity, and its labor is materially lessened when the body is laid flat. Hence, a person with a feeble circulation is apt to have swelling (œdema) of the feet and ankles while standing about during the day, but finds the swelling disappears after rest in a recumbent position at night. While active congestion leads to hypertrophy of existing tissue—*e.g.* muscle—passive hypertrophy results in degeneration and the formation of fibrous tissue, which afterwards becomes fatty. This is because the tissue which has an excess of arterial blood driven through it has an extra food supply, while the tissue in which venous blood lingers is starved and even poisoned. Hence the degenerative changes which take place in the liver, kidneys, and other organs when, either through inefficient propulsion or abnormal obstruction, they suffer from venous hyperæmia. Fibrous changes are set up, the organ gradually becomes less and less efficient, and finally the fibrous tissue suffers fatty degeneration, unless the failing organ first causes a general breakdown.

Treatment.—When abnormal congestion depends upon a weak heart, the treatment is directed towards the strengthening of that organ, and, at the same time, towards lessening its work. Cardiac tonics are used, and the patient is, if necessary, kept flat in bed. Where congestion depends upon a local condition, counterirritation may be of service, after the primary cause has been as far as possible removed. Thus, cerebral congestion may be treated by plunging the feet in hot water and mustard, or by applying a blister to the nape of the neck or behind the ear; or cold may be used in the shape of cold water, or vinegar, ice, or evaporating mixtures, applied as near as possible to the congested part. In addition, the congested part must, of course, have physiological rest, since an active organ draws blood to itself; so, thinking and worry must be minimized in the case of the congested brain; so also, for congested digestive organs, digestion must be made as easy as may be by fasting when possible, and light feeding when necessary.

Congleton, municipal borough, Cheshire, England, 8 miles s.s.w. of Macclesfield. The manufacture of silks and ribbons, introduced in 1752, is the staple industry; cotton-weaving, iron and brass founding, and various other industries, are also carried on. Area, 2,572 acres. Pop. (1931) 12,885.

Conglomerate, a rock which may be regarded as a consolidated gravel. It may consist of fragments of any kind of rock held together by a matrix of clay, sand, or other materials. The pebbles in conglomerates are mostly rounded and water worn. (See BRECCIA). Conglomerates are the deposits of former shallow waters where waves and currents moved the shingle to and fro, and washed away the finer material. Hence they were formed on old shore lines, in shallow seas and lakes, at the mouths of rivers, and in similar situations. They very often accompany unconformabilities.

Congo, Belgian (formerly CONGO FREE STATE), territory in South Central Africa, extending from 5° N. to 12° S. lat., and from 17° to 30° E. long., together with a strip of land along the Congo River to the Atlantic Ocean. It is thus bounded on the north by the French Congo, French Sudan, and Egyptian Sudan; on the east by Uganda, Tanganyika Territory, formerly German East Africa, and Rhodesia; on the south by Rhodesia and Portuguese West Africa (Angola); and on the west by Portuguese West Africa, the Atlantic (where, however, its seaboard is only 20 miles long), and the French Congo. Its area is estimated at 902,082 square miles.

Topography.—The outstanding feature of its physical conformation, apart from its great river and its affluents, is the central plateau, some 2,500 to 5,000 feet above sea level, embracing vast regions of primeval forest. This is bordered on the east by a long succession of elevations, averaging 6,000 feet (Ruwenzori, 16,800 feet; Mfumbiro, 14,800 feet), and on the west by the high escarpment of the great African plateau, known as the Crystal Mountains (2,300 feet). The eastern boundary is formed partly by Lakes Albert, Albert Edward, Tanganyika, and Mweru.

Climate.—The mean annual temperature on the coast is 79° F.; in the interior, 82°; and in the mountainous southeast, at above 3,000 feet, 73°. In the equatorial regions there is little distinction of seasons. Leopoldville (6° S.) has a hot, rainy season (Oct. to May) and a cooler dry season (June to Sept.). The rainfall is very heavy, ranging from 38 inches on the coast to 120 inches in parts of Ruwenzori. The climate is generally unhealthful for Europeans, except on the highlands. The soil is well watered and fertile.

Geology.—The whole Congo basin is believed to be an ancient lake bottom, now overlaid by horizontal rock deposits of the Pre-Cambrian and Palæozoic epochs. Above 1,500 feet elevation are elementary rocks. Ruwenzori on the east, of Archæan formation, is the only volcanic region.

Flora and Fauna.—Characteristic flora are the bamboo, palms, raffia, calamus, papyrus, orchids, gardenia, baobab, rubber, ferns, indigo, vanilla, and pepper trees. The zebra, rhinoceros, lion, leopard, giraffe, elephant, antelope, hippopotamus, forest pig, okapi, ant-eater, and many species of monkeys are found. Reptilian fauna include pythons, cobras, vipers, puff adders, and crocodiles. Insect life, favored by the climate, here reaches its greatest African development.

Mining.—The Colony is rich in minerals. The chief minerals are copper, diamonds, gold, silver, tin, cobalt, radium, uranium and iron. The Katanga is the richest mineral district of the Congo and one of the richest copper districts in the world. The chief supply of gold comes from the Kilo-Moto mines near Lake Albert, and diamonds are obtained from the Upper Kasai region.

Agriculture.—The principal agricultural products are rubber, palm nuts and oil, copal, and cacao. At the government botanical garden near Coquilhatville, and also in private plantations, experiments are being made in the cultivation of rubber, cacao, coffee, rice, cinnamon, hemp, pepper, corn, and pineapples. Ivory is abundant, tropical fruits are found in quantity, and vegetables are raised in small amounts by the natives. The Katanga is well suited to stock raising, and live stock is being imported. Cattle thrive well in all districts where the tsetse fly is not found, notably in the high regions of Katanga, Ituri and Kivu. Several agricultural stations have been established.

Manufactures.—There are almost no native industries, but industrial plants are being rapidly established and foreign capital is steadily being invested. The building of steamers for the Upper Congo is an important industry at Leopoldville, Kinshasa, and Stanley Pool.

Railroads and Communications.—In 1940 there were 3,106 miles of railroad, the principal lines connecting Matadi and Stanley Pool, Leopoldville and Lukula, Stanleyville and Bukama, Kindu and Albertville, and, in the Katanga, Sakania and Elisabethville. The railroad in Katanga is a part of the Cape to Cairo Railway (q. v.). In 1928 the Bukama-Port Francqui railroad, on the Kasai River, was completed, and in 1931 the Lobito Bay-Katanga line connecting with the Portuguese railroad was opened. There is regular air service between Leopoldville and Stanleyville, Stanleyville and Elisabethville, Stanleyville and Usumbura, and Leopoldville and Lusambo. There is also an air service connecting Banningville, Port Francqui, Luebo Luluabourg and Lusambo, a distance of 543 miles. A fleet of more than a thousand steamers and barges operating on the Congo and its tributaries form a valuable aid to the transportation problem. The usual fuel is wood; but in 1911 a pipe line was constructed to transport oil from Matadi to Leopoldville (246 miles), which supplies river steamers and the railroad. Canoes are also extensively used for transport. There are few motor roads, and merchandise for the interior is carried by native porters.

Telegraph (4,209 miles) and telephone (4,000 miles) lines are owned and operated by the government. Twenty-nine wireless stations have been established at Leopoldville, Banana, Stanleyville, Coquilhatville, Elisabethville, and other towns. Cable communication is maintained with Europe from Leopoldville *via* Brazzaville and Libreville, French Congo, and *via* St. Paul de Loanda, Angola. There is regular steamer connection with Antwerp and with other European ports.

Commerce.—Foreign trade is carried on almost entirely with Belgium. The chief exports are palm-nuts and palm-oil, cotton, cocoa, gum-copal, rubber, ivory, copper, gold, tin, radium and diamonds. The imports consist of machinery, cottons, provisions, mineral oils, petrol, steamers and ships, arms and ammunition.

Defense.—There is a force of native troops comprising 159 European officers, 170 European non-commissioned officers and 13,224 natives, including the recruits and about 4,400 men of the territorial police. This army is recruited by conscription and voluntary enlistment and the term of service does not exceed seven years. The recruits are trained in three instruction camps before being drafted to their units.

Population.—The greater part of the black population is of Bantu and Sudanese origin. Interspersed among them are pygmies, known as Akka, Tikki-Tikki, Batwa, and others. Negroes inhabit the basin of the Welle. Stanley's estimate of the native population was 35,000,000; but their numbers have greatly diminished, and were 10,328,400 in 1940. The white population numbered 27,791 in 1940. Of this number 19,608 were Belgians, 1,772 Portuguese, 1,562 Italians, 1,099 British, 870 Greeks, 669 Americans, and the rest Dutch, French, and others.

Homer Smith Photo, Chicago

A NATIVE DANCE ORCHESTRA IN THE BELGIAN CONGO

Homer Smith Photo, Chicago

A STREET IN LEOPOLDVILLE, BELGIAN CONGO

The capital is Leopoldville, formerly Boma (pop. 40,000; 2,841 whites). The principal towns are Matadi (374 whites); Elisabethville (pop. 3,141 whites); Jadotville (1,853 whites); Stanleyville (831 whites) and Coquilhatville (339 whites).

Government.—The Congo is administered by a governor-general who is appointed by the Minister for the Colonies, and is assisted by a vice-governor-general, one or more State-Inspectors and six Provincial Commissioners. The Colony is divided into six provinces and sixteen administrative districts.

History.—Early in the fourteenth century a native kingdom was formed in the Lower Congo by the Bantu chief, Emini-a-nzima. In the closing years of the fifteenth century, through the Portuguese explorer Dom Diego Cam, Christianity was introduced; and in 1534 a cathedral was built at the capital, which was renamed San Salvador. Portuguese influence, strong in the sixteenth, waned in the seventeenth century, and the cathedral was abandoned. Pope Urban III in 1640 organized the Congo as an apostolic prefecture, and several missions were established; but early in the following century the monks were driven away by the natives, as were the French and Italian missionaries who tried to gain a foothold during the succeeding years. From 1782 to 1857 the Congo remained unvisited by Europeans.

Henry M. Stanley, on his return, in 1877, from his great exploration down the Congo, induced Leopold, king of the Belgians, to found the International Association of the Congo (November, 1878), with the object of exploration and commercial development. Stanley went out again to the Congo (1880–84), and concluded commercial treaties with various chiefs, at the same time establishing over twenty stations on the Congo and its tributaries by means of funds supplied by King Leopold. The independence of the new territory was guaranteed by the Congress of Berlin (1884–5), the international agreements providing for freedom of navigation on the Congo and its tributaries, free trade for all nations, the prohibition of trade monopolies, fair treatment of the natives, and the suppression of slavery. In 1885, King Leopold was recognized by the Belgian Parliament and by the powers as the personal head of the new State. In 1889 he bequeathed it by his will to Belgium.

The actual boundaries of the Belgian Congo have been secured by various conventions with the European powers from 1885 to the present time. A convention with France, ratified in March, 1912, settled the boundaries between French and Belgian Congo, and established a commercial agreement. The delimitation of the eastern frontier between the Congo, on the one hand, and Uganda and German East Africa, on the other, was completed in September, 1912. In the interior, the only important event has been a successful war (1892–3) against the Arabs.

Conditions in the Congo, which in 1901 and succeeding years gave rise to protests from Great Britain as violations of the Berlin agreement, included forced labor on King Leopold's rubber plantations in lieu of money taxes, the confiscation of native rights in land, and the restriction of trade to Belgian channels. In addition, complaints were made by consuls and missionaries of deplorable cruelties committed by overseers and other officials—which were denied, however, by the Belgian authorities. A commission of inquiry appointed by Leopold recommended revision of the land laws, of taxation, and of the administration of justice.

Annexation by Belgium was approved by the Belgian Parliament in 1908. In 1911 numerous public buildings were erected in the important towns. The reforms authorized in 1910 contemplated the gradual abandonment of the forced labor system and the opening of the country to trade. The whole colony is now administered under the new conditions, except some State reserves and large concessions. Money taxes have been established.

Following the World War the districts of Ruanda and Urundi (formerly in German East Africa) were ceded to Belgium as a mandatory under the League of Nations. This gives to the Belgian Congo an additional territory of about 21,000 square miles. In 1927 Belgium ceded to Portugal a piece of territory in the southwest corner covering about 480 square miles, and in return received an area in the estuary of the Congo near Matadi.

Bibliography.—H. M. Stanley, *The Congo and the Founding of Its Free State* (2 vols., 1885) and *Through the Dark Continent* (2 vols., 1878); J. de C. MacDonnell, *King Leopold II, His Rule in Belgium and the Congo* (1905); H. H. Johnston, *George Grenfell, and the Congo* (1908); E. D. Morel, *Red Rubber, Great Britain and the Congo* (1909); R. A. Barnes, *The Wonderland of the Eastern Congo* (1922) and *Across the Craterland to the Congo* (1924); C. Christy, *Big Game and Pigmies* (1924); R. Glennie, *The Congo and Its People* (1925); D. Fraser, *Through the Congo Basin* (1927); A. Gatti, *Great Mother Forest* (1936); W. E. Davis, *Ten Years in the Congo* (1940).

Congo, French. See FRENCH CONGO.

Congo River, THE (earlier known as the ZAIRE, named by Stanley the LIVINGSTONE), the second largest river in Africa, forming a curve of about 3,000 miles in length, from below 12° S. to above 2° N., and draining a basin of nearly 1,500,000 square miles.

Issuing out of Lake Bangweolo, which is fed by the Chambezi from the highlands to the northeast, the Luapula flows north, passes Lake Mweru, thence runs northwest till at 6° S. it receives the Lukuga; thence, as the Lualaba, and below Nyangwe as the Congo, it flows northwest and north till at Stanley Falls, 0° 25′ N., it bends thence, flowing west and southwest, it enters the sea, between São Antonio and Banana, at 6° S., by an estuary 7 miles wide. The depth of the estuary is 72 to 900 feet, and the river water is distinguishable for 120 miles out at sea.

The two great tributaries of the Congo are the Mobangi, from the north, known in its upper course as the Welle-Makua, joining the Congo at 0° 30′ S.; and the Kassai, from the south, explored in 1885 by Wissmann. This river receives the waters of the Kuango, and, as the Kwa, enters the Congo at 3° 13′ S. Other important affluents below Stanley Falls are the Boloko, Aruwimi, Lulongo, and Ruki, formed by the confluence of the Chuapa and Busera.

The Upper Congo (above Stanley Pool) is a succession of narrows and broad, lake-like expanses, containing large islands (the largest 70 miles in length). The country here is flat, and thousands of square miles are inundated during the flood seasons. Between Stanley Falls and Stanley Pool (1,000 miles), the river is navigable for steamers of four feet draught. The 100 miles from the mouth to Matadi is navigable for ocean steamers of twenty feet draught. Thence to Stanley Pool—a course of 270 miles through the Crystal Mountains—are numerous rapids and cataracts, this part of the river being very narrow. The great tributaries are navigable waterways.

Until the nineteenth century, all that was known of the Congo was its mouth, discovered in 1482 by Diego Cam, and thence up to San Salvador. In 1871 Livingstone discovered its upper waters, the Luapula and Lualaba. In 1876–7 Stanley followed the Congo to the sea, and for the first time revealed its complete features.

Congregation, a collective term most commonly used of a local body of worshippers, either as assembled together in one place, or as a community—the unit of a greater church or denomination. The word is also employed in many specific senses. Thus, in the Old Testament the 'congregation' of Israel signifies the whole people (Exod. xii. 3; Psalms lxxiv. 2). The phrase 'tabernacle of the congregation' (Exod. xxvii. 21), however, is in the Revised Version correctly altered to 'tent of meeting.' John Knox uses the term 'congregation of Christ' as equivalent to the evangelical or reforming party, and the single word 'congregation' as equal to synod.

In the Roman Catholic Church, congregation is a term applied to a board of ecclesiastics elected for specific purposes—*e.g.,* the Congregatio de Propaganda Fide (Propaganda), the Congregation of Rites, of the Holy Office (Inquisition), of the Index, etc.; also to a body of men or women living under a quasi-monastic rule, but not strictly belonging to the monastic orders—*e.g.,* the Congregations of Cluny.

The congregations of the Universities of Oxford, Cambridge, and Dublin are meetings of the resident graduates and other officials for the purpose of granting degrees.

Congregationalism is a combination of the two principles of (1) independence of the local church with complete control of all its concerns, and (2) the fellowship with one another in voluntary association of such independent churches. These principles exclude alike prelacy and separatism. Such churches are mainly of English origin, though cases exist in Russia, South America, Sweden, and elsewhere.

The Congregationalism of England and the United States has its roots in Puritanism, which, as a combination of deep religious passion and severe intellectual discipline, may be added (3) as a third principle. The first important name in its development is Robert Browne (1550–1633), a native of Rutlandshire. Considerable bodies arose in the eastern counties of England and in Wales, and a central association was formed in London. Persecution led several leaders to emigrate to Holland (1592). There they were tolerated, and flourished among English residents, but became divided among themselves. Some, under John Smyth, advanced to a Baptist position; others, of whom John Robinson was chief, held views practically identical with modern Congregationalism.

From Holland Independency was re-imported into Britain. A Congregational company settled in England in 1616. A ferment stirred by pamphlets from Holland led to persecution; and in 1632 Congregationalism was for a time driven under the surface. The leaven of Independency continued, however, at work.

Combatants from America joined in the ecclesiastical struggle that raged after the fall of Laud (1640). Cromwell and other victorious leaders in the civil war were Independents, and it was largely due to their efforts that Presbyterians did not gain a persecuting ascendency. During the Protectorate the Independents prospered in England, and, through the army, gained a hold on Scotland.

The Restoration, with its re-establishment of Episcopacy, brought persecution, and formed a bond in suffering and in opposition to authority between the Congregationalists and the Presbyterians. After the Revolution the Toleration Act gave freedom to both; but an attempt at union between the two failed (1691). However, a sort of defensive alliance for the protection of civil rights was formed in 1730 between the Congregationalists, Baptists, and Presbyterians.

The early part of the 18th century was a time of stagnation in the Congregational Church; but the dry bones were stirred by the Methodist revolt from the Church of England. The quickening influence spread to Scotland.

The 19th century was marked by a growing tendency to combination. About 1811 the Congregational Union of Scotland was formed; and in 1829 the Congregational Union of Ireland. In 1833 a similar union was set up for England and Wales. In 1896 the Evangelical Union and the Congregational became one.

United States.—Congregationalism was brought to America by the settlers of the *Mayflower* (1620), who, driven from England in 1608, had found refuge in Holland. By 1650 there were 51 Congregational churches in New England; and until the end of the century New England had few churches of other sects. The success thus early attained has largely influenced the type of church polity in the country. In the early part of the 19th century, home missionary associations were formed, which helped to establish colonies, and organized colleges and schools, as well as churches, in the new United States territory in the West. The growth of Congregationalism was temporarily checked by the failure of a plan of union with the Presbyterians (1801), by which the former lost several hundred churches; and, a few years later, by the loss of 120 churches to the Unitarians (q. v.).

Since 1850 the Congregationalists have developed the national body now called the General Council. National conventions were assembled in 1852 and 1865, and continued triennially from 1871 till 1913 and biennially since that time. There are also State conferences, which have advisory and administrative power. The councils are presided over by moderators. The convention of 1910 adopted the report of the committee on polity, recognizing certain limited administrative powers of the national council, and recommending closer relations between the council and the societies and churches of the denomination. These recommendations were made effective in 1913, since which time every member of the National Council has been a corporate member of each of the missionary societies, so that recommendations of the National Council are uniformly acceptable to the corporate societies.

Congregational worship may or may not be liturgical. The sermon is a central element but the service includes prayer, singing, and the reading of the Word of God. There is no official creed; but a general adherence has been given to the Westminster Confession, the Savoy Declaration (1658), and to statements of faith issued by the Congregational Unions of Great Britain and by the U. S. General Council. International councils have been held in London (1891), Boston (1899), Edinburgh (1908), Boston (1920) and Bournemouth (1930).

Consult W. Walker, *A History of the Congregational Churches in the United States* (1894); A. Anderson, *Congregational Faith and Practice* (1906); R. W. Dale, *History of English Congregationalism* (1910); W. E. Barton, *The Law of Congregational Usage* (1916); F. L. Fagley, *The Congregational Churches* (1926); W. W. Sweet, ed., *The Congregationalists* (1939).

Congress, the name applied to meetings or assemblies of accredited representatives of the greater Powers for the purpose of discussing and determining the future policy of the Powers regarding some important object. The principle of the balance of power was first definitely established by the Congress of Münster (1648); and readjustments in accordance with this principle have been the object of the Congresses at Vienna (1815), at Paris (1856) after the close of the Crimean War, and at Berlin after the Russo-Turkish War (1878).

The Congress of Vienna was the first international assemblage to discuss social and economic subjects, such as the slave trade and the freedom of navigation on international rivers. Since that time, however, more than 125 congresses have been held for such purposes. Among the subjects considered have been international postal, passenger and freight, and telegraph and telephone services; marine signals, weights and measures, coinage, agriculture, international law, humanity in war, and world peace.

The name Congress is also applied to periodical meetings of private associations, especially when such associations are international. Congresses of this type, bringing together from all over the civilized world groups of men having intellectual, economic, social, or other interests in common, have done much to eradicate international prejudices. Among recent assemblages of this nature may be mentioned the International Congress of Medicine (London, 1911), of Applied Chemistry (Washington, 1912), of Hygiene and Demography (Washington, 1912), and of Navigation (Philadelphia, 1912).

Congress, Continental. See Continental Congress.

Congress, Library of. See Library of Congress.

Congress of the United States. See United States, section on *Government.*

Congreve, Richard (1818–99), English philosopher and writer, was born in Leamington, Warwickshire. For a time he was a teacher at Rugby, next a tutor at Oxford, which post he resigned (1855) to become a lecturer upon and the principal British exponent of Comte, relative to whose 'religion of humanity' he published *Translation of Comte's Catechism of the Positive Religion* (1858), and *Essays, Political, Social, and Religious* (1874), in addition to other works on history and politics.

Congreve, William (1670–1729), English dramatic poet, was born in Bardsey, Leeds. His childhood was spent in Ireland, at Youghal, Lismore, and Kilkenny. He wrote his solitary novel, *Incognita,* in 1687, though it was not published until 1692. In 1691 he came up to London, and entered the Middle Temple; but he threw himself eagerly into the life of literature and the coffee-houses, becoming acquainted with Dryden and Southerne; published his novel; and produced a comedy, *The Old Bachelor,* played at the Theatre Royal in January, 1693. This raised Congreve at a bound to the front rank of contemporary poets. In November, 1693, he brought out his satirical comedy of *The Double Dealer* (published as a book in 1694). The magnificent comedy of *Love for Love* was performed in 1695, and his single tragedy, *The Mourning Bride,* was acted in 1697.

Up to this time the career of the poet was one of unbroken serenity. With the exception of Dryden, he had no possible rival, and at the age of twenty-seven found himself the most admired of living writers. In March, 1698, however, Jeremy Collier began his series of attacks on the immorality and profaneness of the stage, and Congreve was among those who suffered most. He attempted to reply to Collier, in a pamphlet of *Amendments* (July, 1698), but without tact or temper. Congreve revived the *Double Dealer* in March, 1699, and produced a new comedy, written with inimitable care and wit. This was the matchless *The Way of the World,* which was brought out at Lincoln's Inn Fields in March, 1700, but proved a comparative failure. In deep disgust, 'Mr. Congreve quitted the stage early, and comedy left it with him.' His health was already failing, and he went abroad for some time. In 1701 he published *The Judgment of Paris* and the *Ode for St. Cecilia's Day.* In 1704 he made a momentary effort to be reconciled to the stage, producing, in common with Vanbrugh and Walsh, the farce of *Squire Trelooby,* and reviving *Love for Love.* His latest non-dramatic publications were—*The Tears of Amaryllis* (1705), *A Discourse on the Pindaric Ode* (1706), and an *Epistle to Lord Cobham* (1788). He collected his *Works* in 1710. He died in Surrey Street, on Jan. 19, 1729, and was buried in Westminster Abbey.

Congreve is by far the most distinguished exponent of artificial comedy in English literature. He belongs to the school of Molière, and was preceded by Etheredge and Wycherley; but these English dramatists he surpassed in the vigor of his invention and the splendor of his wit. In this last quality he is, perhaps, without a rival in any modern drama, and his delicate literary skill would give him an extraordinary eminence if it were not for his absence of tenderness and simplicity. But as a writer of the prose comedy of manners, Congreve continues pre-eminent.

Editions of his works appeared in 1710, 1753, and 1840, the last edited by Leigh Hunt. Consult *Life* by C. Wilson, by Gosse in 'Great Writers Series,' and by D. Schmid; Spingarn's *Critical Essays of the Seventeenth Century* (Vol. III., 1909).

Congreve, Sir William (1772–1828), English inventor. His father was controller of the royal laboratory at Woolwich, and young Congreve joined him in 1791, and ultimately succeeded him in 1814. In 1808, after a long series of experiments, he invented the rocket named after him. It was tried in Lord Cochrane's attempt to burn the French fleet in the Basque roads (1809), at the Battle of Leipzig (1810), and at the passage of the Bidassoa; and though its moral effect was satisfactory, its destructive effect was small.

Conibos (Manoas), South American Indians on both banks of the Ucayali affluent of the Amazon in Peru. They appear to be a branch of the Panos (q. v.), whose language they speak. At first the Conibos resisted all attempts at their conversion, and killed the famous missionary, Father Richter, in 1695. Later, nearly all became Christians; and they are now a peaceful, harmless people, noted for their curious facial painting in red and blue stripes, and for the silver rings worn in their lips and noses. Large numbers are employed by the traders to collect sarsaparilla.

Conic Sections are the curves formed by the plane sections of a right circular cone. (See Cone; Circle; Parabola; Ellipse; Hyperbola.) The ellipse and hyperbola are called central conics, and have many properties in common. Pairs of straight lines are particular cases of certain conics. If spheres be inscribed in the cone so as to touch it and also the cutting plane, the points of contact with the plane are the foci of the conic section. In coordinate geometry the general equation of the second degree represents a conic section. See Geometry. H. F. Baker, *Principles of Geometry* (4 vols., 1922).

Conifers, a large and important order of shrubs and trees, characterized by bearing their fruits in a strobilus (cone). There are 31 genera, of which 13 are found in the United States. With the yews the conifers constitute the grand division Gymnospermæ (q. v.). From the fact that most members of the order tend to spread the roots laterally rather than send them downward, conifers are often able to grow on the shallowest of soils, when deep-rooting trees would quickly perish. In consequence of the tall, comparatively unbranching trunk which most conifers possess, and the needle-like shape of their leaves, they offer less purchase to the wind than the much-branched trees of the plains, and consequently are able to thrive in mountainous and other windy districts.

The leaves of conifers are mostly evergreen, except in the larches and gingkos. The flowers are either monœcious or diœcious, and are without calyx or corolla. The male catkins produce a large quantity of pollen, which is distributed and borne to the female flower by means of the wind. The ovules are borne at the base of scales, which usually overlap, and are arranged so as to form a cone. The scales subsequently become woody, and then constitute the cones with which most people are familiar. When the seeds are thoroughly ripe, the woody scales separate, and the seeds escape. The seedlings are curious in that each consists of a central axis terminating above in five or six radiating linear leaflets.

Most of the conifers are natives of the temperate parts of Europe, Asia, and America—often occurring at great heights, however, where the cold is intense. Araucarias are found in the Southern Hemisphere, as are also the Podocarpeæ. Enormous quantities of coniferous timber are transported to distant markets by means of streams or rivers. The wood of hemlock, pine, cedar, fir, and many other conifers is of inestimable value. The bark of hemlock is used for tanning. Naval stores, gum, and lesser products are obtained from this family. For centuries the 'Hollanders,' or timber merchants of the Black Forest, used to raft their logs down the Rhine to the Netherlands; and these 'small kings' have acquired a niche for themselves in German literature.

Fossil conifers are found in the Mesozoic and Tertiary geological formations in great abundance as broken branches, cones, etc. The principal genera are Cupressus, Pinus, Abies, Picea, Larix, Cedrus, Thuja, Araucaria, Juniperus, Taxodium, Taxus, and Sequoia.

To propagate conifers by seed, it is necessary to allow the seed to become perfectly ripe, which takes at least one year—usually two years—from the time of fertilization of the ovule. A well-dug, rich, light soil is required, which has been heavily fertilized; and it should be kept in good condition by rotation of crops. The best month for sowing is May. The seeds should be lightly covered with soil, gently watered, and then mulched into fine leaf mould. The young plants must be kept supplied with water, and slightly shaded from hot sun. They also require some protection from frost. After two years in the seed bed they should be transplanted, and kept for a year or two longer before being set in their permanent places.

See also FORESTS; Sargent, *Silva of N. America;* Mosher, *Studies of Our Cone-bearing Trees of the California Mountains.*

Conine, CONIINE, CONEINE, CONIA ($C_8H_{17}N$), a yellowish, oily, poisonous liquid with a strong odor similar to that of mice. It is a volatile alkaloid derived from the poison hemlock, where it is most abundant in the immature fruit. It produces death through asphyxia due to paralysis of the terminal organs of the motor nerves. See HEMLOCK.

Conington, JOHN (1825–69), English classical scholar, was born in Boston, England. In 1844 he won the Hertford and Ireland scholarships at Oxford; in 1846 obtained a first in classics, and in 1847 won the chancellor's prize for Latin verse. In 1854 he was appointed to the new chair of Latin language and literature. The labor of his life was his edition of Virgil (1861–8), originally begun in 1852 with Goldwin Smith. He also edited Æschylus' *Agamemnon* (1848) and the *Choephoræ* (1857), besides suggesting important emendations in his *Epistola Critica* (1852). Later, he executed many translations—the *Odes of Horace* (1863), the *Æneid* (1866), Horace's *Satires*, etc. (1869), as well as a completion of Worsley's *Iliad* (1868). Consult his *Miscellaneous Writings.*

Coniston Flags form a subdivision of the Silurian system, and are so called after Coniston, in the Lake District of England. They are estimated to be about 6,000 feet thick. Coniston limestone is a distinct series, and belongs to the Ordovician or Lower Silurian. See SILURIAN.

Coniston Water, lake in Lancashire, England, about 4 miles west of Windermere. Its special feature is the mountain known as Coniston Old Man. The lake is nearly 5½ miles long and ½ mile broad, with a maximum depth of 184 feet.

Conium. See HEMLOCK.

Conjevaram (KANCHI, KANCHIPURAM), municipal town, headquarters of the Chengalpat district, Madras presidency, India, on the railroad between Arkonam and Chengalpat; 45 miles southwest of Madras. It is one of the seven holy cities of India, and is called the 'Benares of the South.' It contains numerous temples and shrines, including some of great antiquity. Native silk and cotton fabrics are manufactured. Early in the Christian era Conjevaram was the capital of the Pallava dynasty; and in the eleventh century of Tonda-Mandalam. It passed to the Mussulmans in 1310, and, with several interruptions, remained in their possession until the arrival of Clive in 1752. It played an important part in the war between the English and French. Pop. 50,000.

Conjugal Rights. See HUSBAND AND WIFE.

Conjugate Deviation, a symptom often appearing in apoplexy. Both eyes and head are turned toward that side on which exists the brain lesion producing the disorder.

Conjugation, in biology, is the intimate union of two cells of different origin. The union may be permanent, as when the conjugates are ovum and spermatozoon; or temporary, as in Paramœcium, where separation takes place after an interchange of nuclear fragments. Conjugation is a sexual process, and leads to the rejuvenescence of the conjugates where the process is temporary, or to the production of a new cell where it is permanent. In some cases, as in Paramœcium, the conjugates are similar in size and appearance; in others, as in Vorticella, a small cell conjugates with a large one (dimorphic conjugation). It has been definitely proved, for certain Protozoa, that conjugation is absolutely necessary for the well-being of the individual; without it, cell division ceases, and death ultimately ensues. See CELL.

Conjugation, in grammar, denotes the changes in a verb by inflection or by combination with auxiliaries to show tense, voice, mode, person, and number. Verbs which follow a fixed, complete pattern of inflection are called *regular;* those which deviate, *irregular;* and those which are incomplete, *defective.* Thus, there are four regular conjugations in Latin, three in French, and one in English.

Conjunction, in astronomy, is the meeting of two heavenly bodies in the same longitude. When they coincide in latitude as well, an occultation, a transit, or an eclipse (qq. v.) occurs. Planets revolving inside the earth's orbit come twice into conjunction with the sun in the course of each synodic revolution. They are said to be in 'inferior conjunction' when they pass between the sun and the earth, but in 'superior conjunction' when they pass on the farther side of the sun. Exterior planets, on the contrary, are in conjunction only when in this latter position. The interval between two successive conjunctions of a planet with the sun measures its 'synodic period.' Conjunctions are also defined as occurring at times of zero elongation—*i.e.*, when angular distance from the sun becomes = 0. The moon is 'new' when in conjunction with the sun.

Conjunction, in grammar, is a word or phrase used to join words or groups of words. Conjunctions that join words or word groups of equal rank are *coördinating* conjunctions; those which introduce subordinate word groups are *subordinating* conjunctions.

Conjunctiva, a membrane lining the inner surfaces of the eyelids and the front of the eyeball. The part on the lids is thicker than the rest, and has a slightly velvety surface, due to numerous fine grooves and pits, which constitute the papillæ. The part on the eyeball is made up of numerous layers of flat epithelium, and has no papillæ. The conjunctiva acts as a lubricating surface.

Conjunctivitis, inflammation of the conjunctiva, found in three important varieties — catarrhal, purulent, and granular —as well as in other less frequent forms.

Catarrhal Conjunctivitis may be acute or chronic. In the *acute* form, the conjunctiva on the lid is red and swollen, and there is a more or less profuse mucous secretion, with an itching or smarting sensation in the eyes. Recovery comes in from a few days to one or two weeks. The causes are mechanical irritation, as from dust, infection (usually conveyed by dirty fingers or towels), certain fevers like measles, and a special germ, which causes epidemic conjunctivitis or *pinkeye*, usually in the spring or fall. The *chronic* form —the commonest of eye troubles —is found chiefly in adults, and is characterized by the red lids and the comparative absence of discharge. It may be due to persistent irritation from smoke or dust, to insufficient sleep, eye strain, and alcoholic excess. The treatment is the application of astringent solutions like silver nitrate and alum.

Purulent Conjunctivitis is regularly due to infection with gonorrhœal virus. The lids are red and greatly swollen; there is a profuse, purulent discharge, and the eye is tender and painful. The condition lasts two or three weeks, and may cause ulceration and complete blindness. It appears in babies infected by their mothers, and develops on the second or third day after birth. It is also found in adults. A drop of two-per-cent. solution of silver nitrate should be put in each eye of a baby at birth to prevent this infection.

For Granular Conjunctivitis, see Trachoma. Consult O. P. Henderson and H. G. Rowell, *Good Eyes for Life* (1933).

Conjuring has been described as the production of apparently supernatural effects by natural means, the methods whereby these effects are wrought remaining concealed. It includes the performance of mystifying tricks and illusions by automaton figures, mechanical devices, and other means, and embraces feats of legerdemain, sleight of hand, and prestidigitation. But the modern conjurer goes beyond this, and calls to his aid the principles and deductions of such abstruse sciences as optics, electricity, and magnetism. Conjuring, under the name of black magic or witchcraft, dates from the remotest antiquity; but the best professors of the art in modern times, so far from claiming supernatural powers, openly avow that the marvels they perform are tricks, illusions, and so forth.

Conjuring tricks are performed by secret or concealed substitutions—the coin, or whatever it may be, which is apparently put under one cup, being in reality put under another; and the precise moment in which to effect the substitution is the all-important thing. The great secret of the conjurer's skill lies in his ability, at the critical moment, to distract the attention of the spectators. Conjuring wands are used mainly for this purpose, while they also help to conceal anything held in the hand. See Magic. Consult Downs' *Art of Magic* (1909); Goldston's *Tricks and Illusions for Amateur and Professional Conjurors* (1909) and *More Tricks and Illusions* (1910); Haley's *Dramatic Art of Magic* (1910); Devant's *Magic Made Easy* (1911); Lewis' *Later Magic* (1911); Maskelyne and Devant's *Our Magic* (1911).

Conklin, Edwin Grant (1863), American zoölogist, was born in Waldo, Ohio. He was educated at Ohio Wesleyan and at Johns Hopkins (PH.D., 1891). He has been professor of biology at Ohio Wesleyan (1891–4), and of zoölogy at Northwestern (1894–6), Pennsylvania (1896–1908), and Princeton (1908). He has made extensive studies on the embryology of molluscs, ascidians, and other invertebrates, and upon the fundamental laws governing the development of egg and embryo. The world of science has perforce embraced, if sometimes slowly and reluctantly, many scientific theories which Conklin has championed, *e. g.*, that acquired characteristics cannot be inherited; that both natural selection and mutations are important in evolution; that the egg, in early stages of division, is not a mere lump of homogeneous matter but contains localized formative substances; that discovery of the cell as the basic unit of life was made by Robert Hooke, not by Schleiden and Schwann.

At Princeton Conklin retained his professorship until 1933 when he became professor emeritus and special lecturer. Additionally, at the age of 76 in 1940, he had concluded four years of active service as supervisor of the American Philosophical Society.

Conkling, Roscoe (1829–88), American political leader, orator, and lawyer, was born in Albany, N. Y. He was educated at the Mount Washington Collegiate Institute, New York City; studied law at Utica, N. Y.; and was admitted to the bar in 1850. In the same year he was district attorney for Oneida county. He then practised law at Utica, and became prominent both at the bar and in State and national politics—first as a Whig and later as a Republican. He was mayor of Utica (1858–9); Representative in Congress (1859–63 and 1865–7); and a member of the U. S. Senate (1867–81). In Congress his exceptional ability as a debater and his remarkable oratorical powers gave him great influence. This influence was impaired, however, by personal antagonisms, and particularly a long and bitter political feud between him and his fellow Republican leader, James G. Blaine (q. v.).

During the Civil War and Reconstruction periods Conkling allied himself, on various occasions, with the more radical members of his party. Although he supported President Lincoln, he opposed President Johnson, and advocated his impeachment; and he was a member of the joint committee of the House and Senate on Reconstruction. In 1880 he was the leader of the 'Stalwart' faction of the Republican Party in New York; and in the National Republican Convention proposed General Grant as the party's candidate for a third term, leading the unsuccessful fight to bring about his nomination.

Soon after the inauguration of Garfield, Conkling became involved in a controversy with the President over the distribution of Federal patronage. The President refused to be governed by the recommendations of Senator Conkling and his associate from New York, T. C. Platt, both 'Stalwarts,' and appointed various 'Half-Breeds.' On the appointment of W. H. Robertson, a political opponent, as collector of the port of New York, both Senators resigned and appealed to the New York Legislature to vindicate them by an immediate re-election. Neither was reelected, however, and Conkling retired to private life. Consult his *Life and Letters* (1889), edited by A. R. Conkling; Ingersoll's *Memorial Address;* J. B. Fry, *The Conkling and Blaine-Fry Controversy in 1866* (1893); G. S. Boutwell, *Blaine and Conkling and the Republican Convention of 1880.*

Paul's Photos, Chicago

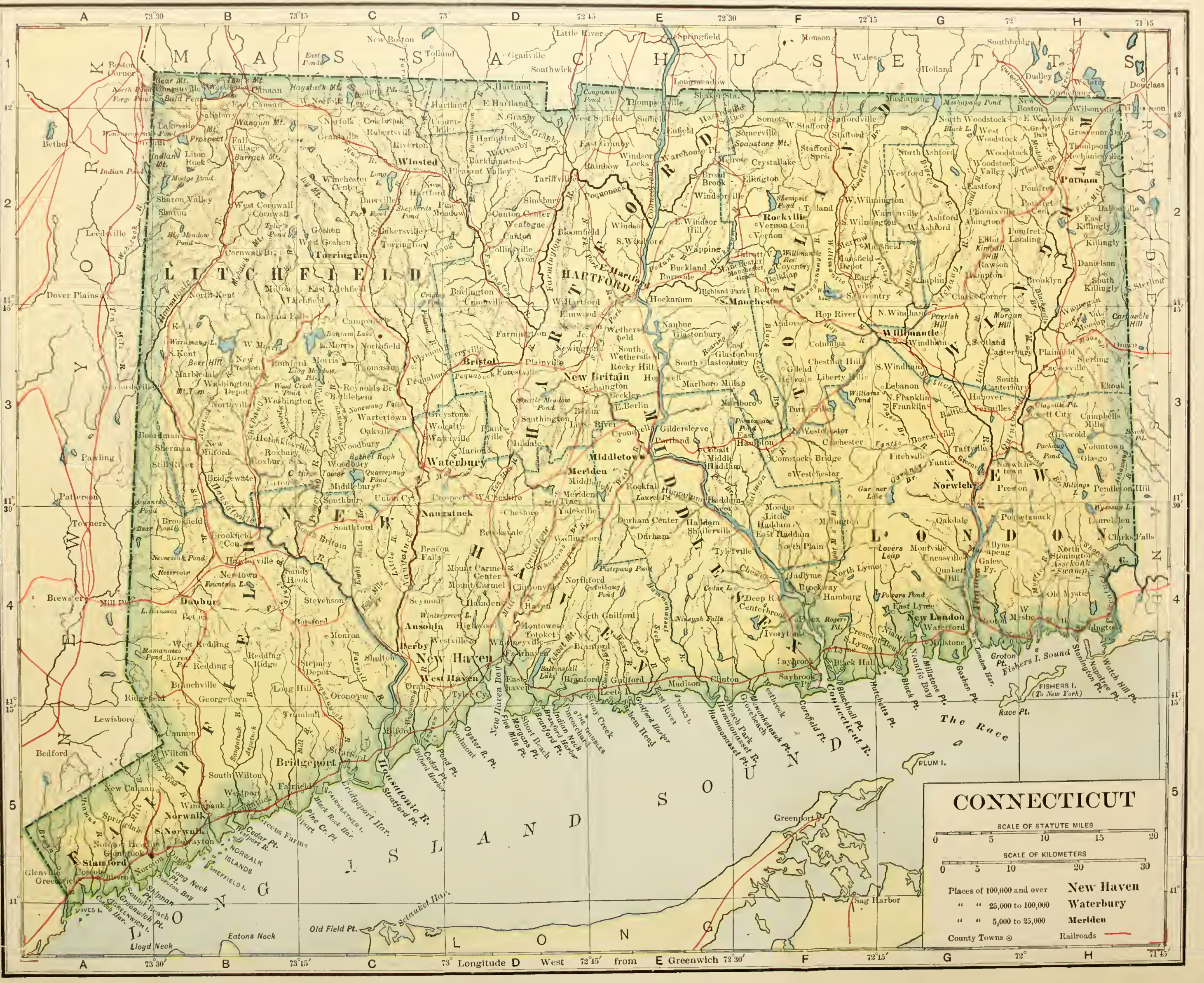
BOATS PLYING THE ROCKY SHORES OF CONNAUGHT

Conn, Herbert William (1859–1917), American biologist, born in Fitchburg, Mass. He was graduated at Boston University, and continued his studies at Johns Hopkins. He was appointed instructor in biology in 1884, assistant professor in 1886, and professor in 1889 at Wesleyan University. From 1889 to 1897 he was director of the biological laboratory at Cold Spring Harbor, N. Y.; from 1890 to 1906, bacteriologist of the agricultural experiment station at Storrs, Conn. In 1905 he became director of the laboratory of the Connecticut State board of health. Both at Wesleyan and at Storrs he made special investigations as to dairy products. He was one of the founders of the American Society of Bacteriologists (president, 1902). He published, in addition to several physiologies for school use, and over 150 scientific memoirs, *Evolution of To-Day* (1886); *The Living World* (1891); *The Method of Evolution* (1900); *Agricultural Bacteriology* (1901); *Bacteria, Yeasts, and Moulds in the Home* (1903); *Bacteria in Milk and Its Products* (1903); *Practical Dairy Bacteriology* (1907); *Biology* (1912).

Connaught, the smallest of the four provinces of Ireland, occupies the western part of the country. It comprises five counties—Galway, Mayo, Leitrim, Roscommon, and Sligo (qq. v.). The Shannon forms the boundary on the east and southeast. It contains several large lakes, besides those lying in the course of the Shannon. A large part is barren; but agriculture is the chief industry. It was formerly one of the Irish kingdoms, and was ruled by the O'Connors. Area, 4,230,822 acres. Pop. (1936) 525,468

Connaught and Strathearn, Arthur William Patrick Albert, Duke of (1850–1942), third son of Queen Victoria, was born at Buckingham Palace; his dukedom was conferred upon him in 1874. Destined for the army, in 1866 he entered the Royal Military Academy, Woolwich, and received his commission in 1868. Serving first in the Royal Engineers, he was transferred in the same year to the Royal Artillery; in 1869 to the Rifle Brigade; and in 1874 to the Seventh Hussars; returning to the Rifle Brigade some four years later as lieutenant-colonel. His promotion was rapid; in 1880 he was made major-general. In 1871, when he attained his majority, an annuity of $75,000 was granted to him, and this was augmented by $50,000 on his marriage. He married Princess Louise Margaret of Prussia (born July 25, 1860), third daughter of Prince Frederick Charles, in 1879.

An efficient soldier, the Duke commanded the First Brigade in Egypt (1882), and was present at Tell-el-Kebir; was commander-in-chief of the Bombay army (1886–90), of the Southern District (1890–93), at Aldershot 1893–8), and in Ireland (1900). He represented Queen Victoria at the coronation of the Czar (1896); opened the Assuan Dam in 1902; and represented King Edward (January, 1903) at the Delhi durbar. In 1902 he was made a field marshal; in 1904 was appointed to the newly created post of inspector-general of the forces, and in his official ca-


CONNECTICUT
SCALE OF STATUTE MILES
0 5 10 15 20
SCALE OF KILOMETERS
0 5 10 20 30
Places of 100,000 and over New Haven
" " 25,000 to 100,000 Waterbury
" " 5,000 to 25,000 Meriden
County Towns ⊙
Railroads
A B C D E F G H
1 2 3 4 5
73°30′ 73°15′ 73° Longitude West 72°45′ from Greenwich 72°30′ 72°15′ 72° 71°45′
42° 41°45′ 41°30′ 41°15′ 41°
MASSACHUSETTS
NEW YORK
RHODE ISLAND
LITCHFIELD
HARTFORD
TOLLAND
WINDHAM
NEW HAVEN
MIDDLESEX
NEW LONDON
FAIRFIELD
LONG ISLAND SOUND
LONG ISLAND
Hartford
New Haven
Bridgeport
Waterbury
New Britain
Meriden
Middletown
Norwich
New London
Danbury
Stamford
Norwalk
Torrington
Winsted
Bristol
Naugatuck
Ansonia
Derby
Willimantic
Rockville
Putnam
FISHERS I. (To New York)
PLUM I.
The Race

INDEX OF CONNECTICUT

CONNECTICUT

Allyns, Conn....G 4
Andover, Conn...F 3
Ansonia, Conn...C 4
Ashford, Conn...G 2
Avon, Conn.....D 2

Bakersville, Conn.C 2
Baltic, Conn.....G 3
BantamFalls Conn.C 3
Barkhamstead, Conn. ....C 2
Beach Pk., Conn.E 4
Beacon Falls,Conn.C 4
Beckley, Conn....E 3
Belknap, Conn...F 2
Berlin, Conn....E 3
Bethel, Conn....B 4
Bethlehem, Conn.C 3
Black Hall, Conn.F 4
Bloomfield, Conn.E 2
Boardman, Conn.B 3
Bolton, Conn.....F 2
Botsford, Conn...B 4
Bozrahville, Conn.G 3
Branchville, Conn.B 4
Branford, Conn..D 4
Bridgeport, Conn.C 5
Bridgewater,Conn.B 3
Bristol, Conn....D 3
Broad Br., Conn.E 2
Brocksvale, Conn.D 4
Brockway, Conn..F 4
Brookfield, Conn.B 4
Brookfield Center, Conn. ....B 4
Brooklyn, Conn..H 2
Buckland, Conn..E 2
Burlington, Conn.D 2
Burnside, Conn..E 2
Burrville, Conn...C 2

Campbell's Mill, Conn. ....H 4
Campville, Conn.C 3
Canaan, Conn....B 1
Cannon, Conn....B 5
Canterbury, Conn.H 3
Canton, Conn....D 2
Canton Cen.,Conn.D 2
Centerbrook,Conn.F 4
Centerhill, Conn..D 2
Central Vil., Conn.H 3
Chapinville, Conn.B 1
Chaplin, Conn....G 2
Cheshire, Conn...D 4
Chester, Conn...F 4
Chestnut HillConn.F 3
ClarksCor., Conn.G 2
ClarksFalls, Conn.H 4
Clinton, Conn....E 4
Clintonville, Conn.D 4
Cobalt, Conn....E 3
Colebrook, Conn..C 2
Colchester, Conn.F 3
Collinsville, Conn.D 2
Columbia, Conn..F 3
Cornwall, Conn..B 2
CornwallBr.,Conn.B 2
Coscob, Colo.....A 5
Coventry, Conn..F 2
Cres. Beach,Conn.G 4
Cromwell, Conn...E 3
Crystallake, Conn.F 2

Danbury, Conn...B 4
Danielson, Conn.H 2
Darien, Conn....B 5
DeepRiver, Conn.F 4
Derby, Conn.....C 4
Durham, Conn...E 4
Durham Cen,Conn.E 4

Eagleville, Conn..F 2
E. Berlin, Conn..E 3
E. Canaan, Conn.B 1
Eastford, Conn...G 2
E.Glast'bury,Conn.E 3
E. Granby, Conn.E 2
E. Haddam, Conn.F 4
E. Hampton, Conn.F 3
E. Hartford, Conn.E 2
E. Hartland, Conn.D 1
East Haven, Conn.D 4
E. Killingly, Conn.H 2
E. Litchfield, Conn.C 2
E. Lyme, Conn..G 4
East River, Conn.E 4
E. Morris, Conn.C 3
East Windsor Hill, Conn. ....E 2
E. Woodst'k Conn.H 2
Ekonk, Conn.....H 3
Ellington, Conn..F 2
Elliott, Conn....G 2
Elmwood, Conn...D 3
Enfield, Conn....E 2
Essex, Conn.....F 4

Fairfield, Conn...C 5
Fairhaven, Conn.D 4
Falls Vil., Conn..B 2
Farmington, Conn.D 3
Fitchville, Conn..G 3
Forestville, Conn.D 3
Franklin, Conn...G 3

GalesFerry, Conn.G 4
Gaylordsville, Conn. ....B 3
Georgetown, Conn.B 4
Gildersleeve, Conn.E 3
Gilead, Conn....F 3
Glasgo, Conn....H 3
Glastonbury, Conn.E 3
Glenbrook, Conn..A 5
Glenville, Conn..A 5
Goshen, Conn....C 2
Granby, Conn....D 2
Grantville, Conn..C 2
Greystone, Conn..C 3
GreensFarmsConn B 5
Greenville, Conn.G 3
Greenwich, Conn.A 5
Griswold, Conn..H 3
Grosvenor Dale, Conn. ....H 2
Groton, Conn....G 4
Grove Beach,Conn.F 4
Guilford, Conn..E 4

Haddam, Conn...E 4
Haddam Neck, Conn. ....F 4
Hadlyme, Conn..F 4
Hamburg, Conn..F 4
Hamden, Conn...D 4
Hampsted, Conn.C 2
Hampton, Conn..G 2
Hanover, Conn...G 3
Hartford, Conn..E 2
Hartland, Conn..D 1
Hawleyville, Conn.B 4
Hazardville, Conn.E 2
Hebron, Conn....F 3
Higganum, Conn.E 3
Highland Pk,Conn.E 2
Highwood, Conn.D 4
Hockanum, Conn.E 2
Hopewell, Conn..E 3
Hop River, Conn.F 3
Hotchkissville, Conn. ....C 3

Ivoryton, Conn..F 4

JewettCity, Conn.H 3

Kensington, Conn.D 3
Kent, Conn......B 3
Killingly, Conn..H 2

Lakeville, Conn..B 2
Laurelglen, Conn.H 4
Lebanon, Conn...G 3
Leete Id., Conn..E 4
Liberty Hill, Conn. ....F 3
Lime Rock, Conn.B 2
Litchfield, Conn..C 2
Little Haddam, Conn. ....F 4
Little River,Conn.E 3
Long Hill, Conn.C 4
Lyme, Conn.....F 4

Madison, Conn...E 4
Manchester, Conn..E 2
Mansfield, Conn..F 2
Mansfield Depot, Conn. ....F 2
Manchester Green, Conn. ....E 2
Marble Dale,Conn.B 3
Marion, Conn....D 3
Marlboro, Conn..F 3
Marlboro Mills, Conn. ....F 3
Mashapaug, Conn.F 2
Massapeag, Conn.G 4
Mechanicsville, Conn. ....H 2
Melrose, Conn...E 2
Meriden, Conn..D 3
Merrow, Conn...F 2
Middlebury, Conn.C 3
Middlefield, Conn.E 3
Middletown Conn.E 3
Mid.HaddamConn.E 3
Milford, Conn...C 5
Milldale, Conn...D 3
Millington, Conn.F 4
Mill Plain, Conn.A 4
Millstone, Conn..G 4
Milton, Conn....B 2
Monroe, Conn....C 4
Montowese, Conn.D 4
Montville, Conn..G 4
Moodus, Conn...F 4
Moosup, Conn...H 3
Morris, Conn....C 3
Mt. Carmel, Conn.D 4
Mystic, Conn....H 4

Napaug, Conn....C 2
Naubuc, Conn....E 3
Naugatuck, Conn.C 4
Newtown, Conn..B 4
NewBoston,Conn.H 1
New Canaan,Conn.B 5
New Hartf'd Conn.C 2
New Haven, Conn.D 4
NewMilford,Conn.B 3
NewLondon,Conn.G 4
NewPreston,Conn.B 3
NewBritain,Conn..D 3
Newington, Conn.E 3
Newington Junction, Conn....E 3
Niantic, Conn....G 4
Noank, Conn....H 4
Norfolk, Conn...C 2
N. Ashford, Conn.G 2
N.Branford,Conn.D 4
N. Franklin, Conn.G 3
N. Granby, Conn.D 2
N.Guilford, Conn.E 4
Northfield, Conn.C 3
Northford, Conn.D 4
N. Hartland ConnD 1
No. Haven, Conn.D 4
North Grosvenor Dale, Conn....H 2
N. Kent, Conn..B 2
N. Lyme, Conn...F 4
NorthPlain, Conn.F 4
N. Sterling, Conn.H 2
N.StoningtonConnH 4
Northville, Conn..B 3
N.W'tchesterConn.F 3
N.Windham, Conn.G 3
N.WoodburyConn.C 3
N.Woodst'k, Conn.G 2
Noroton. Conn...B 5
Noroton H, Conn.B 5
Norwalk, Conn...B 5
Norwich, Conn...G 3
Norwichto'n,Conn.G 3

Oakdale, Conn...G 4
Oakville, Conn...C 3
OldMystic, Conn.H 4
Oneco, Conn.....H 3
Orange, Conn....C 4
Ore Hill, Conn..B 2
Oronoque, Conn..C 4
Orton, Conn.....B 3

Packerville, Conn.H 3
Pallouville, Conn.H 2
Pendleton Hill, Conn. ....H 4
Pequabuck, Conn.C 3
Phoenixville,Conn.G 2
Pineorchard,Conn.D 4
PineMeadow Conn.C 2
Plainfield, Conn.H 3
Plainville, Conn..D 3
Plantsville, Conn.D 3
PleasantVal,Conn.D 2
Plymouth, Conn..C 3
Poquetanuck, Conn. ....G 4
Poquonock, Conn.E 2
Pomfret, Conn...H 2
PomfretCen,Conn.H 2
PomfretLdg,Conn.H 2
Portland, Conn..E 3
Preston, Conn...H 3
Prospect, Conn...D 3
Putnam, Conn...H 2

QuakerHill, Conn.G 4
Quinebaug, Conn.H 1

Rainbow, Conn...E 2
Rawson, Conn....G 2
Redding, Conn...B 4
Redding Ridge, Conn. ....B 4
Reynold's Ridge, Conn. ....C 3
Ridgefield, Conn.B 4
Riverside, Conn..A 5
Riverton, Conn...C 2
Robertsville, Conn.C 2
Rockfall, Conn...E 3
Rockville, Conn...F 2
Rockyhill, Conn..E 3
Romford, Conn...B 3
Rowayton, Conn.B 5
Roxbury, Conn...B 3
RoxburySta.,Conn.B 3

SachemHd., Conn.E 4
Salisbury, Conn..B 2
Sandy Hook, Conn.B 4
Saugatuck, Conn.B 5
Saybrook, Conn..F 4
SaybrookPt. Conn.F 4
Scitico, Conn....E 2
Scotland, Conn...G 3
Seymour, Conn..C 4
Shailerville, Conn.E 4
Shaker Sta., Conn.E 1
Sharon, Conn....B 2
Sharon Val.,Conn..B 2
Shelton, Conn....C 4
Sherman, Conn...B 3
Short Beach, Conn. ....D 5
Simsbury, Conn..D 2
Somers, Conn....F 2
Somerville, Conn.F 2
SoundBeach,Conn.A 5
S. Britain, Conn.C 4
Southbury, Conn.C 3
S.Cant'bury,Conn.H 3
S.Coventry, Conn.F 2
Southford, Conn.C 4
S.Glastonb'y,Conn.E 3
Southington,Conn.D 3
S. Kent, Conn...B 3
S. Killingly, Conn.H 2
S. Lyme, Conn..F 4
Southport, Conn.B 5
S.ManchesterConnE 2
S. Meriden, Conn.D 3
S. Norwalk, Conn.B 5
South Wethersfield, Conn. ....E 3
S.Willington Conn.F 2
S. Wilton, Conn..B 5
S.Windham, Conn.G 3
S. Windsor, Conn.E 2
Springdale, Conn.A 5
Stafford, Conn....F 2
StaffordSprs. ConF 2
Staffordville,Conn.F 2
Stamford, Conn..A 5
StepneyDep.,Conn.C 4
Sterling, Conn...H 3
Stevenson, Conn.C 4
Still River, Conn.B 3
Stonington, Conn.H 4
Stony Creek, Conn.E 4
Stratford, Conn..C 5
Suffield, Conn...E 2

Taftville, Conn..G 3
Talcottville, Conn.F 2
Tariffville, Conn.D 2
Terryville, Conn.C 3
Thomaston, Conn.C 3
Thompson, Conn.H 2
Thompsonville, Conn. ....E 1
Tolland, Conn...F 2
Torringford, Conn. ....C 2
Torrington, Conn.C 2
Totoket, Conn...D 4
Tracy, Conn.....D 3
Trumbull, Conn..C 5
Turnerville, Conn.F 3
Tyler City, Conn.D 4
Tylerville, Conn.F 4

Uncasville, Conn.G 4
UnionCity, Conn.C 3
Unionville, Conn.D 2

Versailles, Conn.G 3
Vernon, Conn...F 2
Vernon Cen., Ct.F 2
Voluntown, Conn.H 3

Wallingford,Conn.D 4
Wapping, Conn..E 2
Warehouse Point, Conn. ....E 2
Warrenville, Conn.G 2
Washington, Conn.B 3
Washington Depot, Conn. ....B 3
Waterbury, Conn.C 3
Waterford, Conn.G 4
Watertown, Conn.C 3
Waterville, Conn.C 3
Wauregan, Conn.H 2
Weatogue, Conn.D 2
Wethersfield,Conn.E 3
WhitneyvilleConn.D 4
Willimantic, Conn.G 3
Wilsonville, Conn.H 1
Wilton, Conn....B 5
Winchester Center, Conn. ....C 2
Windham, Conn..G 3
Windsor, Conn..E 2
Windsor Locks, Conn. ....E 2
Windsorville Conn.E 2
Winnipauk, Conn.B 5
Winsted, Conn...C 2
Wolcott, Conn...D 3
Woodbury, Conn.C 3
Woodmont, Conn.D 5
Woodstock, Conn.H 2
Woodstock Valley, Conn. ....G 2
W.Ashford, Conn.G 2
Westbrook, Conn.F 4
Westchester,Conn.F 3
W. Cheshire,Conn.D 3
W. Cornwall,Conn.B 2
Westford, Conn..G 2
W. Goshen, Conn.C 2
W. Granby, Conn.D 2
W.Hartford, Conn.E 2
W. Haven, Conn.D 4
Westport, Conn..B 5
W. Morris, Conn.B 3
W. Mystic, Conn.H 4
W. Norfolk, Conn.C 1
W. Redding,Conn.B 4
W. Stafford, Conn.F 2
W. Suffield, Conn..E 2
Westville, Conn..D 4
W.Will'gton,Conn.F 2
W.Woodst'k,Conn.G 2

Yalesville, Conn.D 4
Yantic, Conn....G 3

pacity visited South Africa early in 1906. In 1905 he was made personal *aide-de-camp* to Edward VII. His eldest daughter, Princess Margaret, was married to Prince Adolphus of Sweden on June 15, 1905. She died in 1920. His younger daughter, Patricia ('Princess Pat'), was married in 1919 to the Hon. Alexander Ramsay, a naval officer. His only son, Prince Arthur of Connaught (1883–1938), was a personal *aide* to four English kings. He was married in 1913 to Princess Alexandra Victoria, Duchess of Fife; they had a son, who in 1942 succeeded to the dukedom of Connaught and Strathearn. Prince Arthur was appointed Governor-General and commander-in-chief of the Union of South Africa in 1920; he resigned in 1923. In 1907 the Duke became commander-in-chief and high commissioner in the Mediterranean; and in 1910 again visited South Africa, where he opened the first parliament of the Union of South Africa.

In 1911 the Duke of Connaught succeeded Earl Grey as Governor-General of Canada. Although originally appointed for a period of two years only, he completed the customary five-year term, being succeeded, in 1916, by the Duke of Devonshire. He visited India in 1920.

Conneaut, kon-nē-aut', city, Ashtabula county, Ohio, on Conneaut Creek and on the New York Central, New York, Chicago, and St. Louis, and Bessemer and Lake Erie Railroads; two miles from Lake Erie and sixty-seven miles northeast of Cleveland. It has a good harbor, is an important point in the shipment of iron ore, coal, and steel, and has one of the best-equipped lighthouses on fresh water. The New York, Chicago, and St. Louis Railroad has its largest locomotive and car repair shop here. It has manufactures of tin cans, canned goods, machine and tool drills and electric light bulbs (G. E.). The first settlers in Northern Ohio landed at Conneaut in 1796. Pop. (1930) 9,691; (1940) 9,357.

Connecticut, ko-net'i-kut (popularly called the 'Nutmeg State'), one of the original thirteen States of the United States and one of the New England group, is situated between the parallels of 40° 59' and 42° 3' N. lat. and the meridians 71° 47' and 73° 43' w. long. It is bounded on the north by Massachusetts, on the east by Rhode Island, on the south by Long Island Sound, and on the west by New York. The total area is 4,965 square miles, of which 145 are water surface. The State has eight counties.

Topography. — Several ranges of hills, in part representing stubs of ancient mountain masses, traverse the State from north to south. The Housatonic, lying farthest west, rises highest; the Green Mountains extend southward to near New Haven; the Mount Tom Range and the Blue Hills lie farther east. These upland areas, together with others of similar character in Southern New England, are parts of an ancient plain that sloped gently seaward. A later elevation of the region rejuvenated the streams and permitted them to carve the present valleys out of this old plain. Bear Mountain (2,355 feet) and Gridley Mountain (2,200 feet) are the highest points in the State.

Three rivers of considerable size cross Connecticut from north to south—the Housatonic, the Connecticut, and the Thames with its tributaries. The Connecticut River (q. v.) is the largest in New England. Its valley forms the central portion of the State and is the chief agricultural district. There are many small streams tributary to those named, and others reaching the coast independently. The coast line measures a hundred miles, and is indented by numerous bays with excellent harbors, that of New London being especially fine. Many islands lie off shore.

Climate and Soil.—The climate is temperate, although the weather is changeable. The mean annual temperature is about 50° F., the average for winter being 27° and for summer 72°. The average annual rainfall amounts to about fifty inches. The snowfall is rather heavy.

Stony soils cover much of the upland country; rich alluvial soils and loams occupy the valleys; and thin, sandy soils lie along the coast.

Geology. — Metamorphic crystalline rocks of Palæozoic and Archæan age occupy the greater portion of the State. In the Connecticut River Valley sedimentary rocks of Triassic age, cut by diabasic traps in dykes and sills, form a belt from five to eighteen miles wide. The whole State is drift-covered. Building stones, as brownstone, slate, and granite, are produced in quantities. The Salisbury Iron Mines are probably the oldest in the United States. Coal deposits occur at Simsbury and Bristol. Tungsten is found.

Mining.—The mineral resources of Connecticut are not extensive. As early as Colonial days, however, there was some attempt to exploit the mineral wealth known to be present. The production of iron around Salisbury became important after 1732, and mines in this vicinity furnished metal for cannon and other military supplies used in the Revolutionary War. Quarries near Long Island Sound furnish granite used for residential and public buildings, and building lime of good quality is supplied by lime quarries in western Connecticut; feldspar is also produced in commercial quantity. Brownstone from Portland quarries was used in many American cities for building purposes during one period, especially in New York City in the late 19th century, though these quarries were subsequently idle. A vein of siderite at Mine Hill in Roxbury was prospected at various times from early in the 18th century, chiefly in the hope of finding silver, and great sums of money were spent in developing the mine; in recent times the site has been maintained by the Columbia School of Mines for demonstration purposes.

Agriculture.— Originally Connecticut's leading occupation, agriculture has been superseded in importance since the middle of the 19th century by industry. Farm products are still important, however, and although many other States rank higher in the total yield of various crops, Connecticut has an excellent production record considering its small area.

Connecticut tobacco is of high quality, and is used extensively in cigar wrappers and binders. Its cultivation began as early as 1680, in the Connecticut Valley in the vicinity of Hartford. Hay and fodder are also among the most valuable agricultural products. Potatoes rank as the largest vegetable crop. Potatoes and corn are the usual rotation crops on tobacco soils; and it has been found that the sweet potato can be raised successfully in the older tobacco soils. Market-gardening is important especially near the large cities. The State contains an ample supply of lime for agricultural purposes. Apples, pears, peaches, grapes, strawberries, and raspberries are valuable products. Dairying, aided by good pasture land, is one of the principal industries. Nearby large cities furnish a steady market for all dairy products, and have also been a stimulus to poultry raising.

Fisheries.—The State Shellfish Commission has actively aided commercial interests in developing the cultivation of oysters and lobsters. It has taken such measures as regulating the harvesting of shellfish, fixing closed areas, licensing vessels, eliminating pests, and establishing a lobster hatchery at Noank. With the State Health Department it has worked to overcome the hazard to the commercial fisheries resulting from stream and harbor pollution. Oyster farming, the harvesting of clams, swordfishing out of Stonington and Mystic, offshore flounder fishing, scallop fisheries on the Niantic River, and shad fisheries on the Connecticut River are valuable marine industries.

Manufactures.—Connecticut is pre-eminently a manufacturing State. Its three fine seaports, Bridgeport, New Haven, and New London, afford ample opportunities for domestic coastwise traffic and commerce. Besides, the main line of the most important railroad system in New England traverses the State, providing direct communication with all parts of the country.

The inventive genius of many of the early settlers and later natives of Connecticut has contributed substantially to the development of American industry. In the history of clock-making, Eli Terry, Seth Thomas, and Chauncey Jerome played major parts. Some of the best-known makes of clocks and watches today come from Connecticut. Charles Goodyear, of New Haven, discovered the process for vulcanizing rubber, and thus brought an important industry to the State. John Fitch, a native of Windsor, was the first to apply steam power to navigation. The manufacture of sewing machines was first undertaken on a large scale by Elias Howe at Bridgeport; improvements were made by Wheeler and Wilson, in the same city. The invention of electro-silver plating goes back to the Rogers brothers, of Hartford. The city of Meriden leads in the production of silverware and silver-plated ware.

Connecticut has played an important part in the development of the firearms industry, and has been a leader among the States in the production of firearms and ammunition. The State has also ranked first in brass and bronze products, hardware (there are numerous big lock factories), and felt hats (Danbury has been called 'the hat center of the world'). Important too is the production of such varied items as typewriters, textiles (including silk, wool, cotton, knit goods, etc.), corsets, thread, carpets, electrical machinery, foundry and machine shop products, motor boats and launches, and hooks and eyes, pins, needles, and snap fasteners.

Insurance.—A number of the leading insurance concerns of the United States have their home offices in Hartford, a center of this business. These include fire, life, general indemnity, and steam boiler insurance companies. In Hartford's early days marine insurance was written by local financial interests to cover shipping hazards, but as commerce shifted to other ports, insurance coverage began to be extended to fire risks and later to the life, accident, and liability categories.

Transportation.—Connecticut has more than 900 miles of railway. The principal railroad lines belong to the New York, New Haven and Hartford Railroad. A large number of bus companies operate within the State, and there are about a score of aviation fields. Transportation is also facilitated by the numerous water routes, the ports of entry being New Haven, Hartford, Stonington, New London, and Bridgeport.

Population.—According to the 1940 census the population of Connecticut was 1,709,242; the urban population was 67.8 per cent of the total (compared with 70.4 per cent in 1930). During 1930–40 the population increased 6.4 per cent (compared with 16.4 per cent during the decade preceding).

The population of the State according to earlier censuses was as follows: (1790) 237,946; (1820) 275,248; (1860) 460,147; (1900) 908,420; (1910) 1,114,756; (1920) 1,380,631; (1930) 1,606,903.

The populations of the largest cities in 1940 were: Hartford (the capital), 166,267; New Haven, 160,605; Bridgeport, 147,121; Waterbury, 99,314; New Britain, 68,685; Stamford, 47,938; Norwalk, 39,849; Meriden, 39,494.

Education.—The history of education in Connecticut goes back to the earliest colonial days. Later the State's 'school fund' was largely established by setting aside the proceeds from the sale of the Western Reserve (q. v.) in 1795. Besides elementary and high schools there are four State teachers' colleges, under the control of the State board of education, at New Haven, Willimantic, New Britain, and Danbury.

Notable schools for higher education include: Yale University (q. v.) at New Haven; Connecticut College (q. v.), for women, at New London; Wesleyan University (q. v.) at Middletown; Trinity College, at Hartford; Berkeley Divinity School (Epis.) at New Haven (founded in Middletown in 1854); Hartford Seminary Foundation (comprising the Hartford Theological Seminary, Hartford School of Religious Education, and Kennedy School of Missions) at Hartford; and the University of Connecticut (established in 1881 as the Storrs Agricultural School, next called the Connecticut Agricultural College, and then, until 1939, the Connecticut State College) at Storrs.

Charities and Corrections.—The State maintains hospitals for the insane at Norwich and Middletown; reformatories at Cheshire and Meriden; an industrial school for girls at Middletown; a school for epileptics and feeble-minded at Mansfield; Newington Home for Crippled Children; a school for the deaf at West Hartford; an institute for the blind at Hartford; five tuberculosis sanitaria; the State prison at Wethersfield; and various other hospitals and institutions.

Government.—The present constitution of Connecticut was adopted in 1818 and has since been frequently amended. Amendments are adopted after they have been approved by a majority vote of the lower house of one General Assembly and a two-thirds' vote of both houses of the next General Assembly and have received a majority vote of the electorate. There are the usual suffrage restrictions as to age, residence, and education.

The executive power is vested in a governor, lieutenant-governor, secretary of state, treasurer, and comptroller—all elected biennially. A majority vote of both houses is sufficient to overcome the governor's veto.

The legislature, termed the General Assembly, consists of a Senate of 35 members and a House of Representatives of 267, consisting of one or two members from each town—towns of more than 5,000 inhabitants being entitled to two representatives. Members of both houses are elected for two years. Legislative sessions are biennial.

The judiciary is made up of a supreme court of errors, with a chief justice and four associates; a superior court of six justices; courts of common pleas; justices of the peace; and town, borough, police, and city courts. Justices of the first two courts are appointed by the General Assembly on the nomination of the governor, and serve eight years.

Connecticut has six Representatives in the National Con-

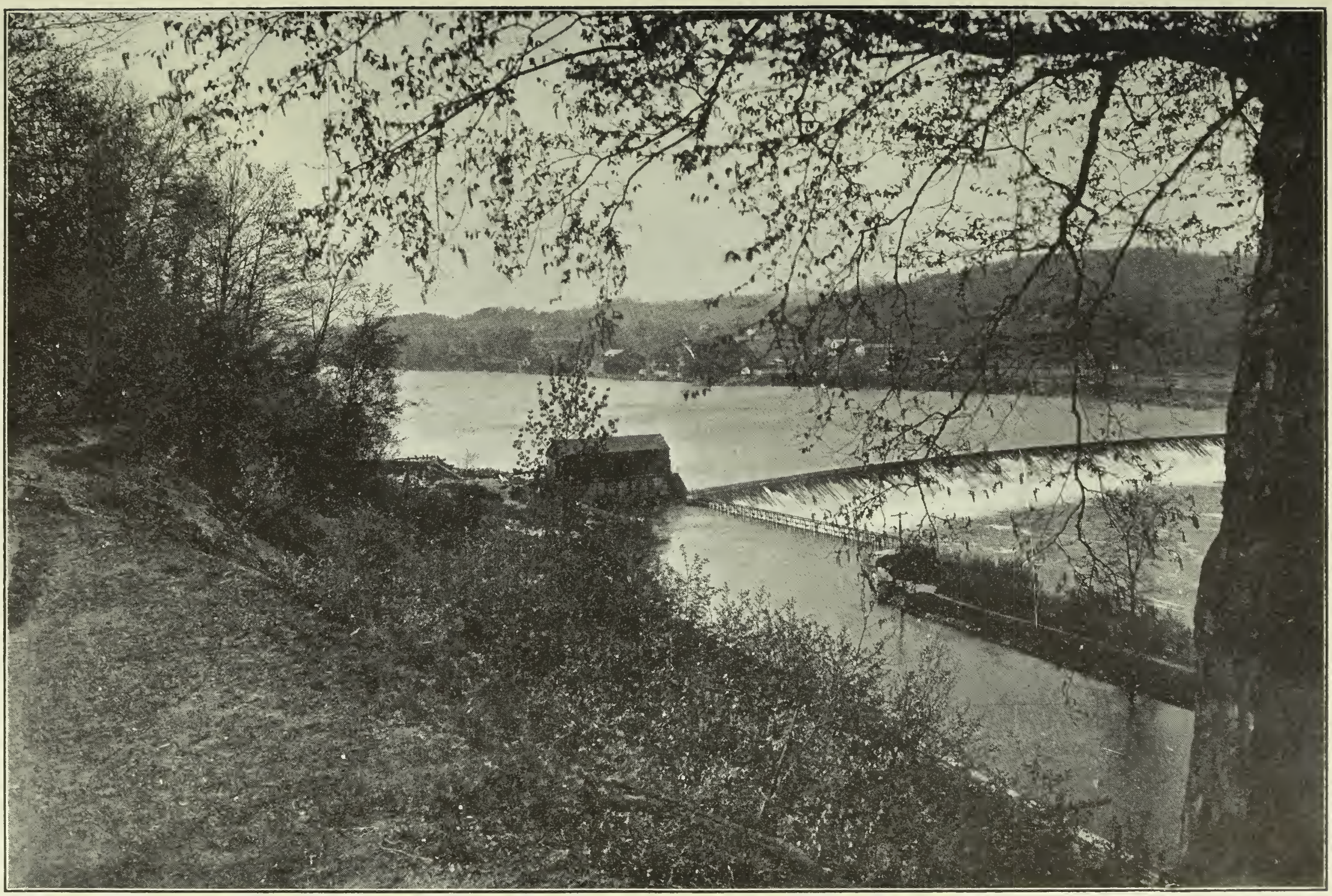


Photo from Brown Bros., N. Y.

CONNECTICUT.

A characteristic view of the Housatonic River in Western Connecticut, showing a dam and power site. Throughout its course, the Housatonic affords water power to many manufacturing villages.

gress. Hartford is the State capital.

Recent Legislation.—Important measures enacted in recent years are those creating a public utilities commission (replacing the railroad commission), forbidding the employment of children in certain occupations, and requiring State licenses of airships and their operators (1911); prohibiting night work for children under sixteen; providing for industrial insurance and for workmen's compensation (1913); establishing a budget system (1915); regulating hours of night work for women and children; amending banking laws of the State; establishing a teachers' retirement system (1917); creating a widow's pension law (1919); providing continuation schools for children between the ages of fourteen and sixteen; regulating the conditions of child labor; establishing State schools for non-English-speaking adults; reorganizing the State police department; amending the bigamy law (1921); establishing an old-age pension system to conform with Federal law (1935) and an unemployment-insurance system also in conformity with Federal law (1936); providing for a civil-service system for State employees, requiring new employees to pass examinations (1937); and measures designed to prevent infection with tuberculosis and to provide for hospitalization of those afflicted with the disease.

History.—The territory of Connecticut formed a part of the vast strip of land, extending as far west as the Pacific Ocean, which was granted by Robert, Earl of Warwick, to Lord Say and Sele, Lord Brooks, and others in 1631. Before the grant, Dutch settlers from the New Netherlands had explored the Connecticut River, and in 1633 they established a trading post at Hartford.

The first English settlements were made by colonists from Massachusetts at Wethersfield (1634) and at Windsor and Hartford (1635). The Dutch attempted to expel the English and, failing in that, tried to build a fort at the mouth of the Connecticut which should serve as a means of communication between the fort at Hartford and New Amsterdam. The English, however, forestalled them and erected a fort at Saybrook.

In 1636 there was a large influx of immigrants from Massachusetts, who were dissatisfied with the form of government in vogue in that colony. In 1637 a war was waged against the Pequot Indians by the settlers which practically exterminated the tribe. In 1639 the three towns of Wethersfield, Windsor, and Hartford drew up a democratic constitution for the colony of Connecticut, which remained in force until the granting of the royal charter by Charles II in 1662. Because of the liberal clauses of this charter, practically no change was made in it at the time of the Revolution, and it continued in force until the adoption of the present constitution in 1818.

New Haven was settled in 1638 by nonconformists from England, who in the following year drew up a constitution which was based entirely upon the Scriptures. A feature of this constitution was the requirement that each settler should sign his name to the compact. By 1650 several other settlements had been founded.

In 1662 all the Connecticut settlements were brought under one jurisdiction by the terms of a liberal charter granted by Charles II. In 1687 Connecticut was called upon to surrender this charter to Sir Edmund Andros, who had been appointed governor-general of New England by the English crown. The colonists refused to produce the charter; but Andros assumed control of public affairs, and maintained his position until 1689.

Connecticut's course during the pre-Revolutionary period had a strong influence in arousing public opinion against England, and she contributed materially to the final success of the American cause. The Colony declared itself a free and independent State in October, 1776. During the war, Danbury, New London, and New Haven were attacked by the English, the two former being almost totally destroyed.

At the close of the Revolution Connecticut claimed jurisdiction over part of the region north and west of the Ohio River in virtue of her old colonial charter. She eventually agreed to relinquish her claim on condition of receiving the ownership of a large tract of land in what is now Northeastern Ohio. (See WESTERN RESERVE).

The State was not in sympathy with the War of 1812 and was instrumental in calling the Hartford Convention (q. v.). In the Civil War, Connecticut furnished 54,882 men to Federal service.

In 1900 several anniversaries were celebrated throughout the State by some of the oldest towns —Middletown leading, with an age of 250 years. In 1912 constitutional amendments relating to the office of lieutenant-governor and to the length of term of the General Assembly were adopted. Connecticut furnished 67,709 men to the armed services in the World War.

Widespread suffering was caused by the great blizzard which struck the Atlantic coast region in February, 1934. Various observances throughout the State, including an industrial exposition at Hartford, celebrated the tercentenary in 1935 of the white man's first settlement of Connecticut. Serious damage was caused by floods in March, 1936, especially along the Connecticut River, at Hartford and above. Coastal communities of the State suffered heavily from the New England hurricane in September, 1938, which caused many deaths and large property losses. Ocean Beach Park, a $3,000,000 recreational development at New London, was opened in 1940, replacing the resort razed by the 1938 hurricane.

In national politics Connecticut supported the Democratic party in 1820, 1836, 1852, 1876, 1884, 1888, 1892, 1912, 1932, 1936, and 1940. Republican electors were chosen in 1896, 1900, 1904, 1908, 1916, 1920, 1924, and 1928.

Bibliography.—E. B. Sanford, *History of Connecticut* (rev. ed., 1922); B. C. Trowbridge, *Old Houses of Connecticut* (1923); N. G. Osborn, ed., *History of Connecticut in Monographic Form* (5 vols., 1925); E. Ramsay, *History of Tobacco Production in the Connecticut Valley* (1930); T. S. Duggan, *The Catholic Church in Connecticut* (1930); L. S. Mills, *The Story of Connecticut* (1932); T. A. Cook, *Geology of Connecticut* (1933); C. E. Perry, ed., *Founders and Leaders of Connecticut, 1633–1783* (1934); G. G. Goodwin, *The Mammals of Connecticut* (1935); a series of pamphlets published in New Haven for the Connecticut Tercentenary Commission (1933–36); F. S. M. Crofut, *Guide to the History and Historic Sites of Connecticut* (2 vols., 1937); Federal Writers' Project, *Connecticut, a Guide to Its Roads, Lore, and People* (1938); C. W. Burpee, *The Story of Connecticut* (4 vols., 1939); O. Shepard, *Connecticut, Past and Present* (1939).

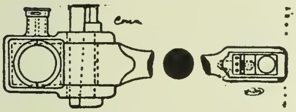
Connecticut College, a four-year liberal arts college for women in New London, Conn., privately endowed, non-sectarian, chartered in 1911, opened in 1915. Confers the A.B. and M.A. degrees.

Connecticut Lakes, four small lakes in the extreme northern part of New Hampshire which are the source of the Connecticut River. The uppermost lake, or fountainhead, is a mere mountain pond, 2,551 feet above the sea.

Connecticut Reserve. See Western Reserve.

Connecticut River, the largest river of New England, rises in Coos county, N. H., near the Canadian border, forms the entire boundary between Vermont and New Hampshire, and flows across Massachusetts and Connecticut to Long Island Sound, having followed a southerly course of about 360 miles. Among its tributaries are the Ammonoosac, Chicopee, and Farmington. Bellows Falls, Brattleboro, Greenfield, Northampton, Holyoke, Chicopee, Springfield, Hartford, and Middletown are on its banks. It drains an area of 11,085 square miles. The valley is very fertile, and produces tobacco and Indian corn. It is navigable by steamers to Hartford, at the head of tide water, a distance of 50 miles. Large power plants are in operation at Wilder, Bellows Falls, Turners Falls, Holyoke, Hinsdale, N. H. (1909), and Brattleboro, Vt. (1910). The scenery along its upper course is charming. Consult Bacon, *Connecticut River.*

Connecting Rod (of an engine), the rod which transmits the motion from the crosshead, at the end of the piston rod, to the crank pin. The term is also applied to rods performing a similar function in other machines. The figure shows a common form of connecting rod. The small end encircles a pin in the crosshead, and the larger end embraces the crank pin. The rod itself is of wrought iron or steel, and is provided with brasses at the ends. The wear of the brasses at the crank-pin end is taken up by a gib and cotter, and at the small end by a fine-threaded screw which works in a nut and presses against one of the brasses. The latter arrangement is not suitable, however, for large engines.



Connecting Rod

Connective Tissue, a body tissue of mesoblastic origin which supports and binds together the other tissues of the body and forms a framework for the organs.

Connellsville, kon'elz-vil, city, Pennsylvania, in Fayette county, on both banks of the Youghiogeny River, and on the Pennsylvania, the Baltimore and Ohio, the Western Maryland and Pittsburgh and Lake Erie Railroads; 48 miles s.e. of Pittsburgh. It is the seat of a State hospital and State armory. The surrounding district is rich in coal and natural gas, and the city is one of the most important coke centers in the United States. The huge electric generating plant of the West Penn Power Company is situated here, and there are railroad shops; quarries producing glass sand, and fire and silica clay for brickmaking; and manufactures of pig iron, steel, glass, electrical equipment and machinery. Pop. (1930) 13,290; (1940) 13,608.

Connemara, kon-i-mä'*ra*, district in the western part of County Galway, Ireland, including Connemara proper, Jar-Connaught, and Joyces country. It consists largely of mountain and lough, and is celebrated for its wild and romantic scenery. It has a deeply indented and precipitous coast line, and is a favorite haunt of anglers. Building stone and a valuable green marble (Connemara marble) are quarried.

Con'ner, David (1792–1856), American naval officer, became a midshipman in the U. S. Navy in 1809, and was a lieutenant on the *Hornet* during the War of 1812, taking part in the defeat and capture of the British brigs *Peacock* and *Penguin.* He was a member of the Board of Navy Commissioners (1841–2); first chief of the Bureau of Construction and Repairs (1842–3); and in the Mexican War commanded the American squadron which transported General Scott's army to Vera Cruz, and took an important part in its capture.

Con'nersville, town, Indiana, county seat of Fayette county, on the White Water River, and on the Baltimore and Ohio, New York Central and Nickel Plate Railroads; 23 miles s.w. of Richmond. It has flour mills, foundries, and manufactures of caskets and casket hardware, pistons and piston rings, refrigerator cabinets, steel kitchen equipment, glassware, automobiles and automobile parts and accessories, and rotary blowers. Pop. (1930) 12,795; (1940) 12,898.

Conning Tower, the circular or elliptical pilot house of a war vessel, heavily armored, with a narrow observation slit between the walls and the roof. It is the post from which, by means of telephone and speaking tubes, the commander directs a battle.

Con'nolly, James Brendan (1868–), American author, born in Boston, Mass. From 1890 to 1895 he was clerk, inspector, and surveyor with the U. S. Engineer Corps at Savannah. At the outbreak of the Spanish-American War, he enlisted with the Ninth Massachusetts Infantry, and was present at the siege of Santiago (1898). In 1907–08 he served in the U. S. Navy.

Connor, Ralph. See Gordon, Charles W.

Connota'tion and Denota'tion. By the *connotation* of a term is meant the sum of attributes commonly signified by it; by the *denotation* of a term, the sum of individuals or objects to which it may be applied. Thus, the term 'man' connotes the attributes rationality, mortality, etc., and denotes the individual Socrates, Plato, etc. The question as to which terms are to be regarded as connotative and which as non-connotative has been variously answered. According to Mill's usage, 'a non-connotative term is one which signifies a subject only, or an attribute only. A connotative term is one which denotes a subject and implies an attribute.' The simplest and most symmetrical usage, however, seems to be that suggested by Fowler—*viz.*, that proper names, at the one extreme, have only denotation; general or common terms (*e.g.*, man) have both denotation and connotation; while mere attributes (*e.g.*, white) have only connotation. It is customary to formulate a law that denotation and connotation vary inversely —*e.g.*, the term 'man' denotes many more individuals, but connotes fewer attributes than the term 'clergyman.'

Conon, kon'on, Athenian commander, was appointed general in 409 b.c., along with Alcibiades and Thrasybulus. In 406, after the fall of Alcibiades, he became one of the commanders of the Athenian fleet, when he was blockaded by Callicratidas at Mytilene, but set free by the Athenian victory at Arginusæ. The next year he escaped with eight ships from the Athenian disaster at Ægospotami; entered the service of the Persian king; and in command of his fleet destroyed the Spartan fleet at Cnidus (394). After expelling the Spartan governors from the Ægæan Islands, he took Cythera; and returning to Athens (393), restored its fortifications. Sent to negotiate with the Persian satrap Tiribazus in opposition to the Spartan Antalcidas (392), Conon was imprisoned by Tiribazus, but escaped and died in Cyprus.

Conon of Samos, Greek astronomer and mathematician, lived in the third century b.c. When Ptolemy iii, Euergetes, the Egyptian king, started on a dangerous expedition against the

Assyrians, his wife Berenice vowed, in the event of his safe return, to consecrate her beautiful hair to the temple of Arsinoë. The condition being fulfilled, she paid her vow, and Jupiter placed the shining locks among the stars. Conon identified the constellation which he called Coma Berenices with the tresses of the queen. He wrote seven books on astronomy, in which he included Chaldæan observations on solar eclipses; composed a calendar giving the time of rising and setting of the fixed stars and containing meteorological forecasts; and published several studies in conic sections, which formed the basis of Apollonius' fourth book of Conics.

Conowingo Project, a hydroelectric power development on the Susquehanna River, Maryland, started in 1926 and completed around 1930, at a cost of $52,000,000. It comprises a 4,800-foot dam and power house at Conowingo, Maryland, and, with the exception of that at Niagara Falls, is the largest single hydroelectric plant in the United States. Designed to contain 11 generators of 50,000 horsepower each, the station is capable of producing 1,360,000,000 kilowatt-hours of electricity a year. The average net head is 89 feet. A highway bridge 105 feet above the foundation serves as part of the main highway between Baltimore and Philadelphia. High voltage lines transmit the energy generated to Philadelphia, 75 miles away.

Con'quest, the acquisition of territory by force, as by war, as distinguished from occupancy, or cession, as by treaty. Conquest involves occupation, but goes far beyond it, and includes the appropriation of territory, the assertion of sovereignty over it, and the proof of ability to keep it. The conquest may be recognized by the terms of a treaty of peace; or undisputed possession, coupled with the exercise of sovereignty for a reasonable time, varying with the circumstances of each case, may be admitted as sufficient proof. See INVASION.

Conquest Flag. See FLAG.

Conquistadores (Spanish, 'conquerors'), kōn-kēs-tä-THŌ'-räs, a title specially applied by the Spaniards to their great leaders who subdued the natives of Mexico, Peru, and other portions of Spanish America. The most celebrated of these adventurers were Cortes, Almagro, and Pizarro (qq.v.).

Conrad I., kon'rad, *Ger.* kōn'-rät, German emperor, was chosen to fill the throne on the extinction of the line of Charlemagne by the death of Lewis the Child (911), the title emporor not being used at that period. His reign was one unbroken period of unsuccessful strife against Lorraine (912), Saxony (912), Swabia (916), and Bavaria (917).

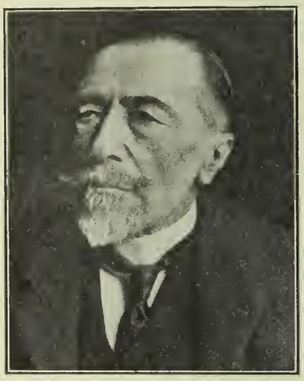
Conrad II. (c. 990–1039), king of Germany and emperor of the Romans. With the extinction of the imperial house of Saxony by the death of Henry II., the German people were compelled to elect his successor and in 1024 chose Conrad, who thus became the founder of the Franconian dynasty. In 1026 he crossed the Alps into Italy and after subduing the Italian insurrections against his authority was crowned king of Italy at Milan; the following year he received the imperial crown at Rome. In 1032 he added the duchy of Burgundy to the empire. Towards the close of Conrad's life serious disturbances in Italy compelled him again to cross the Alps, where he succeeded in restoring order at the cost of many concessions to his Italian subjects. He died in Germany in 1039.

Conrad III. (1093–1152), emperor of the Germans, founder of the Hohenstaufen dynasty, was the nephew of Henry V., who in 1115 made him Duke of the Franks. Henry having died without issue, the choice of his successor fell to the German people, who chose Lothair the Saxon in preference to Conrad. On the death of Lothair, however, in 1138, the throne was offered to Conrad, and he was crowned at Aix-la-Chapelle. He soon became involved in conflict with Henry the Proud, Duke of Bavaria, who was the leader of the Guelfs, beginning the struggle between the Guelfs and Ghibellines (q.v.) which raged at intervals for a century. With the death of Henry in 1139, peace temporarily ensued, and Conrad could turn his attention to other matters. St. Bernard of Clairvaux had by his eloquence stirred the people to a new crusade to deliver Jerusalem, and in 1147 Conrad set off for Palestine with a large army. He lost the greater number of his soldiers by disease and fighting, and returned in 1149 broken in spirit. Three years later he died in Bamberg.

Conrad IV. (1228–54), emperor of Germany, of the house of Hohenstaufen, was the second son of the Emperor Frederick II. and Iolanthe, heiress to the kingdom of Jerusalem. Elected king of the Romans (1237), he governed Germany during the long absence of his father in Italy, and after his death (1250) became emperor. Confronted with the enmity of the Pope, who excommunicated him, he was defeated by the Imperialist candidate, William of Holland, at Oppenheim (1251) and compelled to retire to his dominions in Swabia (of which he had been appointed duke in 1235). Having determined to strengthen the dominions of his house in Italy, Conrad entered Verona in 1251, subdued Apulia, and conquered Naples (Oct. 10, 1253). He was preparing to invade Germany at the head of a great army to reestablish his authority there, when he died of fever at Lavello.

Conrad, FREDERIK WILLEM (1769–1808), Dutch engineer, succeeded his preceptor, Brunings, as inspector-general of the sea dykes in the province of Rynland, and was later appointed administrator-general of the sea dykes of Holland. He is remembered for the reclamation of great tracts of land from the sea, and for his masterly work in the reconstruction of the outlet of the Rhine.

Conrad, JOSEPH (1857–1924), English novelist, was born in the Ukraine, the son of a Polish squire, and in 1884 became a naturalized British subject. His parents being implicated in the Polish rising of 1862, his mother was sent to Siberia, and his father, editor of a patriotic review in Warsaw, died in prison.



Courtesy Doubleday, Page & Co.

Joseph Conrad

As a young boy, Conrad had a passion for the sea and much against his parents' wishes secured a berth on a collier at Marseilles; later he shipped as an ordinary seaman at Newcastle, and after that served on many vessels, in many seas, through all grades from seaman to master, spending an eventful twenty years and acquiring an immense store of experience upon which he subsequently drew for his writing. *Youth* (1902) and *The Mirror of the Sea* (1906) contain descriptions of his early experiences as a sailor. Having mastered the English language, in 1889 Conrad began his first novel, *Almayer's Folly,* which was published in 1895. It at once attracted attention, and in a few years the author abandoned the sea, and settled in England to devote himself to literary work. In 1923 he paid his first and only visit to the United States.

Conrad's work is distinguished by a brilliant faculty of natural and psychological description. His style is remarkably vigorous and he was especially skilful in depicting the effect of Oriental influence upon Western character. By some critics he is considered the foremost English novelist of his time. His published works include, in addition to those already mentioned: *An Outcast of the Islands* (1896); *The Nigger of the Narcissus* (1897), *Tales of Unrest* (1898); *Lord Jim* (1900); *The Typhoon* (1903); *The Secret Agent* (1907); *A Set of Six* (1908); *'Twixt Land and Sea* (1912); *Some Reminiscences* (1912); *A Personal Record* (1912); *Chance* (1913); *Victory* (1915); *Within the Tides* (1916); *The Shadow Line* (1917); *The Arrow of Gold* (1919); *The Rescue* (1920); *The Rover* (1923); *Under Western Eyes* (1923); *Suspense* (1925); *Last Essays* (1926). Consult H. Walpole's *Joseph Conrad* (1916); F. M. Ford's *Joseph Conrad: A Personal Remembrance* (1924); A. Symons' *Notes on Joseph Conrad: With some unpublished letters* (1926); G. Jean-Aubry's *Joseph Conrad* (1927); R. Curle's *The Last Twelve Years of Joseph Conrad* (1928).

Conrad, Michael Georg (1846–1927), German writer, known as 'the foremost apostle of Zola.' He was engaged in journalistic work from 1868 to 1883 and eventually settled in Munich, where he founded (1885) a 'realistic' weekly, *Die Gesellschaft*. His first published work was a volume of sketches, *Parisiana* (1880), followed by further sidelights on Parisian life, *Madame Lutetia* and *Lutetias Töchter* (1883). His other writings include *Flammen* (1882); *Die Klugen Jungfrauen* (1889); *Deutsche Weckrufe* (1890); *Die Beichte der Narren* (1893); *Die Emanzipierten* (1889); *Von Zola bis Gerhart Hauptmann* (1902); *Wagner's Geist und Kunst in Bayreuth* (1906); *Emile Zola* (1906).

Conrad, Robert Taylor (1810–58), American lawyer, in 1838 was appointed judge of the criminal sessions for Philadelphia. On the dissolution of the court he edited *Graham's Magazine* for several years, and engaged in newspaper work. In 1854 he was elected mayor of Philadelphia by the Whig and American Parties, and in 1856 was made judge of the quarter sessions. He is best remembered for his tragedy, *Aylmere; or, The Bondman of Kent*, produced in 1841 by Edwin Forrest, who played Jack Cade with great success.

Conrad, Timothy Abbott (1803–77), American palæontologist, was born near Trenton, N. J. His father was professor of botany at the University of Pennsylvania, and he himself early developed an interest in natural science. He was New York State geologist (1837) and palæontologist for the State survey of New York (1838–41). His published works include: *American Marine Conchology* (1831); *Fossil Shells of the Tertiary Formations of North America* (1832); *New Fresh Water Shells of the United States* (1834); *Fossils of the Tertiary Formations of the United States* (1838). All of these books contained plates from his own drawings.

Conradin of Swabia, kōn'rä-dēn (1252–68), the last of the Hohenstaufen dynasty, son of Conrad IV. (q.v.), was brought up in Swabia. His father died when he was but two years old, and Manfred, his father's half-brother, undertook to rule Naples and Sicily as king during the minority of the young sovereign. He was opposed in this by the Pope, who offered the crown of the two Sicilies to Charles of Anjou. Charles thereupon invaded Italy, and the rival forces met at Benevento (1266), where Manfred's defeat and death on the battlefield gave Charles possession of the kingdom. Charles proved a cruel and hated king, and Conradin, though only a boy of fifteen, was persuaded by the Ghibellines to attempt to recover his inheritance. He was received with great honor in Rome, won a victory over the French at Scureola (1268), but was subsequently defeated, taken prisoner, and executed at Naples by order of Charles. His brief but tragic career has supplied the theme for various writers of romance.

Conrad von Würzburg (d. 1287), German poet, lived for many years in Strassburg, and afterward in Basel, where he died. He is one of the most important mediæval German poets, for the great number and variety of his works, for the purity and elegance of his language, and for the correctness of his versification. His longest work is the unfinished *Der Trojanische Krieg*, containing about 40,000 verses. Other important works are *Partonopier und Meliur*, also unfinished; *Die Goldene Schmiede*, a religious work celebrating the Holy Virgin; *Engelhart und Engeltrut*, a delightful story of friendship; *Der Welt Lohn*, and *Kaiser Otto* or *Otto mit dem Barte*. Consult Grimm's introduction to *Die Goldene Schmiede*.

Conrart, kôn-rär', Valentin (1603–75), French man of letters, was born in Paris. In his *salon* the French Academy was formally instituted (1634), and he was its secretary until his death.

Conried, kon'rēd, Heinrich (1855–1909), German-American impresario, was born in Bielitz, Austrian Silesia, and was graduated from the Oberrealschule, Vienna. After attaining success as an actor in his native land, he came to New York in 1878, and was made stage manager of the Germania Theatre. In 1879 he starred in the principal German theatres of the country, and afterward organized the Conried Opera Company. In 1892 he assumed the management of the Irving Place Theatre, in New York, where he formed a stock company for the presentation of German drama. From 1903 to 1908 he was manager of the Metropolitan Opera House.

Consalvi, kōn-säl'vē, Ercole, Marchese (1757–1824), Italian cardinal; in 1792 received an appointment at the Vatican. As secretary to the conclave held at Venice in 1799, he did much to bring about the election of Pius VII. as Pope; the following year he was made a cardinal and secretary of state, although he was not a priest, and never became one. In 1801 he went to Paris, where he successfully concluded the Concordat with Napoleon. For opposition to Napoleon's usurpation of the Pope's powers, Consalvi was deprived of his office in 1806 and ordered to take up his residence in Reims. After the fall of the Emperor he was sent to the Congress of Vienna (1815), where, as the Pope's delegate, he succeeded in recovering the Papal States. He was at once reinstated in office and introduced many reforms, such as a new civil and commercial code of laws, a reorganization of the administration, and the suppression of brigandage.

Consanguinity, kon'sang-gwin'i-ti, signifies relationship by blood, as contrasted with affinity, or the relationship created by marriage. It is of two kinds—(1) lineal, or the relationship existing between an ancestor and a descendant in a direct line; and (2) collateral, or the relationship existing between those who are descended from a common ancestor, but not in the same line or branch of the family, and who, therefore, do not bear the relation of ancestor and descendant to each other. Marriages made between lineal relations, however remote, are null and void.

In English law, marriages between collateral consanguinei are void only when they stand in the first, second, or third degree to each other. Children born of the same father but of different mothers are consanguineous; those born of the same mother by different fathers are uterine relations.

In the United States, the law as to validity of marriages between collateral relations varies in different States. In general, however, the statutes prohibit the marriage of first cousins. Lineal descendants are preferred to collaterals, under the laws relating to inheritance. See Affinity; Agnates; Cognates; Collateral; Next of Kin. Consult Lang and Atkinson's *Social Origin and Primal Law.*

Con′science. In any community there is a generally accepted standard of right and wrong—*i.e.*, there is a set of moral judgments accepted without question as binding by most members of the community. This moral standard as an operative content in the mind of any member of the community—*i.e.*, as known by him, and applied in judging his own conduct—is called 'conscience.' When the individual's conscience is in advance of that generally accepted, it is said to be 'enlightened.' When, in consequence of repeated transgressions of the accepted standard, its hold over him is relaxed, it is said to be 'blunted.' If the individual judges himself to have transgressed his moral standard, he feels remorse. If he judges himself to have acted up to it, he is free from this pain, or has a certain pleasure of self-approval.

Upon these facts the intuitional moralists have built a theory of conscience as a moral faculty. Conscience is, in their view, a faculty of intuitive moral principles or judgments, which, if not obstructed in its operation, is uniform in all men, and is in itself certain and unerring, though in our application of these intuitive principles to particular cases we may fall into error. Further, the intuitions of conscience are not acquired, but innate. This theory is not so much a statement of actual facts, however, as the expression of an ideal. It represents the ideal at which moral reflection aims—*viz.*, the perception of final moral truth—as being an already existent, though possibly latent, faculty.

Now, while it is obvious that the final or ideal moral truth must be uniform and unerring, and while we must assume that man is not incapable of attaining this truth, yet it is certain that not all men are equally in possession of it, and uncertain whether any man is fully in possession of it. Thus, the faculty of moral perception for which the intuitional moralists contend may be so indefinitely latent in individuals, or even in peoples (as we see in the case of savage races and in the history of morals), that their contention loses all practical importance. The intuitional theory was motivated mainly by the fear that if moral principles were regarded as the result of education and development, they would lose their character and sink to the level of mere conventions. This fear arises from a confusion between the origin and the validity of a judgment, the truth of a judgment being in reality quite unaffected by the fact that a process of development and education is acquired for its perception. The basis of fact in the intuitional theory—*viz.*, the fact that the members of any community regard a certain set of moral principles as self-evident—is sufficiently accounted for by their common social environment. And, of course, the principles so recognized do, in fact, vary with this environment.

The classical exposition of the place of conscience in human nature is set forth by Joseph Butler (q.v.), the English theologian, in his *Three Sermons on Human Nature.* For the views of later intuitionalists, consult H. Sidgwick's *History of Ethics* (ch. iv.), with the works therein mentioned; Calderwood's *Handbook of Moral Philosophy.*

Conscience, kon′syäns′, Hendrik (1812–83), the most famous of Flemish novelists, and one of the originators of the popular literary Flemish movement, was born in Antwerp. He served as a soldier (1830–6), but left the army and was in 1840 appointed secretary of the Academy of Arts in his native town; in 1857 a commissary for Courtrai; and in 1868 keeper of the Wiertz Museum in Brussels, where he died. His first notable literary success was the historical novel, *De Leeuw van Vlaenderen* (1838). This was followed by other books in the same field, as *Jakob von Artevelde* (1849), *De Burgemeester van Luik* (1866), and *Everard t' Serclaes* (1847). His finest achievements, however, are his studies of Flemish domestic life, in which a touch of pathos gives depth to his graphic characterization. His skill in this *genre* is well illustrated in the little stories, *Hoe men Schilder wordt* (1843); *Siska van Roosemael* (1844); *De Loteling* (1850); *Rikke-tikke-tak* (1851); *De arme Edelman* (1851); *Het Geluk van rijk te zijn* (1855). He also wrote a popular *Geschiedenis van Belgie* (1845), and his own autobiography in *Geschiedenis mijner Jeugd.*

Conscience's one-hundredth volume was published in 1881. A collected edition of his works has appeared in 10 volumes. Most of his work has been translated into French and German; English translations include *Fashion, The Lion of Flanders, The Merchant of Antwerp, Summer Evening Tales, Tales of Flanders,* and *The Young Doctor.* Consult Pol de Mont's *Life,* in Dutch; Eekhoud's *Life,* in French.

Conscience Money, money voluntarily paid, to assuage the conscience, by one who has evaded an obligation, such as a tax or a debt. Cases also occur frequently where a person may have stolen money, even trifling sums, many years before, and makes anonymous restitution. The British Treasury always acknowledges receipt of such money in *The Times.*

Conscience Whigs, those members of the Whig party in Massachusetts who refused to accept the Compromise Measures of 1850 as a final settlement of the slavery controversy. Their opponents, who supported President Fillmore, were known as 'Cotton Whigs.' In New York also there was a division along much the same lines—the anti-Administration faction, led by W. H. Seward (q.v.), being known as 'Seward Whigs' or 'Woolly-Heads,' and the pro-Administration faction as 'Silver Grays.'

Con′sciousness. To be 'conscious' is to be mentally awake or active, in contrast with the 'unconsciousness' of dreamless sleep, or that produced by an injury to the brain. Consciousness is the term used, either abstractly to signify the quality of being conscious, as when we speak of states of consciousness; or concretely, to signify that whole stream of such states in which the waking life of a man (or any other conscious subject) consists. Consciousness in the latter sense is a unity or continuous whole for the conscious subject himself, in so far as it is characterized by memory. But, whether so characterized or not, it must be regarded as a unity, in so far as it pertains to a single bodily organism or nervous system. And this second mode of definition is applicable in cases such as those of so-called double personality, where unity and continuity in the other sense seem entirely broken up.

Consciousness as a quality varies in intensity from the vagueness of the conscious state in which we find ourselves on emerging from sleep to a state of the utmost mental alertness.

And this difference of intensity attaches not only to one total state of consciousness as compared with another, but also to the various parts of the single conscious state—*i.e.*, the parts of the total field of consciousness at the moment. We are most intensely conscious of what we are immediately attending to—what occupies the focus of consciousness. And in proportion as any part of the total field of consciousness is remote from the focus, its intensity will be less.

In the nature of the case, it is very difficult to say when consciousness of any particular thing or feeling has ceased; our attention may be very gradually diverted from one direction into another. The term *subconsciousness* (q. v.) is therefore used to signify the marginal region between distinct consciousness, on the one hand, and total disappearance from consciousness, on the other. By some, indeed, the term is used so widely as to include our whole past experience—this being supposed to linger on in an ever fainter and fainter manner, and to be capable of being re-intensified when we attend to it in memory. But it is more practical to include only what can be inferred to have been dimly present from the fact of its modifying what we are clearly conscious of, as when we look up, feeling sure that somebody is in the room, although we are quite unable to particularize what makes us feel in this way.

The abstract nature or meaning of consciousness as a quality has been variously analyzed. The usual analysis may be stated as follows: Consciousness as a quality is exhibited when somebody is 'conscious of' something. Thus, it seems to imply (1) a subject that is conscious, and an object of which the subject is conscious; and (2) a relation between the subject and object which is in some sort a cognitive one. Further, the subject is either pleasantly or unpleasantly affected (in however faint a degree) by its contact with the object; and this feeling gives rise to some sort of reaction of motor expression, while both feeling and motor reaction will vary more or less with every variation on the cognitive side of consciousness. Hence it is held that consciousness (1) implies a fundamental duality of subject and object, and (2) consists of three constituents — *viz.*, cognition, feeling, and will or conation. These three constituents are regarded as being present in some form in every state of consciousness, though, of course, they may be very variously developed and combined. See PSYCHOLOGY; PERSONALITY; UNCONSCIOUS; UNCONSCIOUSNESS. Consult William James' *Principles of Psychology.*

Conscrip'tion, formerly used to designate the enrollment of men selected by lot for compulsory military or naval service, is now also applied to the enrollment of all male citizens of certain ages for the purpose of enforcing nation-wide compulsory service. In the nations of antiquity the nobles or chiefs were usually called upon to furnish quotas when an army was to be raised. Greece, however, developed not only the republican principle of government, but also the militia idea and that of universal compulsory service. In Athens, the system resembled that of modern Europe, with its active army and reserves; while Sparta kept in constant training its entire male population of military age. In the early days of Rome, her army was also provided through universal military service.

In Greece, the justification of compulsory service was based upon the duty of every citizen to the state of which he was a part; in most monarchical states it rested upon allegiance to the crown. The republican idea was exemplified in the Acts of the Continental Congress, in the Constitution of the United States, and in the Act of Congress of 1792 'to provide for the national defence by establishing a uniform militia throughout the United States' by 'enrolling every free able-bodied white male citizen of the respective States' between the ages of 18 and 45 years. France passed a somewhat similar law in the same year (1792), but left the selection of recruits to the communes, which forwarded their most undesirable citizens, and the numbers obtained were wholly inadequate. The law of 1793 changed the limiting ages from 18 and 40 to 18 and 25; the results were excellent. Further improvements were effected by the Army Law of 1798, which remained in effect without much change until 1870. Efficiently administered by Napoleon, it was a leading cause of his victories.

The real foundation of the modern European system was laid in Prussia by the Law of 1808, which was based on the French model, but which permitted no exemption through distinction of class or by purchase. After 1815 the full development of the system achieved very important results. It fused the nation, bringing together recruits from all parts—the classes and the masses; it brought about universal education, which was introduced as a military measure; it was of much assistance in the founding of national industries. The money borrowed and spent to carry out compulsory service and education in the years following Napoleon's downfall steadied and supported national finance; the care of the health of recruits and their hygienic instruction is said to have greatly improved their bodily condition throughout life, and to have added an average of five years to its duration; and, lastly, the possession of such a military establishment relieved the nation from all fear of foreign aggression.

The remarkable success of the Prussian army in 1866 and of the German army in 1870 caused all the nations of Europe to adopt some modification of the Prussian system. While the details differed somewhat in each country, the general features of military service (except in Switzerland) were similar to those of Germany, briefly as follows: liability began at the age of 17 years, but recruits were usually called at 20. Service in the active army was 7 years: 2 years (3 for cavalry and horse artillery) in the ranks, and 5 years (4 for cavalry and horse artillery) in the reserve, which was given two periods of training of 8 weeks each. The soldier then passed into the *Landwehr,* and remained until he reached the age of 39, receiving two training courses of eight to fourteen days during the first five years, but none afterward. The *Landsturm* comprised all soldiers between the ages of 39 and 45; also untrained or partly trained men rejected as in excess or for other causes when presenting themselves for service. In the navy, the terms of service were similar, the *Seewehr* replacing the *Landwehr.* Specially educated or qualified recruits in both army and navy were permitted to volunteer for one year's service. From these were drawn a large proportion of the officers of the *Landwehr* and *Seewehr* in time of mobilization or of war. Noncommissioned or petty officers were derived from those men who were permitted to volunteer for a greater length of service than the compulsory period.

Conscription in Great Britain and Ireland.—On May 24, 1916, Great Britain adopted a general Conscription Act, providing for compulsory military service of all men in the United Kingdom between the ages of 18 and 41. Ireland was excluded from the operations of the act at this time, and in January, 1918, a measure to extend conscription to that country was defeated in the House of Commons. On April 9, 1918, however, a new man power bill was introduced by Premier Lloyd George providing for the drafting of all able-bodied men in Great Britain between the ages of 18 and 50 and for the extension of conscription to Ireland. The measure was bitterly opposed, but on April 16 passed its final reading in the House of Commons by a majority of 198. It received the royal assent on April 18 and became a law. The Irish conscription clause met with violent opposition by the Irish members of the House and in Ireland, where it was greatly complicated by the Home Rule situation (see HOME RULE).

Conscription in Canada.—A bill providing for compulsory military service was introduced into the Dominion Parliament on June 11, 1917, and was enacted as the Military Service Act on Aug. 29. It made all British subjects between the ages of 20 and 45, resident in Canada, subject to call for active service, with the exception of clergymen and those declared exempt by the terms of the Act, and authorized the calling to the colors of 100,000 men. The Act met with considerable opposition, but in the general elections held throughout the Dominion in December, 1917, the Union Government was returned, Sir Robert Borden retained his premiership, and conscription was confirmed by popular vote. On Jan. 3, 1918, the first registration of drafted men was held. In May, 1918, the age limit was lowered to nineteen. (See CANADA, *Army*.)

In Australia, in which military training and service for home defence is compulsory up to 26 years, a referendum was twice held on the subject of conscription for service in the World War. The issue was defeated in October, 1916, by a vote of 1,146,000 to 1,085,000, and again in December, 1917, by a vote of 1,072,000 to 889,000.

Conscription in the United States.—Shortly after the entrance of the United States into the World War, Congress passed a Selective Draft Act, which was signed by President Wilson on May 18, 1917. According to the provisions of this Act, all men in the United States between the ages of 21 and 31, citizens and aliens, married and unmarried, were to be registered on a day set apart by the President. The only exceptions allowed were men in the Navy or Regular Army of the United States, the Marine Corps, the Officers Reserve Corps, members of the National Guard and Naval Militia actually in the service of the United States, and men in the enlisted reserve corps actively in service. A year's imprisonment and enforced registration were the penalty for failure to register, and for making false statements. June 5 was the day of registration; and the total number registered on that date was over 9,000,000.

From the men thus registered the Draft Act further provided for the raising by selective conscription of a war army in increments of approximately 500,000 men. The first increment was placed at 687,000 men, the excess to be used in filling vacancies in the Regular Army and National Guard; and on July 20 the selective draft was put into effect by means of a drawing held at Washington. The men whose numbers appeared near the top of the list were then called for physical examination by local medical boards, Government appointed; and appeals for exemption from service on account of dependents, etc., passed on by special exemption boards.

In November, 1917, a new plan of classifying registered men was announced. A detailed questionnaire was issued to each of the registered men not yet selected, and on the basis of their replies they were classified as follows:

CLASS I. (1) Single men without dependent relatives; (2) married man (or widower) with children, who habitually fails to support his family; (3) married man dependent on wife for support; (4) married man (or widower) with children, not usefully engaged; family supported by income independent of his labor; (5) men not included in any other description in this or other classes; (6) unskilled laborer.

CLASS II. (1) Married man or father of motherless children, usefully engaged, but family has sufficient income apart from his daily labor to afford reasonable adequate support during his absence; (2) married man, no children, wife can support herself decently and without hardship; (3) skilled farm laborer engaged in necessary industrial enterprise; (4) skilled industrial laborer engaged in necessary agricultural enterprise.

CLASS III. (1) Man with foster children dependent on daily labor for support; (2) man with aged, infirm, or invalid parents or grandparents dependent on daily labor for support; (3) man with brothers or sisters incompetent to support themselves, dependent on daily labor for support; (4) county or municipal officer; (5) firemen or policemen; (6) necessary artificers or workmen in arsenals, armories, and navy yards; (7) necessary customhouse clerk; (8) persons necessary in transmission of mails; (9) necessary employees in service of United States; (10) highly specialized administrative experts; (11) technical or mechanical experts in industrial enterprise; (12) highly specialized agricultural expert in agricultural bureau of State or Nation; (13) assistant or associate manager of necessary industrial enterprise; (14) assistant or associate manager of necessary agricultural enterprise.

CLASS IV. Married man with wife (and) or children (or widower with children) dependent on daily labor for support and no other reasonably adequate support available; (2) mariners in sea service of merchants or citizens in United States; (3) heads of necessary industrial enterprises; (4) heads of necessary agricultural enterprises.

CLASS V. (1) Officers of States or the United States; (2) regularly or duly ordained ministers; (3) students of divinity; (4) persons in military or naval service; (5) aliens; (6) alien enemies; (7) persons morally unfit; (8) persons physically, permanently, or mentally unfit; (9) licensed pilots.

The men were called to duty by classes, all Class I being exhausted before Class II was called upon. The registrants were examined physically in the order of their selection; and full details regarding each catalogued with his local board to enable it to determine for what class of service he was best fitted.

Under this plan no actual exemptions for military service were granted, such exemption being replaced by deferred classification. The local board had jurisdiction in all cases except those involving employment in agriculture or industry, and appeals from its decision might be made to the district board whose jurisdiction was final except that further appeal might be made to the governor. The district board had jurisdiction also in all cases involving employment in agriculture or industry and appeal from its decision might be carried to the governor or to the President. Appeals to the President were made through the board.

On May 20, 1918, a new Selective Draft Bill was signed by President Wilson, calling upon all men reaching the age of 21 between June 5, 1917, the date of original registration, and June 5, 1918 (except those already in the military service of the United States), to register for military service. Registration took place on June 5, and on June 27 the second draft lottery, affecting these men, was held at Washington. Under the law all the new registrants went at the bottom of the classes to which they were assigned; while the order in which the number on each man's registration card was drawn determined his place in the list of additions. The total number of registrants at this time was 744,865. Registration was again held on August 24, 1918, for all men who had reached 21 since June 5, 1918.

On August 31, 1918, President Wilson signed a new Man Power Bill providing for the registration for military service of all men between the ages of 18 and 45, and proclaimed Sept. 12 as the day of registration.

On May 23, 1918, Provost Marshal General Crowder issued a drastic amendment to the Selective Service Regulations compelling any registrant found by a local board after July 1 to be an habitual idler or not engaged in some useful occupation to apply himself to some form of useful labor or be inducted into military service.

Col. Leonard P. Ayres stated in his statistical summary (*The War with Germany*, 1919): Under the Selective Service Law (1917) 24,234,021 men were registered and 2,810,296 were inducted into the military service. 'The willingness with which the American people accepted the universal draft was the most remarkable feature in the history of our preparation for war. Despite previous hostility to the principle of universal liability for military service, a few months after the selective service law was passed, the standing of the drafted soldier was fully as honorable in the estimation of his companions and of the country in general as was that of the man who enlisted voluntarily. The record of desertions from the army shows that a smaller percentage occurred among drafted men than among those who had volunteered.' Under the first and second registrations (21 to 31 years) 10,679,814 registered and 2,666,867 were inducted into service; under the third registration (18 to 45 years) 13,228,762 registered and 120,157 were inducted; from Alaska, Hawaii, and Porto Rico (18 to 45 years) 325,445 were registered and 23,272 were inducted into service.

England and United States have prescribed compulsory military service only in case of war. Peace time conscription for some form of military training is almost universal except for these two nations and those disarmed by the peace conference.

Draft Treaties were entered into, during the World War, by the United States and certain of her Allies, whereby the men of draft age residing in an allied country might be drafted into the army of that country if they did not return, within a prescribed period, to their own country. Thus, an American, subject to draft and residing in England, might register there, and if his number was drawn, might join an American training camp either in England or in France. Failing to do this, he was subject to British conscription. Similarly a British subject liable to conscription might be drafted into the U. S. Army upon failure to return for service to Great Britain.

A special agreement was made between the United States and Canada, also, with reciprocal provisions practically identical with those in the treaty with England. The treaties with Great Britain and Canada were ratified July 30, 1918. It is estimated that they affected 54,000 Americans, including 36,000 in Canada; 250,000 British and 60,000 Canadians in the United States were also affected. Similar treaties were in force between the United States and France, the United States and Italy, and the United States and Greece.

See ARMY; MILITARY AGE; MOBILIZATION; EUROPE, GREAT WAR OF.

Consecra'tion is the formal dedication of something to God. The belief that places, things, and persons can be made sacred belongs to primitive religion, and is found in some form in all religions.

Among Christians the word consecration describes—(1) the ordination of bishops. The Nicene Council required the ceremony to be performed by not less than three bishops. This rule is maintained by the Church of England. Among Roman Catholics the Pope may license consecration by one bishop and two priests. (2) The hallowing of the elements in the eucharist, by the words of institution, according to Roman Catholics and Anglicans; by the invocation of the Holy Spirit, according to the Greeks. (3) The dedication of churches; first mentioned by Eusebius. The rites, originally very simple, have become long and elaborate in the Church of Rome. In the English Church that most generally used was drawn up by the Anglican episcopate in 1712. In the American Episcopal Church a form was appointed in 1799. (4) The benediction of abbots and abbesses according to forms prescribed in the Roman Pontifical. (5) The consecration of altars, chalices, and patens by the bishop with or without the chrism or hallowed oil.

Consec'utive, in music, is a term applied to recurring intervals, especially fifths and octaves. The rules of harmony forbid consecutive octaves and perfect fifths in part writing, though there are exceptions in modern music.

Consent, in the law of obligations, denotes a free and deliberate intention of undertaking a legal duty. Consent may be disproved by evidence that the party bound was incapable of understanding the nature of the transaction or of appreciating its effects on account of extreme youth or mental infirmity, or that he was laboring under an essential error, or was the victim of a fraud, or that he was compelled by force or threats to comply with another's wishes. See OBLIGATION.

Conservation Association, National. See NATIONAL CONSERVATION ASSOCIATION.

Conservation Movement. A phrase brought into general use to express foresight, restraint, and social or governmental control in the exploitation of the natural resources of wealth as necessary for the perpetuity of civilization, and the welfare of present and future generations; also the measures necessary to secure such foresight and restraint. The 'natural resources' here in view correspond closely to 'land' as defined by the classical economists, and include the earth's surface, with the forests and other vegetable crops upon it; the mineral deposits underneath it; the waters upon and underneath it; the agricultural elements of the soil; and the wild life of land and sea. With the advance of population and civilization the rate at which man uses up the resources of the earth has increased. In some cases, as that of ore deposits, these are fixed in amount, and use decreases them; while in others, as in that of timber, they are continually renewed, and their decrease or increase depends on the rate of use. In a third class, represented by water power, the resource is not an accumulation, but is supplied at a fairly uniform rate, and must be used at this rate or let go to waste, storage being possible only to a limited extent.

Soil is not a fixed resource, as it is constantly renewed by the action of air, water, and plant growth on the rocks of the earth's crust. Tillage, however, may both use it up and waste it much faster than it can be made. Crops take away the soluble minerals, which have to be replaced by fertilization, and the rains wash the soil into the rivers, which carry it seaward. The immediately arable land throughout the world has been largely occupied; but unavailable land is being made available by deforestation, irrigation, and drainage. Intensive methods of cultivation, also, may greatly increase the yield even of fertile fields. There is a net plant-food deficit of 5¾ billion pounds annually in American soils it was estimated by the American Agricultural Chemical Company. American farm land yields a very low average product when compared with that of Europe.

The water as a source of food has been little drawn upon. Fish will be eaten more and more as population increases; the supply can be increased by propagation, and the quality improved by breeding.

The problem of fuels and of sources of power is in reality one. The use of the former to raise temperature is only a special case of power utilization. Water power in connection with electric power transmission plays a large part in the world's industrial life, and like the winds it is continually renewed, only its rate of availability being limited. The great water powers of the earth have hardly begun to be utilized. Tidal power may some day be made available through a perfected storage battery. Experiment has also been made with wave motors; but these simply utilize wind power through intermediate agency.

Fuel power is dependent on accumulations in great forests, beds of peat and coal, and deposits of petroleum and natural gas. All these are but temporary sources of power. Coal may be conserved by the use of powdered coal and of inferior grades, use of forced draft in furnaces, improvements in smelting methods, the use of central heating plants, the use of gas engines instead of steam engines, and larger use of water power. Aids to oil conservation are (1) cracking and hydrogenation of gasoline resulting in the recovery of a larger percentage of gasoline in the crude oil and (2) by unit production for each oil dome. An impressive object lesson in unit operation was furnished by Kettleman Hills, California. A comparison with the unrestrained flood of oil from the east Texas field, which had to be controlled by martial law, should teach the value of coöperation in oil production.

Gas can best be conserved by keeping it underground and piping it to its destination as was done in piping gas from the Texas Panhandle to Denver, to Kansas City, and on toward Chicago.

Forests constitute a self-renewing resource, like the food crops, and are now chiefly valuable for materials of construction. In America they are being used up faster than they can be renewed, and renewal is hindered by the wasteful way in which the timber is gathered. Instead of making the forest a constant source of timber and revenue, as in many parts of Europe, it has been generally cut off all at once in such a way that no useful crop is likely to take its place. Originally the United States had 822,000,000 acres of virgin forest. Only about two-thirds of this area was forested in 1934 and only 125,000,000 acres were in virgin forests. Consumption of lumber was three times greater than the forest growth. The adoption of scientific methods of forestry can remedy this. In 1934 the U. S. Government had in national forests about 25 per cent of all the nation's potential commercial timber lands. Among great enterprises in reforestation were: in Russia, an undertaking involving 100,000,000 acres; in Great Britain, the work of the Forestry Commission, the premier landowner in the isles (about 1,000,000 acres); in Chile, the reforestation of its central region after the alarming drought of 1934; in the United States, reforesting of 20,000,000 acres following the drought of 1934, which visited over half of the nation's agricultural area. (See FORESTRY.)

Rivers as trade routes were formerly of high importance. Conservation restores much of their value, through deepening of channels by dredging, or by damming to create successive slack-water pools (canalization), with incidental development of water power; and through equalization of flow by forestation and storage, with proportionate decrease of flood losses and increase of water power. It may here be noted that, generally speaking, the conservation of water for potation, transportation, sewerage, and power alike require uniformity of flow; but for irrigation in a temperate climate the flow should be concentrated in the growing season. The orderly adjustment of these conflicting needs should be the aim of public policy. Canals should be considered as connecting links in the system of natural waterways.

Wild animals injurious to man will doubtless be systematically destroyed. Some domestic animals, useful in the past as power sources, will largely lose such usefulness. Others, preserved for food, such as cattle, sheep, swine, fowls, etc., must be fed, and the problem of their food supply is the same as that of man's. Æsthetic and scientific motives will insure the preservation of many wild species in refuges where primal geographical conditions may also be artificially perpetuated behind legal barriers. The lingering fondness of man for the ancient sports of hunting and fishing, and the commercial values of many wild animals and birds for furs, food supply, destruction of harmful insects and other human uses, will conserve the untamed life of the earth.

Conservation has been briefly and pithily defined to be 'utilization with maximum efficiency and minimum waste.' Gifford Pinchot (q. v.) has outlined the movement as standing for development, for use of substitutes for exhaustible resources, for prevention of waste, for control against natural calamities, for perpetuation and renewal, for progressive and cumulative conquest of nature. It means, he declares, 'the greatest good to the greatest number for the longest time.'

The natural resources that are the subject of conservation—the forests, the streams, the soil, the wild life, and the minerals—are mutually interdependent. Waste or conservation of one of them begets waste or conservation of the others. Utilization of water power means delayed exhaustion of coal, peat, firewood, and fuel oil. Larger production of aluminum means lesser need of tin; larger use of asphalt, lesser need of wood; and so on. Enlargement and preservation of forests, planting of wood lots, and lining of highways with trees increase stream flow and provide wild life refuges. Birds that come to live in planted groves and orchards befriend the trees and other plants by devouring the insects that harm and destroy them.

Effect of the World War upon Conservation.—A calamity involving widespread destruction of one species influences other species favorably or unfavorably. Man himself is within the law.

The World War's waste of human life and cessation of trade and intercourse affected not only all mankind, near and remote, but plant, animal, and mineral resources, close at hand and far away. When forty thousand foresters fought each other across the trenches, forestation ceased, and gunfire mowed down not only the foresters, but their carefully cultivated groves. Within each belligerent country the strain evolved new and more extensive control of natural supplies. Unusual toll was taken from American minerals. The cutting off of trade lessened the demand for furs from the Canadian Northwest and fish from the Newfoundland Banks. The loss of potash imports from Germany developed kelp harvesting along the shores of California; and the cutting of the kelp in turn produced problems not only of its own conservation, but of the preservation of bathing beaches and the protection of marine fishes. These are but a few instances in a thousand of the World War's significance relative to conservation.

United States.—The Conservation Act of 1891 was the first provision for a comprehensive administration of government-owned natural resources of the United States. It authorized the President to set aside public lands and to provide for their administration as national forests in order to conserve timber, watersheds, water flow, and grazing forage for livestock. Theodore Roosevelt's administration was notable for the conception of an organized movement to coördinate all forces for conservation of the nation's natural resources. Among wide-reaching conservation activities prior to 1908 were: the reclaiming and settling of arid public lands in the West from 1902; creation of an adequate forest policy, and the placing of the national forests under the administration of the Forest Service (1905); the creation of a Public Lands Commission for the systematic study of the Federal land laws, and the recommendation of administrative and legislative reforms (1903–5); the control of grazing in the national forests under a fee system (1905); the adoption and enforcement of a system of water-power leases in the national forests (1906); the withdrawal from private appropriation of water power sites on public lands outside the forests (1908–9); the drafting of legislation for the legal separation of the surface of public lands from the underlying deposits of coal, oil, gas, and asphalt (1907); the withdrawal of coal lands from sale in aid of this proposed legislation (1906); and the creation of an Inland Waterways Commission (1907).

The conservation measures of President Theodore Roosevelt's administration were based upon the need for rational public control of natural resources—by the Federal Government where ownership of the public lands or control of navigable rivers gave it jurisdiction; by the State governments where private property must be regulated through the exercise of the general 'police power.'

It remained to coördinate all efforts toward this common end, and to enlist the coöperation of the States. In 1907 the Inland Waterways Commission suggested to the President a conference for this purpose, to be composed of all State and Territorial governors, with delegates appointed by each of them, and representatives of national organizations interested in the subject. This 'White House Conference' met in Washington in May, 1908. It heard and discussed papers by competent experts concerning the several resources; adopted resolutions strongly endorsing the proposed policy, and recommended the creation of State and Federal conservation commissions to devise means of coöperation.

In response to this recommendation President Roosevelt created the *National Conservation Commission,* consisting of forty-nine well-known publicists, scientists, and industrial leaders. In 1908 and 1909 more than ninety similar commissions were appointed by governors of States and national societies. The National Commission, assisted by expert Federal officials, made an inventory of the nation's resources. Its report was endorsed at Washington (Dec. 8–10, 1908) by a Joint Conservation Conference composed of governors and governors-elect or their representatives, members of 26 State commissions, and representatives of 60 national organizations. When the activities of the National Commission were suspended its functions were taken over first by a Joint Committee on Conservation, and then by the *National Conservation Association,* supplemented by the *National Conservation Congress* as a forum for annual public discussion. On the invitation of President Roosevelt, delegates of the United States, Canada (with Newfoundland), and Mexico met at Washington on Feb. 18, 1909, and adopted a comprehensive declaration of principles.

The conservation measures and propaganda of that Roosevelt administration aroused the hostility of many private interests, and the opposition of certain Government officials and bureaus. At the outset of President Taft's administration, Secretary of the Interior R. A. Ballinger (q. v.) annulled certain of the water-power withdrawals, and stopped the practice of withdrawing small tracts in national forests for administrative use by forest rangers. In August, 1909, Louis R. Glavis, a chief of field division in the General Land Office, in charge of the investigation of land frauds in Alaska, submitted charges that Secretary Ballinger and his subordinates had unduly favored the patenting of thirty-three fraudulent coal claims in Alaska, known as the 'Cunningham Group.' (See ALASKA, *History.*) President Taft exonerated Secretary Ballinger and his subordinates from the Glavis charges, and ordered the dismissal of Glavis and Gifford Pinchot (q. v.), chief of the Division of Forestry. A prolonged investigation by a joint committee of the U. S. Senate and House of Representatives followed, which eventually exonerated Ballinger. Not long thereafter he resigned, and was succeeded by W. L. Fisher, a straight-out conservationist. Secretary Fisher disallowed the Cunningham claims.

The conservation commissions of 1908 and 1909 were organized as non-official or voluntary deliberative bodies. The National Conservation Congress held annual sessions in such large cities as Seattle, St. Paul, Kansas City, and Indianapolis. Its meetings kept interest in the movement alive, although the programmes and addresses wandered somewhat from strictly conservation subjects. The meeting in Washington in November, 1913, five years after the original White House conferences, at which 1,400 delegates were present, dealt with the question of water power. Distinguished engineers represented national societies of their profession. There was a lively contest between the advocates of State control and the advocates of Federal control of water rights, which the nationalists won. The Congress issued a declaration of water power policy designed to influence Federal law making.

The conference of the Governors of the States, instituted by President Roosevelt, has become a feature of American Government. This House of Governors, so called, meets each year. Other subjects than conservation, however, have mainly occupied its attention. (See GOVERNORS, HOUSE OF.)

National organizations devoted to special lines of conservation or to occupations affected by it have helped powerfully to shape the movement. Among these are the American Forestry Association (q. v.), organized in 1875, with a membership (1933) of about 15,000 extending to every State of the Union and every province of Canada. The American Game Protective and Propagation Association, organized in 1911, with a membership of about 50,000, promotes and sponsors legislation; aids State and Federal Governments, associations and individuals with game and fish problems; conducts annual American Game Conferences;

and publishes *American Game,* monthly, and *Transactions* of conferences. The American Nature Association, organized in 1922, with a membership of 115,000 students, teachers, and others, conducts campaigns for the protection of wayside beauty; publishes *Nature Magazine,* monthly, *Nature Almanac,* and *The Roadside Bulletin.* The American Tree Association, organized in 1923, with a membership of 200,000 persons interested in promoting the planting of trees, publishes *Forestry Almanac, Forestry News Digest, Tree Planting Book,* etc. The Association of State Foresters, organized in 1920, promotes coöperation between the various States in forestry matters. The National Shade Tree Conference, organized in 1924, with a membership of 200 tree experts, studies problems of control of diseases, insects, and care of trees. The Society of American Foresters, organized in 1900, with a membership of 1,800 professional foresters employed by the State or nation, conducts research in forestry problems and publishes the *Journal of Forestry.* The American Fisheries Society, organized in 1870, with a membership of 700 conservation officials and others interested in conservation, about half of the members being State or Federal officials and employees, has divisions of fish culture, aquatic biology and physics, commercial fishing, angling, legislation and protection, and publishes *Proceedings* of its annual meetings. The Game Conservation Society, organized in 1912, has a membership of 300, founded the Game Conservation Institute (Clinton, N. J.) to provide knowledge in production and management of game birds, and publishes *Game Breeder;* it transferred its Institute to More Game Birds in America, Inc. in 1932. The International Association of Game, Fish and Conservation Commissioners, organized in 1902, has a membership of 100 conservation officials representing 34 states; it publishes *Proceedings* of its annual meetings and promotes the conservation of wild life. The Izaak Walton League of America, organized in 1922, has a membership of 100,000 interested in the improvement, protection, and preservation of America's outdoors; has a full-time clerical staff with headquarters in Chicago; publishes *Outdoor America,* monthly. More Game Birds in America has a full-time office staff with headquarters in New York, a training school for game keepers, works to increase the game birds and maintains a collection of statistics, laws and information on game management. The National Association of Audubon Societies, organized in 1905, has a membership of 10,000, a headquarters staff in New York, a field staff of lecturers; actively supports legislation to protect birds and wild life; protects breeding places of water birds; conducts educational campaigns in schools; and publishes *Bird Lore,* monthly, and books and pamphlets. The National Shell-Fisheries Association, organized in 1909, has a membership of 70 State shellfish commissioners, state and Federal officials, chemists, etc.; meets annually; and has committees on culture, legislation, inspection and hydrography. The American Association of Petroleum Geologists, organized in 1917, with a membership of 2,500 professional geologists (100 government employees), maintains a staff with headquarters at Tulsa, Okla. The Association of American State Geologists, organized in 1908, is composed of the heads of State geological surveys. The Oil States Advisory Committee, organized in 1932, is composed of 9 representatives, 1 from each of the oil-producing States, coördinates efforts to conserve natural petroleum resources and to prevent over-production of oil. The National Drainage, Conservation and Flood Control Congress, dating from 1911, has a membership of 200 engineers, drainage officials, etc., interested in conservation.

On the side of conservation should be mentioned the great work of numerous schools of forestry, mining, engineering, biology, chemistry, agriculture and other conservation sciences in American universities. An interest in conservation is part of the training of the Boy Scouts of America (q. v.). Arbor days and bird days observed in the schools of various States are educational in character.

Parallel with this widespread influence of voluntary societies and institutions of learning is the mightier practical work of Federal and State administrative officers, boards, and commissions under growing legislative interest in Federal and State resources. Long before the historic conservation conference of 1908 there were Federal Departments of the Interior and of Agriculture charged with conservation duties. The important work of the U. S. Geological Survey (q. v.), begun in 1879, has been in progress on an increasing scale. Likewise, long before the appointment of the non-official and merely advisory conservation commissions by the governors of the various States in 1908 and 1909, the States had their administrative fish and game departments, forestry boards, geologists, and other like functionaries. These, if nothing else, had been laying broad foundations of knowledge as a basis for conservation surveys and work. The national conservation movement put new life into them, increased their number, and charged them with genuine and important conservation tasks.

One drawback to the effectiveness of State conservation has been the division of the work among numerous official bodies or single officers created independently of each other and in haphazard fashion from time to time in the process of each State's development. To illustrate, one State, besides a purely advisory and unpaid Conservation Commission, had a State Park Board, State Board of Forestry, Geological and Natural History Survey, Canal Commission, Commissioner of Public Lands, Commissioners of Fisheries, and a Fish and Game Warden, in addition to half a dozen officers and boards charged with separate agricultural interests. A few States have accomplished the difficult task of combining and coördinating these independent offices.

Among the important conservation measures enacted by Congress since 1909 were: the act for reservation by the Federal Government of the mineral contents of public lands upon their entry for cultivation (1910); the treaty with Canada regulating the use of the waters of Niagara (1910); the creation of the Appalachian and White Mountain forest preserves (1911); the creation of the Federal Bureau of Mines (1911); the Federal migratory bird law (1913); the Alaskan railroad and coal leases acts (1914); the law providing for recreation camps in the national forests (1915); and the migratory bird treaty with Canada (1916).

Up to 1920 the Government had allowed its citizens to acquire complete title to lands in the public domain including mineral deposits. The Act of Congress of Feb. 25, 1920 provided that public lands containing coal and oil must be operated under government lease and regulation. This expressed a new policy for the disposal of public lands. On June 4 of that year the Secretary of the Navy was authorized to administer oil reserves either directly or by lease—a new policy authorizing the government to *produce for use.* On June 10, 1920 the Federal Power Commission was created with authority to license private operations, 'reserving the right of the United States or any State or municipality to take over, maintain, and operate any project licensed under this Chapter at any time, by condemnation proceedings upon the payment of just compensation.' Carrying out the provisions of this Act, under the Tennessee Valley Authority, created in 1933, the U. S. Government took over the operation of the Muscle Shoals power plant, for the purpose of generating, distributing and selling electric current and manufacturing and selling fertilizer. In doing this Congress resorted to its power to provide for the general welfare and the courts concurred in this. The exercise of such broad powers by the government was called forth by uneconomic practices by private owners. A similar project was started on the Columbia River in the Northwest.

Conservation activities under the U. S. Department of the Interior had assumed gigantic proportions by the end of the Hoover administration. The Reclamation Service, within that Department, on June 30, 1933, was custodian of a reclamation fund of $155,898,434 for irrigation projects in the West. There were 35 of these projects, irrigating 2,769,605 acres and growing crops valued at $50,158,381 a year. The Reclamation Service develops these projects which afterwards return the money, to be put into new projects. Irrigation of Los Angeles district in California by diverting the Owens River (250 m. distant); the control of Colorado River at Boulder Dam, and of the Columbia River in the Oregon-Washington region are among the greatest works of the Reclamation Service.

In 1931 it was stated by the Secretary of the Interior that one-fifth of the world's oil reserves are under the soil of the United States, and he further declared that if the country did not correct its wasteful methods of producing this fuel, it would be the first oil-producing nation to be without oil. Efforts to restrict production met with little success.

Early in Franklin D. Roosevelt's administration legislation provided for a Civilian Conservation Corps to help protect, develop and perpetuate existing forests; to help prevent soil erosion which aggravates damage from floods; to help establish new and reëstablish old forests. The work included forest improvement by building roads and trails so that fire fighters could reach and fight forest fires more quickly; cultural thinnings, culling out weak and sickly trees, etc.; the construction of erosion-control dams built along the headwaters of streams, such as the Tennessee River, the upper Mississippi, and many of the streams in the far west; the construction of telephone lines, lookout towers, airplane landing stations, bridges, etc. and the planting of trees. In 1934 a ten-year project was set on foot to plant a forest belt from Canada to Texas, 1,000 miles long, and covering 20,000,000 acres (cost about $75,000,000).

The conservation movement, like the movements for better public highways, better service of public utilities, better public health, and better labor conditions, is social in nature. It is a reaction against the old policy of the United States that has freely given away vast public domains to individuals and corporations. It is a protest and a struggle against a rapidly growing monopolistic absorption and exploitation of the country's natural resources by powerful and unscrupulous private combinations. Its primary aim is continued and enlarged public ownership as opposed to private ownership; its secondary aim is greater public control and limitation of private proprietary rights. 'The collective holding and the nationalization of certain forms of property rests upon a moral basis quite as secure as that of private ownership of property,' declared the chairman of Ontario's Hydro-Electric Power Commission.

Canada.—The eastern part of Canada contains one of the greatest forest regions in the world, consisting of mixed conifers and hard-woods. Northward is an enormous supply of pulpwood, while the western slopes of the Rocky Mountains and the Coast Range are covered with forests of evergreens ranging from 200 to 300 feet in height. East of the Rocky Mountains lie the great plains, including the Muskeg country and the Barren Grounds, abounding in fur-bearing animals, and capable of a perpetual supply under the protective regulations of the Dominion and provincial governments. Water-power possibilities in all parts of the Dominion are enormous. Coal areas are very great and other minerals are found in abundance.

Acting upon the recommendation of the North American Conservation Conference, held at Washington, D. C., early in 1909, the Parliament of Canada, on May 19, 1909, enacted a law for the establishment of a permanent Commission of Conservation of thirty-two members. The membership of the Commission was divided into two classes: (1) ex-officio, consisting of the Federal Ministers of Agriculture, Mines, and the Interior, and the member of each provincial government in Canada who was charged with the administration of the natural resources of such province; (2) appointive members, consisting of prominent business and professional men, university professors, and men who had made a special study of the various branches of natural resources.

The work of this Commission, like that of the National Conservation Congress of the United States, was purely investigative, consultative, and advisory. The discussions of its annual meetings powerfully promoted conservation legislation. It reported against the project for damming the St. Lawrence River at the Long Sault Rapids by hydro-electric promoters, and protested to the United States against increased withdrawal of water from the Great Lakes by the Chicago Drainage Canal.

In Canada, as in the United States, administrative conservation work is in the hands of active and progressive Dominion and provincial government boards, commissions, and officials. Two of the most signal conservation measures are the British Columbia Timber Act and the hydro-electric legislation of Ontario, under which a provincial commission distributes power from Niagara Falls to the cities of the province at cost.

See Forestry; Inland Waterways; Irrigation; Reclamation of Land; Water Power.

Bibliography.—For the Inception of the Conservation Movement, consult Inland Waterways Commission's *Report* (1908); *Proceedings* of the White House Conference (1908); National Conservation Commission's *Report* (3 vols., 1909); *Hearings Before the Joint Committee for the Investigation of the Department of the Interior . . . and of the Bureau of Forestry* (7 vols., 1910); G. Pinchot, *Fight for Conservation* (1910); C. R. Van Hise, *The Conservation of Natural Resources in the United States* (1910).

For the History and Progress of Conservation since its inception consult national and State government documents such as the annual reports and occasional bulletins of the U. S. Department of the Interior, of State conservation commissions, and of other State commissions, boards, or officials, charged with conservation interests. The latest State documents may be located by means of the Monthly List of State Publications, issued by the Congressional Library, which also has a select list of references on conservation prepared in 1912 and supplements (1924, 1934). The *Proceedings* of national societies enumerated above have been published in annual series. The annual volumes of the *American Year Book* and of the *Canada Year Book* record current progress. Special mention may be made of *Game Laws* issued by the U. S. Department of Agriculture; *Report* of the Western States Water Power Conference, Portland, Ore. (1915); publications of the U. S. National Park Service (Interior Dept.); the Canadian Conservation Commission's annual *Reports* (1910–1919) and *The National Domain in Canada, and Its Proper Conservation* (1915).

Consult also H. H. Bennett and W. R. Chapline, *Soil Erosion a National Menace* (U. S. Dept. of Agriculture, Circular No. 33, 1928); J. Cameron, *Development of Government Forest Control in the United States* (Institute for Government Research, Studies in Administration, 1928); W. N. Logan, *Conservation* (1927); D. H. Smith, *The Forest Service* (Institute for Government Research, Service Monographs of the U. S. Government, No. 58, 1930); G. W. Stocking, *The Oil Industry and the Competitive System* (1925); R. L. Wilbur and W. A. Du Puy, *Conservation in the Department of the Interior* (1931); E. W. Zimmermann, *World Resources and Industries* (1933).

Conservation of Energy. See Conservation of Matter.

Conservation of Matter. The axiom that the matter in the visible universe, as measured by its weight or mass, is invariable in amount is the foundation of the science of chemistry. It is also implicitly assumed in all affairs of life. In other words, matter, however much it may alter its appearance and many of its physical and chemical properties, can neither be destroyed nor created, but remains conserved throughout all its changes. When water evaporates it appears to lose in weight; but if the steam, instead of being allowed to escape, is weighed with the water, there is found to be no loss in weight at all. When a candle burns, it appears to lose in weight, but that is simply because the products of combustion are allowed to escape. If the candle and the oxygen with which it combines in burning are weighed together beforehand, and the products of combustion (mainly water and carbonic acid gas) are weighed together afterward, it is found that the two weights are exactly equal.

This principle was first enunciated by Antoine Lavoisier (q. v.) about 1780, on the results of his own and previous workers' experiments; and though tested by innumerable investigations since that date, no deviation from its truth that is beyond the limits of experimental error has yet been established. Though no particular experiments can demonstrate the universality of this generalization, its validity has a strong confirmation in the fact that since historical times the length of the year has not varied, showing that, in spite of the enormous chemical changes that have taken place in the earth and sun, their masses have not appreciably altered.

Within the last eighty years another similar principle, known as the ***Conservation of Energy,*** has come to the front; and although the apprehension of its significance is more difficult than in the case of the conservation of matter, its recognition and application all through the sciences has been among the most important factors in the progress of recent thought. Every change which takes place in the visible universe means a transformation of energy from one form into another, but it is simply a transformation without any destruction or creation of energy. The principle unifies in a remarkable way all the activities of the world we live in. Mass motions, molecular motions, chemical reactions, vital growth, are all subject to the laws of energy. No scientific observation has ever been made inconsistent with its truth; and its value as a guide in research has been repeatedly demonstrated in the recent advances of science. See Energy; Thermodynamics.

Conservative. See Tory.

Conservative Brethren. See Dunkards.

Conservator, a title applied in England to the guardian of a river and the curator of a museum. Formerly there were 'conservators of the peace' in that country, answering to the modern justices of the peace, appointed to maintain order and police supervision in their counties. These officials date back into the 12th century. In Scotland there was a 'conservator of the realm,' whose duty it was to settle disputes and safeguard the rights of Scottish merchants.

Conserv'atory (mediæval Latin *conservatorium,* Italian *conservatorio,* French *conservatoire*), a school for the cultivation of music and its allied branches. Originally, in Europe, the conservatory was an asylum wherein poor and orphaned children were taught music; later, paying outside students were also admitted. Vocal and instrumental music, declamation, and modern singing languages are taught in present-day conservatories, while a few give general culture courses.

Naples, the birthplace of the conservatory, possessed a noted school for music as early as 1496. The first Conservatorio there, that of Sta. Maria di Loreto, was founded in 1537, and three others by 1600, all for boys only. That of Sant' Onofrio is most famed, on account of its great teachers, A. Scarlatti, Durante, Leo, and Porpora. Two of these Naples conservatories closed, and Murat in 1808 consolidated the others into the Collegio Reale di Musica. Venice also had four of the earliest conservatories, all for girls; with the death of the republic these were suspended. Palermo has the next oldest, dating from 1615; in 1807 Eugène Beauharnais founded the Regio Conservatorio di Musica at Milan; the Bologna school, founded also in 1807, is marked by its superb library; and the Rossini at Pesaro (established 1882) was endowed by that composer with 2,300,000 lire ($440,000).

The leading music school of the world is the Paris Conservatoire, with eight affiliated bodies in French cities. Admission is by competitive examination, and the teaching is gratis. Its *Prix de Rome,* giving three years' study in Italy, is the grand hope of every student, and has been won by nearly all important French composers, most of whom later became professors at the Conservatoire. It has had but seven heads since its foundation as an opera singers' school in 1784 by Sarette, who became its first director. Suspended in 1793 by the Reign of Terror, it reopened two years later, absorbing a military-music school. Under Cherubini (1822–42) and Auber (1832–71) it was the foremost conservatory in Europe.

In 1843 Mendelssohn and Schumann established in Leipzig a Conservatorium primarily instrumental, all others being primarily vocal. It was long the Mecca of students, and a model for other such schools; among many renowned directors were Moscheles and Reinecke. The oldest of such schools in Central Europe, however, is at Prague (1810). That of Vienna, started in 1817 by Salieri as a singing school, was equipped for instrumental music and named Conservatorium in 1821. That of Brussels was renamed in 1832 from the École Royale de Musique (1821), and had the great Fétis at its head (1833–71). Most of the leading Flemish and Dutch cities have able conservatories. The immense Berlin Hochschule began with a school for composition in 1833, which under Joachim added instrumental features (1869–74); in 1875 it was made a department of the Royal Academy of Arts. Warsaw's conservatory dates from 1821; Leningrad's (1862) is illustrious for a line of world-famed teachers, including Rubinstein, Wieniawski, and Tschaikovsky; Moscow's was founded by Nicholas Rubinstein (1864).

England's Royal Academy of Music was founded in 1822 by John Fane, earl of Westmorland, and was incorporated in 1830. The Royal College of Music was begun by Sir Arthur Sullivan in 1876 as the National Training School of Music; Sir George Grove (1883–94) was the first head under its present name. The London Academy of Music dates from 1861; Trinity College Conservatory from 1872; the Guildhall from 1880.

The great musical uplift in the United States began just after the Civil War. The New England Conservatory of Music in Boston and the Chicago College of Music both date from 1867; Peabody Conservatory in Baltimore from 1868; the Cincinnati College of Music from 1878. In New York City, the National Conservatory of Music (a corporation), of 1885, had Dvořák for its head; best endowed in the country is the Institute of Musical Art (1905); the noted Guilmant organ school was begun in 1898. Several leading American universities have musical departments.

Conservatory, in horticulture, as generally understood, is a glass house set apart for the display of plants, rather than for their propagation and continuous culture. A conservatory should be well provided with means of ventilation, otherwise healthy plant growth is impossible. The glass used for a conservatory should never be less than 21 ounces to the square foot; the roof may consist of frosted or clouded glass. The aspect, where choice is permitted, should be south or southwest; and in summer, shelter from the hot sun must be afforded, preferably by means of roller blinds. The most satisfactory method of heating a conservatory is by hot water driven by a good boiler through a sufficient quantity of pipes. See GREENHOUSE.

Consett, town, Durham, England; 12 miles N.W. of Durham. It has large iron works and collieries. Pop. (1931) 12,251.

Conshohocken, kon-shō-hok'en, borough, Montgomery county, Pennsylvania, on the Schuylkill River, and the Pennsylvania and Philadelphia and Reading Railroads; 13 miles by rail N.W. of Philadelphia. It has cotton, woolen and steel mills, boiler shops, foundries and stone quarries. Pop. (1930) 10,815.

Considérant, kôṅ-sē-dä-rän', VICTOR PROSPER (1808–93), French socialist, was born in Salins, Jura. Early becoming imbued with the socialistic doctrines of Fourier (q. v.), he quitted the army (1830), and founded several Socialist colonies, all unsuccessful. On the death of his master (1837), Considérant became the head of his school, and undertook the management of the *Phalange*. In 1848 he was elected to the National Assembly, but in the following year was accused of high treason, and was compelled to flee to Belgium, and afterward to the United States. Here he founded La Réunion community, near San Antonio, Tex.; but the Civil War ruined it, and Considérant returned to France. Among his works are: *Destinée Sociale* (1851); *Manifeste de l'Ecole Societaire Fondée par Fourier* (1841); *Exposition Abrégée du Système Phalanstérien de Fourier* (1845); *Principes du Socialisme* (1847). Two of his works—*The Last War* and *The Difficulty Solved*—have been translated into English. Consult *Lives* by Coignet; P. Collard (in French).

Consideration. Every contract not under seal requires a consideration to support it, that is some benefit to the promisor or loss or detriment to the promisee. A consideration is something done, forborne, suffered, or promised to be done, forborne or suffered by promisee in respect to the promise. It is not essential that the consideration shall flow direct from one party to the other; there must, however, be some benefit flowing to the obligor which he would not have received but for the contract. It is in effect the price bargained and paid for a promise. Consideration may be sufficient if the act to be performed is not obligatory, since it is a legal detriment irrespective of whether it is an actual detriment or loss to him.

Sufficient consideration also exists if the promisee foregoes some advantage or benefit or parts with a right which he might otherwise exert. The surrender of a claim against an insolvent person, if such person is living, is a sufficient consideration to support the promise of a third party. The relinquishment of an invalid claim or forbearance from suit without any request to forbear or circumstances from which an agreement to forbear may be implied is not a consideration which will support a promise. Generally past consideration is insufficient to support a promise.

Though in some jurisdictions a moral obligation is regarded a sufficient consideration it is usually denied. However, a moral obligation insufficient to support an executory promise will support an executed transaction between natural persons acting in their own behalf. Where the moral obligation arises from the receipt of a material or pecuniary benefit it will not support a new promise to supplement a contract already performed or still enforceable. On the other hand where the legal duty has become unenforceable by operation of law a subsequent promise to perform the duty is binding. There is a conflict of authority as to the sufficiency of consideration in the case of a voluntary payment of the debt of another or the making of improvements of property without the owner's request.

To constitute a sufficient consideration to support another promise the promise must be binding. The promises must be concurrent and obligatory on both at the same time. It must be possible of performance and definite to be sufficient consideration for a counter promise. Although at common law contracts not under seal had to be supported by sufficient consideration, if not within the statute of frauds they did not have to recite consideration since that could be proved by parol (oral) evidence or may be inferred from the terms and obvious import of the contract. Consideration is not insufficient merely because it is inadequate. It need not be a thing of pecuniary value. Since the parties are deemed the best judges of the bargains entered into the relative economic value of the consideration is immaterial.

BENJAMIN WERNE, S.J.D.

Consign'ment, in the wider sense, denotes the delivery of goods to a carrier for transmission to a party in another place; this use of the word is most common in the case of over-sea transit. The party sending the goods (which are themselves commonly spoken of as a *consignment*) is called the *consignor*, and the party to whom they are sent the *consignee*. In the narrow sense, the word means the delivery of goods to a mercantile agent or factor for the special purpose of being sold by him at the best advantage.

Consis'tory (Latin *consistorium*), properly a place of assembly, but particularly applied to the privy council or cabinet of the Roman emperor. The form of the imperial consistory passed into the Christian Church. In the Roman Catholic Church the word is almost solely used in connection with the *Papal Consistory*, in which the pope presides over the college of cardinals. Lutheran consistories exercise supervision and discipline over religion and education, and examine theological candidates on their trials for license and ordination. In the French Protestant churches the consistory possesses a more restricted jurisdiction than in Germany. In England the word is used to denote the spiritual court.

Con'sole, in architecture, is a projecting stone, resembling a bracket, employed in the dressing of apertures. It flanks and seems to support the weight of the cornice and architrave, and is finished in the form of a scroll. It is a familiar feature of the richer orders. The name is also applied to the desk-like structure containing the keyboards of an organ, especially when separate from the instrument.

Consolida'tion Act is a statute which collects and arranges in orderly form all previous enactments dealing with a specific subject. The opportunity is usually taken at the passing of such acts to introduce necessary amendments into the law, to settle disputed points, and also to a certain extent to embody the results of judicial decisions. See CODE; REVISED STATUTES.

Con'sols, a contracted form of Consolidated Annuities, constitute the main portion of the British national debt. Prior to the middle of the eighteenth century great confusion had been caused in the financial arrangements of the country by the issue of different kinds of stock at various rates of interest. Between 1750 and 1757 several acts were passed consolidating these into joint stocks of annuities, the greater part of which bore interest at 3 per cent, though some were at a higher rate. The interest now given is between 2½ and 4 per cent.

Con'sonance is a combination of notes which can sound together without the harshness produced by beats. See SOUND; MUSIC.

Consonant. See ALPHABET; PHONETICS.

Con'sort is the name given in Great Britain to the wife or husband of a reigning king or queen. A queen consort, or wife of a reigning king, is always a subject of her husband, though she is entitled to certain privileges. Practice has varied with regard to the husband of a reigning queen. Philip of Spain, the husband of Mary of England, was accorded no share in the government of the country. Prince George of Denmark, the husband of Queen Anne, was a naturalized subject of his wife by act of Parliament. To Prince Albert of Saxe-Coburg, the husband of Queen Victoria, special precedent was accorded after the Queen, and in 1857 he received the title of Prince Consort.

Conspiracy is an agreement between two or more parties to do an unlawful thing in an unlawful manner. The theory of conspiracy rests on a preconceived plan to work some public or private wrong or injury by concerted action originating in a combination, either carried out in joint enterprise, or, at least, pursuant to joint agreement. The crime existed at common law but in those states which do not recognize common law offenses and the federal courts can punish only such combinations as are made punishable by statute. The elements essential to the crime are:

1. There must be a combination of two or more persons. 2. There must be a real agreement, combination or confederation with a common design; mere passive cognizance of the crime or unlawful act to be committed or mere acquiescence is not sufficient. 3. The existence of an unlawful purpose or act to be accomplished or a lawful purpose to be accomplished by unlawful means.

As in other offenses criminal intent is a necessary element. Intent however will ordinarily be inferred from the nature of the act. Although at common law the criminal offense of conspiracy is complete as soon as the confederacy or combination is formed, the rule has been modified in many jurisdictions by statutes which require that there be both an agreement and an overt act to effect the object of the agreement. Any person who takes part in the conspiracy, whether as a party to the agreement or by wilfully doing an act in furtherance of the common design is liable as a conspirator. One may be liable as a conspirator even though he is incapable of committing a crime which is the purpose of the conspiracy. Among the indictable combinations are agreements: to commit crime, to injure reputation, to deceive the public, to commit an offense against the United States, to defraud the United States, to injure or interfere with civil rights and to obstruct justice.

Although strictly speaking there is no such thing as a civil action for conspiracy, an action will lie for damages caused by the acts committed pursuant to a formed conspiracy, rather than by the conspiracy itself. An act lawful if done by an individual may be the subject of civil conspiracy when done in concert provided that there be a direct intention that injury result from the performance of such act or when its natural consequence is the prejudice of the public or the oppression of individuals. Intention to injure however is not an indispensable element of the wrong. Anyone capable of being sued who takes part in a conspiracy may be held to answer in damages. Such actionable conspiracies are a combination to induce breach of contract; to make a false representation as to the solvency of a person in order to induce credit and the fraudulent use of legal proceedings. Exemplary damages may be awarded in an action for conspiracy only against persons actuated by malicious motives.

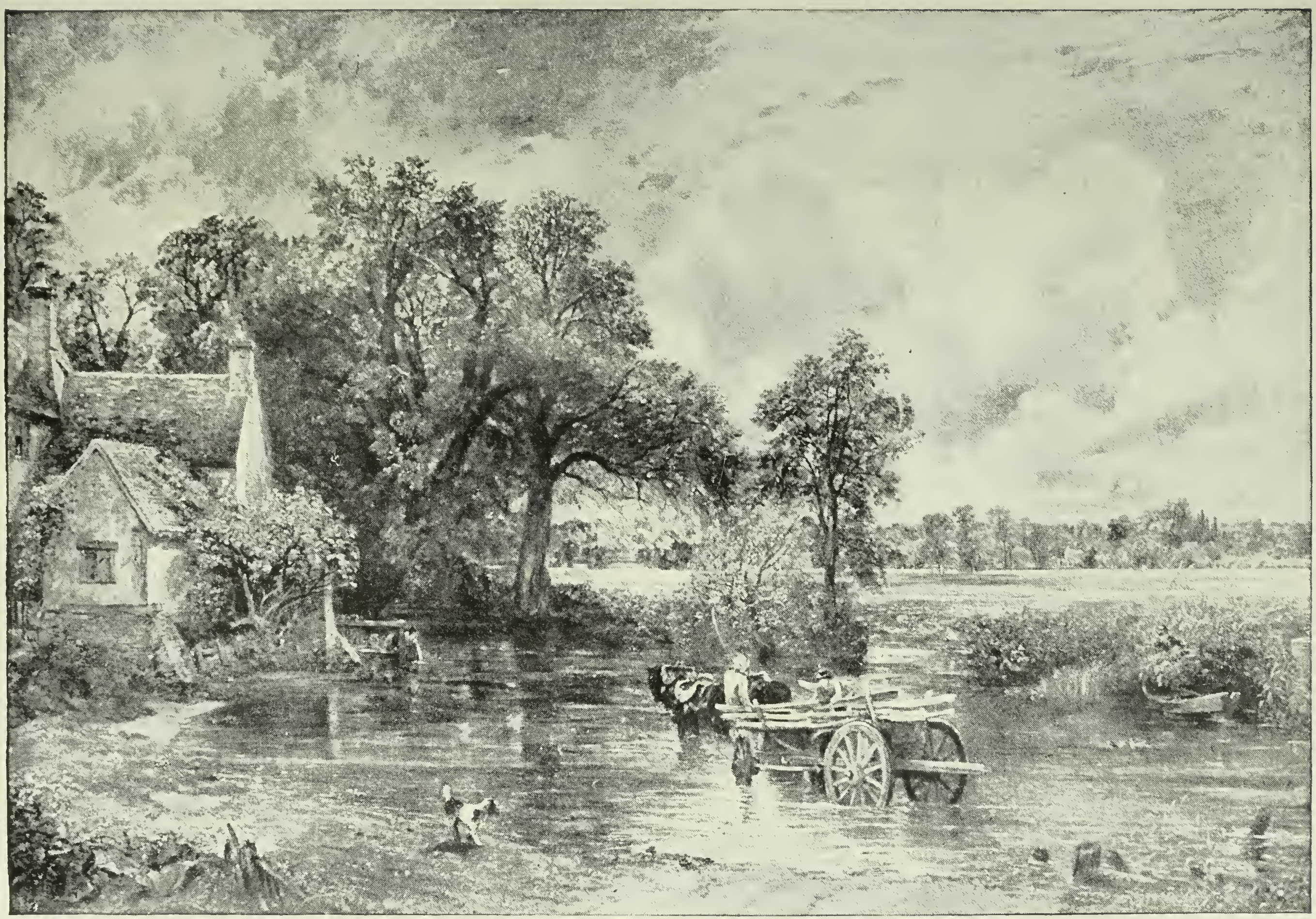
BENJAMIN WERNE, S.J.D.

Constable, kun'st*a*-b'l (Latin *constabulus*), the title of an ancient officer, originally of high military rank, but now generally an officer of the peace. The Constable or Connétable of France rose gradually in importance till he became *ex officio* the commander-in-chief of the army, the highest judge in military offenses and in questions of chivalry and honor, and the supreme arbitrator in tilts, tournaments, and martial displays. The office was suppressed by Louis XIII in 1626. Under Napoleon, the constable was the fifth of the great dignitaries of the empire. The office was again abolished on the restoration of the Bourbons.

The high constable of England appears shortly after the Conquest as the seventh great officer of the crown. The office went by inheritance to the Earls of Hereford and Essex, and afterward in the line of Stafford. When Edward Stafford, duke of Buckingham, was attainted in 1521, the office became forfeit, and has never since been granted except for a special ceremony of state.

For the police constable, see POLICE.

Constable, ARCHIBALD (1774–1827), Scottish publisher, was born at Carnbee, Fifeshire. He came first into prominence as the publisher of the *Edinburgh Review* (1802), whose contributors he paid at the then unheard-of rate of twenty-five guineas per sheet. He had a share in the publication of Sir Walter Scott's



A FAMOUS PICTURE BY CONSTABLE: 'THE HAY WAIN.' NATIONAL GALLERY, LONDON.

MAY 2

Minstrelsy of the Scottish Border and the *Lay of the Last Minstrel;* and published the greater part of Scott's novels. In 1812 the firm (Constable & Co.) bought the copyright and stock of the *Encyclopædia Britannica.* In 1826 the failure of their London agents involved Constable and his partner in bankruptcy. His last publication was his *Miscellany,* begun in 1827. Consult his *Life* by his son.

Constable, John (1776–1837), English landscape painter and leader of modern art, the son of a miller, was born in Suffolk, where he had opportunities of watching the movement of clouds, changes of wind, and play of light on water and foliage, and where he sketched them assiduously. Entering the Royal Academy schools (1799), he worked under Farington and Reinagle. At first he tried his hand at portraiture and historical pictures. A careful study of Ruysdael, however, decided the young painter to go back to his village and study from nature only; and all Constable's work testifies to his passionate, direct, and investigating temperament. His life of hard work and constant misunderstanding in London, Suffolk, and Hampstead was brightened by his marriage in 1816 to Mary Bicknell; and in 1828, on the death of her father, solicitor to the Admiralty, an inheritance of $100,000 enabled Constable to devote himself to landscape work. In 1821 he had great success with his *Hay-wain* (then titled *A Landscape—Noon*), exhibited in the Paris Salon by a French purchaser, as also by his *White Horse,* at the Lille Exhibition in 1825. Each work gained a gold medal, and the former won the enthusiasm of Delacroix. He was elected A.R.A. in 1819 and R.A. in 1829. During his later years he worked steadily, producing *Salisbury Cathedral from the Meadows* (1831); *Waterloo Bridge,* then titled *Whitehall Stairs* (1832); and *The Valley Farm* (1835). He was engaged upon *Arundel Mill and Castle* at the time of his death.

The art of Constable marks the first definite departure in the history of English landscape from the conventional treatment of the earlier painters, the breaking away from the traditions of Claude and the Dutch masters, the return to direct and personal impressions of nature. With a broad and rapid touch he renders all the force and variety of coloring that full-leafed English landscape presents. His works have now assumed their true place in the sequence of British art; and their painter is recognized as one of the foremost English landscape painters. The National Gallery has eighteen of his pictures, among them *The Valley Farm, The Corn-field,* and *The Hay-wain;* South Kensington Museum has eleven, including *Salisbury Cathedral* and *Hampstead Heath,* besides some 400 sketches. He is represented in the Metropolitan Museum, New York, by *Bridge on the Stour* and *The White Horse.*

The most important of the engravings after Constable are the mezzotint plates by David Lucas. Consult Leslie's *Memoirs of the Life of Constable;* Holmes' *Constable, and His Influence on Landscape Painting;* Ruskin's *Modern Painters.*

Constance. See Konstanz.

Constance, Council of, an ecclesiastical council (1414–18) held at Constance, called by Pope John xxiii at the instigation of the Emperor Sigismund. Its purpose was threefold: to end the great papal schism occasioned by three rival popes having been simultaneously elected; to consider the Hussite movement; and to devise much-needed measures for a general church reform. Its first session took place on Nov. 16, 1414. Sigismund, Pope John xxiii, representatives from all the monarchs of Catholic Christendom, as well as dignitaries of the church and State attended, and action in many directions was taken. The three rival popes, John xxiii, Gregory xii, and Benedict xiii were deposed after some difficulty, and Martin v was elected. John Huss and Jerome of Prague were condemned and burned. Religious unity was restored to Europe, but the authority of the pope was not diminished, and no effective reform was instituted. Consult Creighton's *History of the Papacy during the Reformation.*

Constance, Lake (anc. *Brigantinus Lacus;* Ger. *Bodensee*), a lake formed by the expansion of the river Rhine at the north base of the Alps, 1,309 feet above sea-level, between Switzerland and Austria (Vorarlberg) on the south and Germany (Baden, Wurtemberg, and Bavaria) on the north. It is evidently of glacial origin, and at one time reached much farther south. It now extends 40 miles from southeast to northwest, has a maximum breadth of 9 miles, and covers an area of 208 square miles. Its greatest depth is 827 feet. The west portion divides into two branches—the Ueberlingensee in the northwest and the Untersee in the west, the latter communicating with the main lake by a narrow channel 2½ miles in length. Bregenz, Lindau, Friedrichshafen, Constance (from which the lake is named), and Arbon are the chief towns on its shores.

Constans I., kon'stanz (321–350 A.D.), the youngest son of Constantine the Great and Fausta. In 333 he was made governor of Illyricum, Italy, and Africa, and received those provinces as his share of the empire. At the death of his father (331 A.D.) he became, with his two brothers, Emperor. His brother Constantine treacherously attacked him but was killed, and Constans became sole Emperor of the West (340), and abandoned himself to licentious indulgence. In 350 he was killed by the cavalry of a usurper to the throne.

Constant, kôn-stän', Jean Joseph Benjamin (1845–1902), French painter and writer on art, was born in Paris and studied at the École des Beaux Arts in Toulouse and under Cabanel in Paris. He exhibited early in the Salon and his *Hamlet* was bought by the French government in 1869. During travels in Spain and Morocco he began to paint Oriental subjects with sensuousness of feeling and color worked with heavy *impasto,* such as his *Prisoners of Morocco,* 1878 (Bordeaux Museum); *The Last Rebels,* 1878 (Luxembourg, Paris). His later work consists largely of mural decorations and portraits. Among his mural paintings are a ceiling in the Hotel de Ville, Paris, large dramatic panels in the New Sorbonne, and ceiling decorations in the Opéra Comique. His portraits include one of Queen Victoria, exhibited at the Royal Academy in the year of her death (1901), and others painted in England and America. There is a fine series in the Toulouse Museum. A large mural painting, *Justinian in Council,* is in the Metropolitan Museum of Art, New York. Other works are: *Sampson and Delila* (1872); *Mohammed II* (1876); *Le Jour des Funérailles* (1889). Consult Stranahan's *Modern French Painters.*

Constanta, Constantza, or Kustenji, town and seaport in the Dobruja, Roumania, is situated on the Black Sea at the eastern end of Trajan's Wall. It is Roumania's chief outlet to the Black Sea. Exports oil and cereals; imports machinery, iron goods, coal, coke and textiles. Constanta was the scene of an engagement (April, 1854) between the Turks and Russians, and in the World War was captured by the German-Bulgarian forces in October, 1916. Pop. (1937) 60,490.

Constant de Rebecque, de rebek', Henri Benjamin (1767–

1830), French author and politician, was born in Lausanne and educated at Oxford, Erlangen, and Edinburgh. In 1795, settling in Paris, he gained reputation as a publicist. He entered the Tribunate (1799), but was banished from France (1802) for having denounced the despotic acts of Napoleon, and went to Germany, where he came in contact with Goethe and Schiller. On Napoleon's fall in 1814 he returned to Paris, and during the Hundred Days was one of Napoleon's councilors of State, though previously opposed to the Emperor. He was returned to the Chamber of Deputies in 1819, and became the leader of the Opposition. Among his friends were Madame de Staël, Talleyrand, Gibbon and Kant. His political pamphlets were collected under the title of *Cours de Politique Constitutionnelle* (1817–20); his *Discours* were published in 1828, and he wrote also *De la Religion* (1824–30); a remarkable novel, *Adolphe* (1816); *Œuvres Politiques* (1875); *Letters to Madame Récamier* (1881); *Journal Intime* (1894). Consult *Life* by Ricard.

Constantine, kôn-stän-tēn' (Ar. *Ksentina*), town, Northern Algeria, Africa, capital of the province of Constantine. It is connected by rail with the seaport of Philippeville (54 miles), with Algiers (288 miles west), and with Tunis. It is situated at an altitude of 2,100 feet on a rock entirely isolated on three sides by the deep and narrow ravine in which the Rummel flows. The situation of the town is most picturesque, but hinders its development. It is in the center of a corn-growing district, and the principal native industries are tanning and the manufacture of woollen cloth. Constantine (the ancient Cirta) was the capital of Massinissa; Cæsar established the Roman colony, and Constantine the Great rebuilt the city in 312. It was taken by the French, in 1837. Pop. (1936) 113,777. The province has an area of 73,929 square miles and a population (1936) of 2,727,766.

Constantine, kon'stan-tīn, or CONSTANTINUS, the name of thirteen emperors of Rome, of whom all but the first two were rulers only of the East. The most noteworthy are:

Constantine the Great (272–337 A.D.), Flavius Valerius Aurelius Constantinus Magnus, son of the Emperor Constantius Chlorus and Helena, was born at Naissus, in Upper Mœsia. He succeeded to the throne when his father died at York (306 A.D.), but at first held only the countries beyond the Alps. His victory over Maxentius, near Rome, in 312, gave him possession of Italy; and his subsequent defeat (323) of Licinius, master of the East, in the decisive battles of Adrianople, and Chrysopolis (now Scutari), left him sole ruler of the whole empire. It was during the former campaign that he is said to have seen the cross in a vision, with the words, 'By this conquer,' and so to have been converted to Christianity. Though not baptized until just before his death, he protected the Christians; but his Christianity was rather politic than conscientious, as he retained much pagan superstition. In 330 he founded Constantinople, and made it the capital of the empire. He introduced a new system into the Roman empire, dividing the military from the civil administration, and establishing in each department officials of different grades, whose dependence on himself secured his authority. Consult Gibbon's *Decline and Fall;* Firth's *Constantine the Great.*

Constantine II., Flavius Claudius (312–40 A.D.), Constantine the Younger, son of Constantine the Great, emperor from 337 to 340. He governed Gaul, Britain, Spain, and part of Africa. In a war against his brother Constans (q. v.), to obtain the rest of Africa and Italy, he fell in battle.

Constantine VII., Flavius Porphyrogenitus (905–59 A.D.), the only son of Leo VI and Zoe. His surname means 'born in the purple,' and was given him because born in the purple chamber in which the empresses awaited their confinement. He reigned from 911 to 959, but from 912 to 944 was forced to live in retirement by Romanus Lecapenus, his usurping colleague. During his reign his troops defeated the Arabs in Syria. He is best known as an author, having left books on the *Administration of the Empire,* on *Tactics,* on *Strategy,* and on the *Ceremonies of the Byzantine Court.*

Constantine XIII., Palæologus (1394–1453 A.D.), surnamed Dragases, was the last emperor of the East. He reigned from 1448 to 1453. In his day, all that remained of the empire was the city of Constantinople, with a few coast towns and islands in Greece. The end came when the Turkish sultan Mohammed besieged Constantinople. The siege lasted from April 6 to May 29, 1453; on that day the city was stormed and the emperor cut down by the Turks.

Constantine I. (1868–1923), King of Greece, was born in Athens, the eldest son of King George I and Olga, niece of Nicholas I of Russia, and was educated by German tutors for a military career. In 1889 he married Princess Sophia, sister of Wilhelm II of Germany. He commanded the Greek forces in the Turkish War of 1897 and was severely criticized for the Greek failure, but in the Balkan War of 1912–13 won warm praise and was acclaimed a national hero. Upon the assassination of his father, in March, 1913, he ascended the throne and by his continued victories over the Turks and Bulgarians and by the treaties of London and Bucharest, greatly enlarged the area of his sovereignty. Because of his alleged German sympathies during the World War he was forced to abdicate and was exiled to Switzerland. Following the death of his second son, Alexander, who had succeeded him on the Greek throne, Constantine was recalled in 1920. He entered at once on a campaign of aggression against the Turkish Nationalists, but after several victories his army was overwhelmed by the Turks, in September, 1922. Civil and military revolts caused his second abdication (1922) and his retirement to Sicily, where he died.

Constantine, or FLAVIUS CLAUDIUS CONSTANTINUS, a British soldier who in 407 A.D. was chosen emperor by his comrades, in rivalry to Honorius. He crossed into Gaul, securing nearly the whole of that country, and in 408 was recognized by Honorius, who desired to gain his aid against the Goths. Constantinus thereupon entered Italy with a strong army, intending to depose Honorius, but was recalled by the rebellion of his own general, Gerontius. He was subsequently forced to surrender to Constantius, the general of Honorius, and was executed by Honorius.

Constantine, NIKOLAEVITCH (1827–92), grand-duke of Russia, second son of the emperor Nicholas I, and brother of Alexander II. During the Crimean War he commanded the Russian fleet in the Baltic, and directed the defensive preparations which held the forces of the Allies in check before Cronstadt. He strenuously opposed the concessions made to the allies, but throughout gave steady allegiance to his elder brother. On the outbreak of the Polish insurrection (1862), he became viceroy of Poland, was appointed in 1865 and reappointed in 1878 president of the council of the empire. After the accession of his nephew, Alexander III

General View from Galata Tower, Looking East along the Bosporus, toward the Black Sea. In the distance is Scutari.

Santa Sophia, the Most Perfect Piece of Byzantine Architecture in the World and formerly one of the Most Sacred of All Mohammedan Mosques. It was a Christian Cathedral in the days of Constantine. It is now a Museum.

CONSTANTINOPLE
(Photos by Publishers Photo Service)

(1881), he was deprived of his offices on suspicion of having intrigued with the revolutionary party.

Constantinople, officially Istanbul (since 1929), a great, historic city, formerly the capital of the Ottoman Empire, is situated at the southern extremity of the Bosporus, the strait which connects the Black Sea with the Mediterranean via the Sea of Marmora. The city stands upon two continents and consists of three towns, separated by arms of the sea. On the European side are Stambul and Galata-Pera, separated by the Golden Horn, a narrow inlet of the Bosporus, about four miles long, extending in a northwesterly direction. On the Asiatic side is Scutari.

Stambul, the real old Constantinople, occupies a peninsula studded with seven low-lying hills and presents a most picturesque appearance, with its varied architecture and gorgeous coloring. It stands on the site of ancient Byzantium and is triangular in form, with the Golden Horn on the north, the Sea of Marmora on the south, and the Bosporus at the eastern apex. The mainland forms the western boundary.

Across the Golden Horn lies Galata-Pera, connected with Stambul by two iron pontoon bridges. For many centuries Galata has been the center of the city's overseas trade. Here the banks, merchants, shipping and brokerage firms have their main offices. There is a well constructed quay and a long street running parallel with the Golden Horn. From Galata a street car line runs up along the European shore of the Bosporus.

Above Galata rises Galata tower (14th century), from which look-out is kept for fires. There are three main arteries leading from Galata to the heights of Pera: the tunnel up the steep incline with funicular belt trains; the Rue Voivoda (or Bank Street), and Yuksek Kalderim ('High Steps' Street). Pera is the 'foreign quarter,' where embassies, hotels and theatres, as well as the best stores, are located. The Rue Voivoda continues as Rue de Pera, which traverses the long ridge from the Square up to Taxim.

Scutari, which is considered a suburb of Constantinople, is on the Asiatic side of the Bosporus and is thoroughly Oriental in character. Here is a British cemetery, where many of the victims of the Crimean War (1854–5) lie buried, and adjoining this is the hospital built on the site of the old one in which Florence Nightingale performed her heroic work.

A trip by boat up the Bosporus between its picturesque palisades extends 20 miles from the Sea of Marmora to the Black Sea. Shortly after entering the main channel of the strait there appears at the left the Dolma Baghtchè Palace, with its long, ornate façade. Yildiz Kiosk, the palace darkly associated with the reign of Abdul Hamid II, and the Hamidieh Djami (mosque) may be seen high up on the hill a little farther along. The boat then passes the ruins of the Tcheragan Palace destroyed by fire in 1910. Murad V died here a state prisoner in 1902.

After passing Curutchesmeh on the European side, the buildings of the Constantinople Woman's College come into sight. This institution, founded as a high school for girls by the American Woman's Board of Missions in 1871, was reorganized in 1890 to provide higher education. On rounding Arnautkeuy Point into Bebek Bay, Robert College (q. v.) appears on the hill to the left above the old fortress built in 1452 by Mohammed II.

On the Asiatic shore is Anatoli Hissar (Castle of the Orient), companion fortress to Rumeli Hissar; it was built at the end of the 14th century by Sultan Bayezet. The suburb of Therapia on the upper Bosporus is a popular summer resort. Above Anatoli Kavak on the Asiatic shore rises Giant's Mountain, with which fantastic legends are connected. Then appear the waters of the Black Sea, spreading out from the mouth of the Bosporus.

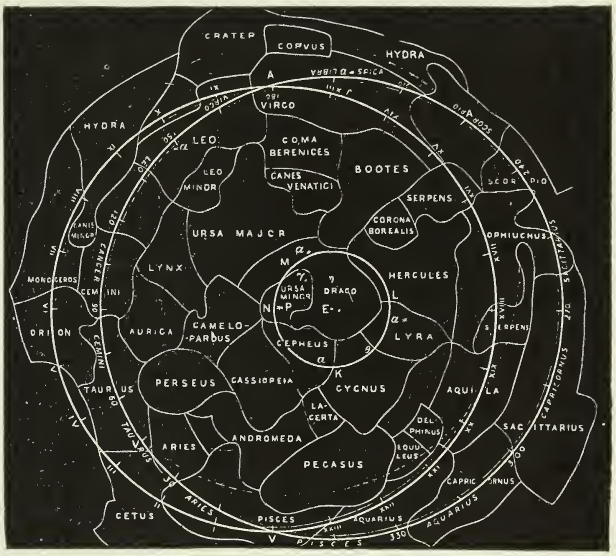
Transportation.—In September 1934, the government bought out the two French companies that held the concessions for the port facilities of Istanbul in order to take over the entire control of the port on Jan. 1, 1935. During the summer months the Turkish State Airways maintains a regular daily service between the city and Ankara.

Walls, Gates and Buildings.—The walls which formerly surrounded Stambul are now largely in ruins. The 'harbor walls,' pierced at intervals by 17 gates, stretch from Seraglio Point at the northeast to Aivan Point on the west, a distance of about 3 miles; they were built about 829–42. The sea walls extend some 5 miles from Seraglio Point to the southern extremity of the land walls, near the Seven Towers; they, too, are pierced by gates, 17 in number. The land walls, which stretch from the Golden Horn to the Sea of Marmora, include the walls of Theodosius II, the walls of Manuel Comnenus, the wall of Heraclius and the wall of Leo the Armenian. These walls are flanked by many towers and have many historic gates. The Golden Gate is a triumphal archway commemorating the victory of Theodosius I over Maximus in 388; the gate of Selivria, through which marched Alexius Strategopoulos in 1261 to complete the downfall of the Latin empire of Constantinople; and the gate of St. Romanus through which passed Sultan Mohammed when the city capitulated to the Turks in 1453.

The At Meidan (Horse Square), near Sultan Achmet Djami, is the survival of the Hippodrome of Constantine's city, and is now an attractive parkway. An obelisk was placed there by Theodosius the Great in the 4th century; it was brought from Heliopolis, Egypt. The stump of the entwined serpentine column is all that remains of a monument originally set up by the Greeks at Delphi after their defeat of the Persians at Plataea in 479 B.C. Rustem Pasha Djami is known as the 'Tile Mosque' on account of its beautiful Persian tiles. Fine mosaics and frescoes are in Kakrieh Djami, formerly the church of the Chora. The Seraglio, at the eastern end of Stambul (see Seraglio), was formerly the residence of the Turkish sultans and of the Grand Vizier (Prime Minister). From the reign of Abd-ul-Mejid it was practically abandoned for those purposes, the imperial dwelling place being moved to the palace of Dolmabaghtchè, and later to Yildiz Kiosk. Many of the buildings came into use for government purposes and as museums and schools.

Churches and Educational Institutions.—Most famous mosque in Stambul is Santa Sophia. In 1932 the work of restoring the brilliant mosaics on the walls (covered with paint and plaster when it was turned into a mosque) was begun by Thomas Whittemore, director of the Byzantine Institute of America. The mosque of Suleiman the Magnificent, built in 1550–56, the largest and most splendid of the mosques, occupies a commanding site in the northwestern part of Stambul. Its interior is decorated with lavish splendor.

Other noteworthy mosques are the Mosque of Ahmed I, just S.E. of the Hippodrome; the Mosque of Mohammed II, near the center of Stambul; the Mosque of Shak-Yadeh, delicate and beautiful in outline; the Baye-



General Plan of the Northern Constellations.
N. P. North Pole. E. Pole of the Ecliptic

zidiyeh, or Mosque of Bayezid II, with a fine courtyard haunted by myriads of pigeons; the Yeni Valideh Jami, commenced by the wife of Ahmed I and completed by the mother of Mohammed IV; the Tulip Mosque, in the western part; and the Huri Osmaniyeh Jami, built entirely of marble.

The National University, installed in the commodious buildings of the old War Office, was completely reorganized in 1933 and renamed the University of Istanbul.

Manufactures and Commerce.—The modernization of Turkey has greatly affected the always small manufacturing trade of the city, but tanneries, flour mills, match and cigarette factories are to be found. The fez was manufactured on a considerable scale, but is now forbidden.

The transshipment trade of the port continues on a large scale, its market supplying to a great extent all the foreign countries bordering the Black Sea and to some extent those of Asia Minor. Coastwise trade was reserved for Turkish vessels in 1926, and a port monopoly for handling goods established.

History.—A band of Greeks from Megara in the year 658 B.C. settled on the promontory now occupied by the building and gardens of the Seraglio, and called the settlement Byzantium. This settlement grew and prospered and came under the rule of the Persians. It was a member of the Athenian League, and was unsuccessfully besieged by Philip of Macedon in 340 B.C. Constantine the Great, in A.D. 330, determined to make it the capital of his empire and it became known as Constantinople or New Rome. On the division of the empire, in 395, it became the residence of the Emperors of the East. Under the influence of a luxurious and immoral court the inhabitants degenerated, lived upon the charity of the emperors, and sought their chief delight in the circus-racing which gave rise to two frivolous and fanatical factions, the Blues and the Greens, whose furious hatred culminated, in 532, in riots, which raged for a week, and ended in the massacre of 30,000 by Belisarius. Its strong fortifications protected the city repeatedly against the attacks of foreign foes. The Persians were repulsed in 616, and again in 626; the Arabs in 668–75 (when Greek fire was first used), and again in 717–18. Terrible havoc was done by the Crusaders in 1203–4, when numerous ancient monuments were either destroyed or taken away. The Latin empire which they founded here lasted about sixty years. After the restoration of the Greek empire, in 1265, Constantinople remained undisturbed, save for the contentions of the Venetians and Genoese, till 1396–1401, when it was fruitlessly besieged by the Turkish sultan. It was again besieged in 1422 by Murad II, and was eventually taken in 1453, after a heroic defense of forty days by 7,000 Greeks and Italians against 80,000 Turks.

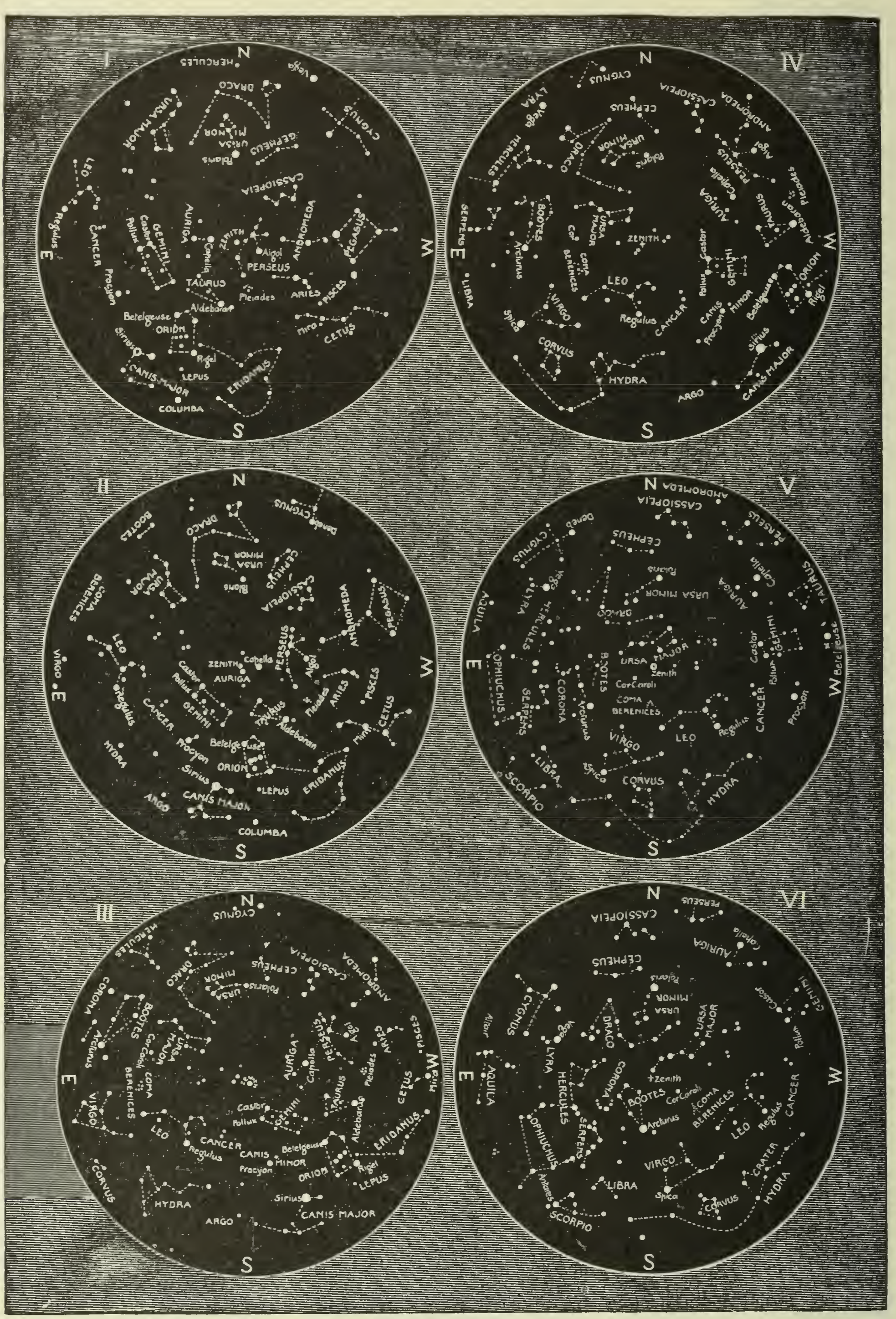
In the years following its capture by the Turks, Constantinople is historically of importance not so much as an individual city as it is as the symbol of Turkish power. During the Russo-Turkish War, in 1878, the Russians advanced close to the city, and imposed the peace of San Stefano. During the Balkan Wars of 1912–13 the Balkan Allies nearly reached the walls of the city (see BALKAN WAR) and in the World War, the British and French attempted to capture it by forcing the Dardanelles (q. v.).

The city was occupied by a Franco-British force during 1920–23, meanwhile the capital of Turkey was transferred to Ankara. The Capitulations which allowed immunity of jurisdiction to the nationals of certain foreign Powers were abolished by the Treaty of Lausanne (1923), and by a revision of that treaty (1936) the remilitarization of the Straits of the Dardanelles and the Bosporus was permitted.

Constantius I., kon-stan'shi-us, FLAVIUS VALERIUS (*c.* 250–306), Roman emperor known as *Chlorus.* Under the reorganization of the Roman Empire by Diocletian, Constantius received the government of Gaul, Britain and Spain, and when Diocletian abdicated (305) the power in the west was left to Constantius, in the east to Galerius. While on an expedition against the Picts, Constantius died at Eboracum (York).

Constantius II., FLAVIUS JULIUS (317–61), Roman emperor, second son of Constantine the Great (q. v.), was born in Illyricum. With his two brothers, he succeeded his father in 337, his empire consisting of Thrace, Macedonia, Greece, and Egypt. He waged war with the Persians and suffered a bitter defeat at their hands in 348. In 351 he went against Magnentius, the murderer of his brother Constans and defeating him, at Mursa, Constantius then became master of the whole empire. He subsequently sent his cousin Julian to Gaul against the Alemanni and Franks. Julian repulsed them so successfully that in 360 he was proclaimed emperor. Constantius thereupon marched against him but died on the way.

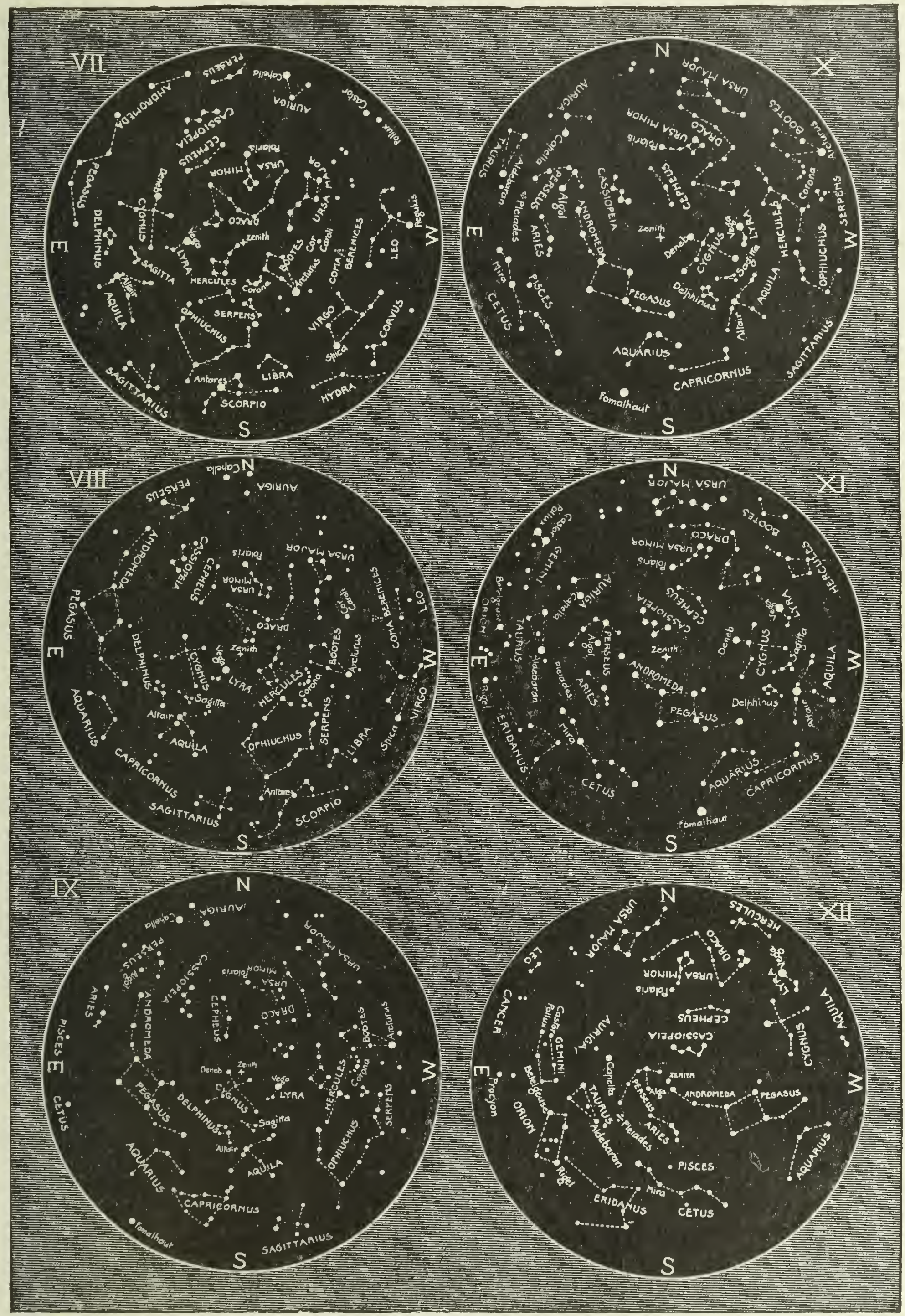
Constella'tion, a group of stars circumscribed by an imaginary figure. A few such groups are mentioned by Homer and Hesiod; but Eudoxus of Cnidus, about 366 B.C., was the first Greek who described with aproximate completeness the constellated



THE NORTHERN CONSTELLATIONS MONTH BY MONTH.—I.

Time of observation, from 8 p.m. to 10 p.m. To give the true position of the constellations, the chart must be held above the head.

I. January. II. February. III. March. IV. April. V. May. VI. June.



THE NORTHERN CONSTELLATIONS MONTH BY MONTH.—II.

Time of observation, from 8 p.m. to 10 p.m. To give the true position of the constellations, the chart must be held above the head.

VII. July. VIII. August. IX. September. X. October. XI. November. XII. December.

heavens, and his work, versified in the *Phainomena* of Aratus (270 B.C.), was the chief source of modern star-lore. Most, however, of the forty-five constellations thus transmitted to our acquaintance had originated long previously in the valley of the Euphrates, and symbolized the earliest mythological conceptions of Sumerian peoples. The Greeks took them very much as they found them, and, modifying only the associated legends, brought them into permanent relationship with systematic astronomy. The following are the names of the 48 Ptolemaic constellations: N. of the Ecliptic (21)—Andromeda, Aquila, Auriga, Boötes, Cassiopeia, Cepheus, Corona Borealis, Cygnus, Delphinus, Draco, Equuleus, Hercules, Lyra, Ophiuchus, Pegasus, Perseus, Sagitta, Serpens, Triangulum, Ursa Major. Ursa Minor; in the zodiac (12) Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces; S. of the ecliptic (15)—Ara, Argo, Canis Major, Canis Minor, Centaurus, Cetus, Corona Australis, Corvus, Crater, Eridanus, Hydra, Lepus, Lupus, Orion, Piscis Australis. The scheme was rounded off in 1603, from materials furnished by Southern navigators. The under-mentioned 12 asterisms, formed in the main by Petrus Theodorus (died 1596) of Embden, were published in Bayer's *Uranometria*, and have kept their places in modern star-maps: Apus, Chamæleon, Dorado, Grus, Hydrus, Indus, Musca, Pavo, Phœnix, Piscis Volans, Toucan, Triangulum Australe. Bayer initiated the system of designating the stars in each constellation in the general order of their brightness, by the letters of the Greek alphabet, and embellished his volume with plates of the 48 antique star-figures from Dürer's fine drawings.

The 85 constellations now usually accepted include, besides Bayer's 60, Coma Berenices, added by Tycho Brahé; Camelopardalis, Columba, Crux, and Monoceros, by Bartschius (1624); Canes Venatici, Lacerta, Leo Minor, Lynx, Scutum, Sobieski, Sextans, and Vulpecula, contributed by Hevelius in 1690; finally, Lacaille's quota of 13 (1752)—*viz.* Antlia, Cœlum, Circinus, Fornax, Horologium, Microscopium, Mensa, Norma, Octans, Pictor, Reticulum, Sculptor, and Telescopium.

Giordano Bruno's satirical proposal (*Spaccio della Bestia Trionfante*, 1854) to substitute ethical personifications for the pagan menagerie of the heavens had as little result as had Julius Schiller's serious attempt, in 1627, to Christianize the constellations. Later, the interests of astronomy were alone consulted in their reform. The British Association appointed a committee for the purpose in 1840, consisting of Sir John Herschel, Francis Baily, and Dr. Whewell. The old asterisms were defined and delimited, rectilinear boundaries replaced vague contours, and the *habitat* of frontier-stars was finally settled. The prehistoric system of nomenclature, however, remains essentially unchanged.

Constipation, the condition in which there is irregular or incomplete action of the bowels, with delay in the expulsion of the unassimilated residue of food. The causes of constipation may be classified as depending variously upon the state of the passages, of the residues of digestive processes, and of the forces acting to expel those residues. The passages (the intestines) may, in comparatively rare cases, be obstructed in various ways—as by twist, or by hernia, or by pressure outside their walls—or their muscular tissue may be weak. The food may be too concentrated, leaving a residue insufficient or too fine to excite the normal propelling contractions of the bowel. Digestion may be slow or incomplete, owing to deficiency in any one of the secretions which should act upon the food in its passage. Also, through ill-health, inattention, sedentary occupation, or exhaustion, both nervous and muscular force may be lacking to evacuate the residue, which then acts as a poison and as an irritant. The general result of constipation is a form of auto-intoxication. Digestion grows worse and worse, the constipation itself becomes more difficult to cure, and the patient becomes sluggish and depressed, disinclined for mental or physical effort, apt to feel discomfort after meals, liable to headaches and dizziness, and showing an unhealthy skin and a coated tongue. Neglected constipation, in extreme cases, may lead to severe irritation and inflammation of the bowel, or to stoppage, and consequent great danger.

The treatment must depend on the cause, but often the latter is not far to seek. Feeding exclusively on soft, concentrated foods; eating too much, too often, and too hurriedly; insufficient exercise; over-excitement and fatigue of the nerves; over-indulgence in tea, the tannin in which has an astringent effect; an undue preponderance of starchy foods, such as bread, in the diet—any, or all, of these may promote constipation, which is greatly favored by the unnatural conditions of modern life.

In all cases of simple constipation, diet must be considered first. Often it is found that no water is drunk, and a tumblerful of water on waking and one at night may effect a cure. Fresh fruit and fresh green vegetables are of great use, particularly if taken before or with breakfast. Massage of the abdomen (which can be performed by the patient) for a quarter of an hour daily will stimulate the bowels. Regular daily exercise, of a kind that will bring into play the muscles of the abdomen, must never be neglected. For this purpose walking is not so good as golf, riding, rowing, skipping, and those set calisthenics and gymnastics which involve abdominal muscles. All these natural remedies should be tried before the habit of drugging is formed. Above all, the patient must be regular in a daily attempt, at a fixed hour, to get an action of the bowels; and if that attempt fail one day, it should not be repeated until the corresponding hour on the day following. Although drugs must be used after a certain time if necessary, the regular effort should not be dropped in their favor, but repeated daily for weeks (with an occasional aperient in addition), in the expectation and belief that patience will effect a cure.

Enemas and suitable suppositories are further means to be used only when necessary. They have the advantage of producing a more local action than do drugs taken by the mouth. Drugs, taken in ignorance of their special properties, and constantly, are apt to aggravate the habit of constipation, which gradually requires stronger doses to overcome it. An occasional dose of castor oil or cascara sagrada will do no harm in a case of merely temporary constipation; but the habit of alternating constipation with drugging is to be avoided.

Constitucion, tn., Chile, 115 m. N.E. of Concepcion, on the coast; cap. of Maule co.; situated at the mouth of the Maule. The river, by the constant washing down of sand, has caused a dangerous shifting bar to appear in the roadstead. There is a railway to Talca. Pop. 7,000.

Constitution, as a medical term, is often used syonymously with 'temperament' and 'diathesis.' It is the natural or inherited condition of the body, or its habit. Certain marked types are described by medical textbooks, such as the 'gouty,' the 'bilious,' the 'sanguine,' the 'lymphatic,' and so on, but there are innumerable shades of difference, by which each type merges into the others. This classification refers to the type of disease to which the constitution is most liable. See GOUT; RHEUMATISM; SCROFULA.

Constitution, THE (popularly called 'Old Ironsides'), a famous vessel in the history of the U. S. Navy, was constructed by the government at Boston, and launched there in 1797, and was considered to be an unsurpassed product of the shipbuilding art. She was a frigate of 1,576 tons, and was rated as a 44-gun vessel, though actually carrying 52 guns. During the war with Tripoli she was in turn the flagship of Commodore Preble (1803–4) and Commodore Rodgers (1805–6), and was part of Commodore Barron's squadron (1804–5). It was on board the *Constitution* that the final treaty of peace was negotiated and signed (June 4, 1805).

In July, 1812, three weeks after the outbreak of the War of 1812, the *Constitution* put to sea from Annapolis, under command of Captain Isaac Hull, and soon fell in with a British squadron of one 64-gun ship and four frigates. For three days these chased her, but she outdistanced them. On Aug. 19, off Cape Race, she defeated and left a total wreck the British frigate *Guerrière*, after a severe fight lasting only thirty minutes, in which the English lost 79 men and the Americans 14. Again on Dec. 29, while under the command of Captain Bainbridge, she met the frigate *Java* (38 guns) off Bahia, Brazil, and defeated her after a two-hours' engagement, the British losing 300 in killed and wounded, and the Americans 34. On Feb. 14, 1814, commanded by Captain Stewart, she captured the *Picton* (16 guns) and her convoy; and on Feb. 20, 1815, after a memorable engagement, she captured the *Cyane* (34 guns) and the *Levant* (18 guns), but was in turn pursued by three British frigates and forced to relinquish the *Levant*.

In 1828–30 a proposal to dismantle the *Constitution* was abandoned on account of popular opposition, mainly aroused by the publication of O. W. Holmes' poem 'Old Ironsides.' Subsequently she was used as a training ship, and since 1897 has lain at the Boston Navy Yard. Consult Hollis' *The Frigate Constitution.*

Constitution *of the United States.*—The English settlers in Virginia, Plymouth, Massachusetts, Connecticut, and the other original colonies, many of them exiles for conscience' sake, carried the English principles of self-government to their new homes, and elaborated and practised them to an extent unknown in the mother country. In 1619 the first representative chamber was established at Jamestown in Virginia; and in 1639 the first modern written constitution was adopted by the townships of Connecticut, serving as a model to the other twelve colonies. Its distinctive principle was that all public officials and members of both legislative chambers were elective. Upon the formation of the State governments, which supplanted the colonial governments after 1775, many new constitutions were adopted. The essential features of these consisted of a bill of rights stating the powers of the government created and the limitations upon such powers, and a description of the framework of the new government.

The first official draft of a plan for the formation of the Federal Government was submitted to the States for ratification in 1777, under the title 'Articles of Confederation.' The ratification of every State was required to put the government into effect, and in 1781 this had been secured. The government thus established consisted of a legislative department only. Practically the sole powers of the government were the carrying on of foreign relations and the determining of peace and war. The government proved to have insufficient power even to enforce upon the States treaty obligations with foreign governments. (See ARTICLES OF CONFEDERATION.)

In order to remedy these defects, Congress recommended that the several States send delegates to a Convention for the purpose of revising the Articles of Confederation. This Convention met at Philadelphia from May 29 to Sept. 17, 1787, and was attended by 55 delegates, all the States except Rhode Island being represented. The result of their four-months' deliberations was the present Constitution of the United States. Their labors were approved by Congress, and the new Constitution was ratified by eleven of the thirteen States in 1788, by North Carolina in 1789, and by Rhode Island in 1790.

The Constitution, as finally drafted, represented three great compromises: (1) between a national party and a State sovereignty party, by providing for a much stronger Congress than the one under the Articles of Confederation which the Constitution replaced, and for a Federal executive and judiciary which had not existed before—but reserving to the States or to the people 'powers not delegated to the United States . . . nor prohibited . . . to the States' (Tenth Amendment); (2) between a large State party, which wished legislative representation based on population, and a small State party, which organized slowly in the Convention and repeatedly threatened to break it up, and which wished all States to have equal representation—by a bicameral legislature, with a lower house in which representation was based on population, and an upper house representing the States as States; and (3) between the slave States and the free, that, for direct taxation and for representation, only three-fifths of the negroes should be counted, but that fugitive slaves should be returned by one State to another, and that the importation of slaves should not be prohibited before 1808.

The sources of the Constitution lie in British and American governmental experience, and the attempts to trace features to Dutch, Swiss, or other foreign sources are fanciful. Among the prominent leaders in the Convention were: Washington, its presiding officer; the nationalizers, Hamilton, Gouverneur Morris, who finally drafted the measure in its clear English, Wilson, King, and Madison; the State sovereignty men, Lansing, Yates, Paterson, Luther Martin, and Bedford; those who sympathized at first with the nationalizers and then with the group last mentioned, including Randolph, Mason, and Gerry; and a few whose main object was conciliation, notably Franklin, Sherman, the two Pinckneys, and Ellsworth. The working plan was that introduced by the Virginia delegates, drafted largely by Madison and presented by Randolph; the New Jersey, or small-State, plan was presented by Paterson, and was a revision of the Articles of Confederation; and the Connecticut compromise, providing for the two systems of representation in the two branches of Congress, was largely due to Ellsworth. In the struggle for the ratification of the Constitution by the States, the great influence was the brilliant series of essays entitled *The Federalist*, published anonymously in 1787–8 by Hamilton, Madison, and Jay.

The work of the Supreme Court in interpreting the Constitution is dealt with in the article SUPREME COURT; but mention should be made here of the influence of John Marshall, Chief Justice in 1801–35, toward greater centralization of power.

Of the influence of custom, little can be said here; but it is to be noted that the most ardent leaders of the strict-constructionist party, who in theory opposed the extension of the central Federal power, have in practice carried this extension very far; that the logic of events, notably in the Civil War, disproved fine-spun theories of nullification, State sovereignty, and State rights, and that in more recent years the tendency seems to be toward greater centralization, the encroachment of Federal upon State power, and the growth of the Executive Branch at the expense of the Legislative Branch.

Text of the Constitution.—The Constitution of the United States is divided into seven Articles, supplemented to 1933 by twenty-one Amendments. The text follows, with Preamble:

We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

Article I.

Section 1. All legislative Powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Section 2. The House of Representatives shall be composed of Members chosen every second Year by the People of the several States, and the Electors in each State shall have the Qualifications requisite for Electors of the most numerous Branch of the State Legislature.

No Person shall be a Representative who shall not have attained to the Age of twenty five Years, and been seven Years a Citizen of the United States, and who shall not, when elected, be an Inhabitant of that State in which he shall be chosen.

Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers, which shall be determined by adding to the whole Number of free Persons, including those bound to Service for a Term of Years, and excluding Indians not taxed, three fifths of all other Persons. The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct. The Number of Representatives shall not exceed one for every thirty Thousand, but each State shall have at Least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to chuse three, Massachusetts eight, Rhode-Island and Providence Plantations one, Connecticut five, New-York six, New Jersey four, Pennsylvania eight, Delaware one, Maryland six, Virginia ten, North Carolina five, South Carolina five, and Georgia three.

When vacancies happen in the Representation from any State, the Executive Authority thereof shall issue Writs of Election to fill such Vacancies.

The House of Representatives shall chuse their Speaker and other Officers; and shall have the sole Power of Impeachment.

Section 3. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six Years; and each Senator shall have one Vote.

Immediately after they shall be assembled in Consequence of the first Election, they shall be divided as equally as may be into three Classes. The Seats of the Senators of the first Class shall be vacated at the Expiration of the second Year, of the second Class at the Expiration of the fourth Year, and of the third Class at the Expiration of the sixth Year, so that one third may be chosen every second Year; and if Vacancies happen by Resignation, or otherwise, during the Recess of the Legislature of any State, the Executive thereof may make temporary Appointments until the next Meeting of the Legislature, which shall then fill such Vacancies.

No Person shall be a Senator who shall not have attained to the Age of thirty Years, and been nine Years a Citizen of the United States, and who shall not, when elected, be an Inhabitant of that State for which he shall be chosen.

The Vice President of the United States shall be President of the Senate, but shall have no Vote, unless they be equally divided.

The Senate shall chuse their other Officers, and also a President pro tempore, in the Absence of the Vice President, or when he shall exercise the Office of President of the United States.

The Senate shall have the sole Power to try all Impeachments. When sitting for that Purpose, they shall be on Oath or Affirmation. When the President of the United States is tried, the Chief Justice shall preside: And no Person shall be convicted without the Concurrence of two thirds of the Members present.

Judgment in Cases of Impeachment shall not extend further than to removal from Office, and disqualification to hold and enjoy any Office of honor, Trust or Profit under the United States: but the Party convicted shall nevertheless be liable and subject to Indictment, Trial, Judgment and Punishment, according to Law.

Section 4. The Times, Places and Manner of holding Elections for Senators and Representatives, shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by Law make or alter such Regulations, except as to the Places of chusing Senators.

The Congress shall assemble at least once in every Year, and such Meeting shall be on the first Monday in December, unless they shall by Law appoint a different Day.

Section 5. Each House shall be the Judge of the Elections, Returns and Qualifications of its own Members, and a Majority of each shall constitute a Quorum to do Business; but a smaller Number may adjourn from day to day, and may be authorized to compel the Attendance of absent Members, in such Manner, and under such Penalties as each House may provide.

Each House may determine the Rules of its Proceedings, punish its Members for disorderly Behaviour, and, with the Concurrence of two thirds, expel a Member.

Each House shall keep a Journal of its Proceedings, and from time to time publish the same, excepting such Parts as may in their Judgment require Secrecy; and the Yeas and Nays of the Members of either House on any question shall, at the Desire of one fifth of those Present, be entered on the Journal.

Neither House, during the Session of Congress, shall, without the Consent of the other, adjourn for more than three days, nor to any other Place than that in which the two Houses shall be sitting.

Section 6. The Senators and Representatives shall receive a Compensation for their Services, to be ascertained by Law, and paid out of the Treasury of the United States. They shall in all Cases, except Treason, Felony and Breach of the Peace, be privileged from Arrest during their Attendance at the Session of their respective Houses, and in going to and returning from the same; and for any Speech or Debate in either House, they shall not be questioned in any other Place.

No Senator or Representative shall, during the Time for which he was elected, be appointed to any civil Office under the Authority of the United States, which shall have been created, or the Emoluments whereof shall have been encreased during such time; and no Person holding any Office under the United States, shall be a Member of either House during his Continuance in Office.

Section 7. All Bills for raising Revenue shall originate in the House of Representatives; but the Senate may propose or concur with Amendments as on other Bills.

Every Bill which shall have passed the House of Representatives and the Senate, shall, before it become a Law, be presented to the President of the United States; If he approve he shall sign it, but if not he shall return it, with his Objections to that House in which it shall have originated, who shall enter the Objections at large on their Journal, and proceed to reconsider it. If after such Reconsideration two thirds of that House shall agree to pass the Bill, it shall be sent, together with the Objections, to the other House, by which it shall likewise be reconsidered, and if approved by two thirds of that House, it shall become a Law. But in all such Cases the Votes of both Houses shall be determined by yeas and Nays, and the Names of the Persons voting for and against the Bill shall be entered on the Journal of each House respectively. If any Bill shall not be returned by the President within ten Days (Sundays excepted) after it shall have been presented to him, the Same shall be a Law, in like Manner as if he had signed it, unless the Congress by their Adjournment prevent its Return, in which Case it shall not be a Law.

Every Order, Resolution, or Vote to which the Concurrence of the Senate and House of Representatives may be necessary (except on a question of Adjournment) shall be presented to the President of the United states; and before the Same shall take Effect, shall be approved by him, or being disapproved by him, shall be repassed by two thirds of the Senate and House of Representatives, according to the Rules and Limitations prescribed in the Case of a Bill.

Section 8. The Congress shall have Power To lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the common Defence and general Welfare of the United States; but all Duties, Imposts and Excises shall be uniform throughout the United States;

To borrow Money on the credit of the United States;

To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes;

To establish an uniform Rule of Naturalization, and uniform Laws on the subject of Bankruptcies throughout the United States;

To coin Money, regulate the Value thereof, and of foreign Coin, and fix the Standard of Weights and Measures;

To provide for the Punishment of counterfeiting the Securities and current Coin of the United States;

To establish Post Offices and post Roads;

To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;

To constitute Tribunals inferior to the supreme Court;

To define and punish Piracies and Felonies committed on the high Seas, and Offences against the Law of Nations;

To declare War, grant Letters of Marque and Reprisal, and make Rules concerning Captures on Land and Water;

To raise and support Armies, but no Appropriation of Money to that Use shall be for a longer Term than two Years;

To provide and maintain a Navy;

To make Rules for the Government and Regulation of the land and naval Forces;

To provide for calling forth the Militia to execute the Laws of the Union, suppress Insurrections and repel Invasions;

To provide for organizing, arming, and disciplining, the Militia, and for governing such Part of them as may be employed in the Service of the United States, reserving to the States respectively, the Appointment of the Officers, and the Authority of training the Militia according to the discipline prescribed by Congress;

To exercise exclusive Legislation in all Cases whatsoever, over such District (not exceeding ten Miles square) as may, by Cession of particular States, and the Acceptance of Congress, become the Seat of the Government of the United States, and to exercise like Authority over all Places purchased by the Consent of the Legislature of the State in which the Same shall be, for the Erection of Forts, Magazines, Arsenals, dock-Yards, and other needful Buildings; — And

To make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and all other Powers vested by this Constitution in the Government of the United States, or in any Department or Officer thereof.

Section 9. The Migration or Importation of such Persons as any of the States now existing shall think proper to admit, shall not be prohibited by the Congress prior to the Year one thousand eight hundred and eight, but a Tax or duty may be imposed on such Importation, not exceeding ten dollars for each Person.

The Privilege of the Writ of Habeas Corpus shall not be suspended, unless when in Cases of Rebellion or Invasion the public Safety may require it.

No Bill of Attainder or ex post facto Law shall be passed.

No Capitation, or other direct, Tax shall be laid, unless in Proportion to the Census or Enumeration herein before directed to be taken.

No Tax or Duty shall be laid on Articles exported from any State.

No Preference shall be given by any Regulation of Commerce or Revenue to the Ports of one State over those of another: nor shall Vessels bound to, or from, one State, be obliged to enter, clear, or pay Duties in another.

No Money shall be drawn from the Treasury, but in Consequence of Appropriations made by Law; and a regular Statement and Account of the Receipts and Expenditures of all public Money shall be published from time to time.

No Title of Nobility shall be granted by the United States: And no Person holding any Office of Profit or Trust under them, shall, without the Consent of the Congress, accept of any present, Emolument, Office, or Title, of any kind whatever, from any King, Prince, or foreign State.

Section 10. No State shall enter into any Treaty, Alliance, or Confederation; grant Letters of Marque and Reprisal; coin Money; emit Bills of Credit; make any Thing but gold and silver Coin a Tender in Payment of Debts; pass any Bill of Attainder, ex post facto Law, or Law impairing the Obligation of Contracts, or grant any Title of Nobility.

No State shall, without the Consent of the Congress, lay any Imposts or Duties on Imports or Exports, except what may be absolutely necessary for executing it's inspection Laws: and the net Produce of all Duties and Imposts, laid by any State on Imports or Exports, shall be for the Use of the Treasury of the United States; and all such Laws shall be subject to the Revision and Controul of the Congress.

No State shall, without the Consent of Congress, lay any Duty of Tonnage, keep Troops, or Ships of War in time of Peace, enter into any Agreement or Compact with another State, or with a foreign Power, or engage in War, unless actually invaded, or in such imminent Danger as will not admit of delay.

Article II.

Section 1. The executive Power shall be vested in a President of the United States of America. He shall hold his Office during the Term of four Years, and, together with the Vice President, chosen for the same Term, be elected, as follows

Each State shall appoint, in such Manner as the Legislature thereof may direct, a Number of Electors, equal to the whole Number of Senators and Representatives to which the State may be entitled in the Congress: but no Senator or Representative, or Person holding an Office of Trust or Profit under the United States, shall be appointed an Elector.

The Electors shall meet in their respective States, and vote by Ballot for two Persons, of whom one at least shall not be an Inhabitant of the same State with themselves. And they shall make a List of all the Persons voted for, and of the Number of Votes for each; which List they shall sign and certify, and transmit sealed to the Seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the Presence of the Senate and House of Representatives, open all the Certificates, and the Votes shall then be counted. The Person having the greatest Number of Votes shall be the President, if such Number be a Majority of the whole Number of Electors appointed; and if there be more than one who have such Majority, and have an equal Number of Votes, then the House of Representatives shall immediately chuse by Ballot one of them for President; and if no Person have a Majority, then from the five highest on the List the said House shall in like Manner chuse the President. But in chusing the President, the Votes shall be taken by States, the Representation from each State having one Vote; A quorum for this Purpose shall consist of a Member or Members from two thirds of the States, and a Majority of all the States shall be necessary to a Choice. In every Case, after the Choice of the President, the Person having the greatest Number of Votes of the Electors shall be the Vice President. But if there should remain two or more who have equal Votes, the Senate shall chuse from them by Ballot the Vice President.

The Congress may determine the Time of chusing the Electors, and the Day on which they shall give their Votes; which Day shall be the same throughout the United States.

No Person except a natural born Citizen, or a Citizen of the United States, at the time of the Adoption of this Constitution, shall be eligible to the Office of President; neither shall any Person be eligible to that Office who shall not have attained to the Age of thirty five Years, and been fourteen Years a Resident within the United States.

In Case of the Removal of the President from Office, or of his Death, Resignation, or Inability to discharge the Powers and Duties of the said Office, the Same shall devolve on the Vice President, and the Congress may by Law provide for the Case of Removal, Death, Resignation or Inability, both of the President and Vice President, declaring what Officer shall then act as President, and such Officer shall act accordingly, until the Disability be removed, or a President shall be elected.

The President shall, at stated Times, receive for his Services, a Compensation, which shall neither be encreased nor diminished during the Period for which he shall have been elected, and he shall not receive within that Period any other Emolument from the United States, or any of them.

Before he enter on the Execution of his Office, he shall take the following Oath or Affirmation: — "I do solemnly swear (or affirm) that I will faithfully execute the Office of President of the United States, and will to the best of my Ability, preserve, protect and defend the Constitution of the United States."

Section 2. The President shall be Commander in Chief of the Army and Navy of the United States, and of the Militia of the several States, when called into the actual Service of the United States; he may require the Opinion, in writing, of the principal Officer in each of the executive Departments, upon any Subject relating to the Duties of their respective Offices, and he shall have Power to grant Reprieves and Pardons for Offences against the United States, except in Cases of Impeachment.

He shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two thirds of the Senators present concur; and he shall nominate, and by and with the Advice and Consent of the Senate, shall appoint Ambassadors, other public Ministers and Consuls, Judges of the supreme Court, and all other Officers of the United States, whose Appointments are not herein otherwise provided for, and which shall be established by Law: but the Congress may by Law vest the Appointment of such inferior Officers, as they think proper, in the President alone, in the Courts of Law, or in the Heads of Departments.

The President shall have Power to fill up all Vacancies that may happen during the Recess of the Senate, by granting Commissions which shall expire at the End of their next Session.

Section 3. He shall from time to time give to the Congress Information of the State of the Union, and recommend to their Consideration such Measures as he shall judge necessary and expedient; he may, on extraordinary Occasions, convene both Houses, or either of them, and in Case of Disagreement between them, with Respect to the Time of Adjournment, he may adjourn them to such Time as he shall think proper; he shall receive Ambassadors and other public Ministers; he shall take Care that the Laws be faithfully executed, and shall Commission all the Officers of the United States.

Section 4. The President, Vice President and all civil Officers of the United States, shall be removed from Office on Impeachment for, and Conviction of, Treason, Bribery, or other high Crimes and Misdemeanors.

Article III.

Section 1. The judicial Power of the United States, shall be vested in one supreme Court, and in such inferior Courts as the Congress may from time to time ordain and establish. The Judges, both of the supreme and inferior Courts, shall hold their Offices during good Behaviour, and shall, at stated Times, receive for their Services, a Compensation, which shall not be diminished during their Continuance in Office.

Section 2. The judicial Power shall extend to all Cases, in Law and Equity, arising under this Constitution, the Laws of the United States, and Treaties made, or which shall be made, under their Authority;—to all Cases affecting Ambassadors, other public Ministers and Consuls;—to all Cases of admiralty and maritime Jurisdiction;—to Controversies to which the United States shall be a Party;—to Controversies between two or more States;—between a State and Citizens of another State;—between Citizens of different States;—between Citizens of the same State claiming Lands under Grants of different States, and between a State, or the Citizens thereof, and foreign States, Citizens or Subjects.

In all Cases affecting Ambassadors, other public Ministers and Consuls, and those in which a State shall be Party, the supreme Court shall have original Jurisdiction. In all the other Cases before mentioned, the supreme Court shall have appellate Jurisdiction, both as to Law and Fact, with such Exceptions, and under such Regulations as the Congress shall make.

The Trial of all Crimes, except in Cases of Impeachment, shall be by Jury; and such Trial shall be held in the State where the said Crimes shall have been committed; but when not committed within any State, the Trial shall be at such Place or Places as the Congress may by Law have directed.

Section 3. Treason against the United States, shall consist only in levying War against them, or in adhering to their Enemies, giving them Aid and Comfort. No Person shall be convicted of Treason unless on the Testimony of two Witnesses to the same overt Act, or on Confession in open Court.

The Congress shall have Power to declare the Punishment of Treason, but no Attainder of Treason shall work Corruption of Blood, or Forfeiture except during the Life of the Person attainted.

ARTICLE IV.

Section 1. Full Faith and Credit shall be given in each State to the public Acts, Records, and judicial Proceedings of every other State. And the Congress may by general Laws prescribe the Manner in which such Acts, Records and Proceedings shall be proved, and the Effect thereof.

Section 2. The Citizens of each State shall be entitled to all Privileges and Immunities of Citizens in the several States.

A Person charged in any State with Treason, Felony, or other Crime, who shall flee from Justice, and be found in another State, shall on Demand of the executive Authority of the State from which he fled, be delivered up, to be removed to the State having Jurisdiction of the Crime.

No Person held to Service or Labour in one State, under the Laws thereof, escaping into another, shall, in Consequence of any Law or Regulation therein, be discharged from such Service or Labour, but shall be delivered up on Claim of the Party to whom such Service or Labour may be due.

Section 3. New States may be admitted by the Congress into this Union; but no new State shall be formed or erected within the Jurisdiction of any other State; nor any State be formed by the Junction of two or more States, or Parts of States, without the Consent of the Legislatures of the States concerned as well as of the Congress.

The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States; and nothing in this Constitution shall be so construed as to Prejudice any Claims of the United States, or of any particular State.

Section 4. The United States shall guarantee to every State in this Union a Republican Form of Government, and shall protect each of them against Invasion; and on Application of the Legislature, or of the Executive (when the Legislature cannot be convened) against domestic Violence.

ARTICLE V.

The Congress, whenever two thirds of both Houses shall deem it necessary, shall propose Amendments to this Constitution, or, on the Application of the Legislatures of two thirds of the several States, shall call a Convention for proposing Amendments, which, in either Case, shall be valid to all Intents and Purposes, as Part of this Constitution, when ratified by the Legislatures of three fourths of the several States, or by Conventions in three fourths thereof, as the one or the other Mode of Ratification may be proposed by the Congress; Provided that no Amendment which may be made prior to the Year One thousand eight hundred and eight shall in any Manner affect the first and fourth Clauses in the Ninth Section of the first Article; and that no State, without its Consent, shall be deprived of it's equal Suffrage in the Senate.

ARTICLE VI.

All Debts contracted and Engagements entered into, before the Adoption of this Constitution, shall be as valid against the United States under this Constitution, as under the Confederation.

This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.

The Senators and Representatives before mentioned, and the Members of the several State Legislatures, and all executive and judicial Officers, both of the United States and of the several States, shall be bound by Oath or Affirmation, to support this Constitution; but no religious Test shall ever be required as a Qualification to any Office or public Trust under the United States.

ARTICLE VII.

The Ratification of the Conventions of nine States, shall be sufficient for the Establishment of this Constitution between the States so ratifying the Same.

done in Convention by the Unanimous Consent of the States present the Seventeenth Day of September in the Year of our Lord one thousand seven hundred and Eighty seven and of the Independance of the United States of America the Twelfth In witness whereof We have hereunto subscribed our Names,

Attest WILLIAM JACKSON
Secretary

G^{o} WASHINGTON—Presid^{t}
and deputy from Virginia

New Hampshire—JOHN LANGDON, NICHOLAS GILMAN.

Massachusetts—NATHANIEL GORHAM, RUFUS KING.

Connecticut—W^{m} SAM^{l} JOHNSON, ROGER SHERMAN.

New York—ALEXANDER HAMILTON.

New Jersey—WIL: LIVINGSTON, DAVID BREARLEY, W^{m} PATERSON, JONA: DAYTON.

Pennsylvania—B. FRANKLIN, THOMAS MIFFLIN, ROB^{t} MORRIS, GEO. CLYMER, THO^{s} FITZSIMONS, JARED INGERSOLL, JAMES WILSON, GOUV MORRIS.

Delaware—Geo: Read, Gunning Bedford jun., John Dickinson, Richard Bassett, Jaco: Broom.

Maryland—James McHenry, Dan of St Thos Jenifer, Danl Carroll.

Virginia—John Blair, James Madison Jr.

North Carolina — Wm Blount, Richd Dobbs Spaight, Hu Williamson.

South Carolina—J. Rutledge, Charles Cotesworth Pinckney, Charles Pinckney, Pierce Butler.

Georgia—William Few, Abr Baldwin.

In Convention Monday September 17th 1787.

Present The States of New Hampshire, Massachusetts, Connecticut, Mr Hamilton from New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina and Georgia. Resolved,

That the preceeding Constitution be laid before the United States in Congress assembled, and that it is the Opinion of this Convention, that it should afterwards be submitted to a Convention of Delegates, chosen in each State by the People thereof, under the Recommendation of its Legislature, for their Assent and Ratification; and that each Convention assenting to, and ratifying the Same, should give Notice thereof to the United States in Congress assembled.

Resolved, That it is the Opinion of this Convention, that as soon as the Conventions of nine States shall have ratified this Constitution, the United States in Congress assembled should fix a Day on which Electors should be appointed by the States which shall have ratified the same, and a Day on which the Electors should assemble to vote for the President, and the Time and Place for commencing Proceedings under this Constitution. That after such Publication the Electors should be appointed, and the Senators and Representatives elected: That the Electors should meet on the Day fixed for the Election of the President, and should transmit their Votes certified, signed, sealed and directed, as the Constitution requires, to the Secretary of the United States in Congress assembled, that the Senators and Representatives should convene at the Time and Place assigned; that the Senators should appoint a President of the Senate, for the sole Purpose of receiving, opening and counting the Votes for President; and, that after he shall be chosen, the Congress, together with the President, should, without Delay, proceed to execute this Constitution.

By the Unanimous Order of the Convention

Go Washington Presidt

W. Jackson Secretary.

Amendments.

Articles in addition to, and Amendment of the Constitution of the United States of America, proposed by Congress, and ratified by the Legislatures of the several States, pursuant to the fifth Article of the original Constitution.

Article I.

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

Article II.

A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.

Article III.

No Soldier shall, in time of peace be quartered in any house, without the consent of the Owner, nor in time of war, but in a manner to be prescribed by law.

Article IV.

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Article V.

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

Article VI.

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defence.

Article VII.

In Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise re-examined in any Court of the United States, than according to the rules of the common law.

Article VIII.

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Article IX.

The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

Article X.

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

Article XI.

The Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State.

Article XII.

The Electors shall meet in their respective states, and vote by ballot for President and Vice-President, one of whom, at least, shall not be an inhabitant of the same state with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President, and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the President of the Senate;—The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates and the votes shall then be counted;—The person having the greatest number of votes for President, shall be the President, if such number be a majority of the whole number of Electors appointed; and if no person have such majority, then from the persons having the highest numbers not exceeding three on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. And if the House of Representatives shall not choose a President whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in the case of the death or other constitutional disability of the President.—The person having the greatest number of votes as Vice-President, shall be the Vice-President, if such number be a majority of the whole number of Electors appointed, and if no person have a majority, then from the two highest numbers on the list, the Senate shall choose the Vice-President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

Article XIII.

Section 1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Section 2. Congress shall have power to enforce this article by appropriate legislation.

Article XIV.

Section 1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

Section 2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice President of the United States, Representatives in Congress, the Executive and Judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion, or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

Section 3. No person shall be a Senator or Representative in Congress, or elector of President and Vice President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may by a vote of two-thirds of each House, remove such disability.

Section 4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations and claims shall be held illegal and void.

Section 5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

Article XV.

Section 1. The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude.——

Section 2. The Congress shall have power to enforce this article by appropriate legislation.——

Article XVI.

The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration.

Article XVII.

The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State legislatures.

When vacancies happen in the representation of any State in the Senate, the executive authority of such State shall issue writs of election to fill such vacancies: *Provided,* That the legislature of any State may empower the executive thereof to make temporary appointments until the people fill the vacancies by election as the legislature may direct.

This amendment shall not be so construed as to affect the election or term of any Senator chosen before it becomes valid as part of the Constitution.

Article XVIII.

Section 1. After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited.

Section 2. The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.

Section 3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

Article XIX.

The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex.

Congress shall have power to enforce this article by appropriate legislation.

Article XX.

Section 1. The terms of the President and Vice President shall end at noon on the 20th day of January, and the terms of Senators and Representatives at noon on the 3d day of January, of the years in which such terms would have ended if this article had not been ratified; and the terms of their successors shall then begin.

Section 2. The Congress shall assemble at least once in every year, and such meeting shall begin at noon on the 3d day of January, unless they shall by law appoint a different day.

Section 3. If, at the time fixed for the beginning of the term of the President, the President elect shall have died, the Vice President elect shall become President. If a President shall not have been chosen before the time fixed for the beginning of his term, or if the President elect shall have failed to qualify, then the Vice President elect shall act as President until a President shall have qualified; and the Congress may by law provide for the case wherein neither a President elect nor a Vice President elect shall have qualified, declaring who shall then act as President, or the manner in which one who is to act shall be selected, and such person shall act accordingly until a President or Vice President shall have qualified.

Section 4. The Congress may by law provide for the case of the death of any of the persons from whom the House of Representatives may choose a President whenever the right of choice shall have devolved upon them, and for the case of the death of any of the persons from whom the Senate may choose a Vice President whenever the right of choice shall have devolved upon them.

Section 5. Sections 1 and 2 shall take effect on the 15th day of October following the ratification of this article.

Section 6. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of three-fourths of the several States within seven years from the date of its submission. [The text followed above is that of the 'Literal Print' edition issued by the Department of State in Washington, D. C., 1933.]

Article XXI.

Section 1. The eighteenth article of amendment to the Constitution of the United States is hereby repealed.

Section 2. The transportation or importation into any State, Territory, or Possession of the United States for delivery or use therein of intoxicating liquors, in violation of the laws thereof, is hereby prohibited.

Section 3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by conventions in the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

Amendments.—In the Constitution as originally adopted, slight provision was made for the guaranty to the individual of a sphere of liberty not to be encroached upon by the Federal Government. To remedy this defect, the first Congress after the adoption of the Constitution passed and submitted to the States for ratification a series of ten Amendments, which were duly ratified and declared in force on Dec. 15, 1791.

The Eleventh Amendment was passed in 1793, and declared in force Jan. 8, 1798.

The Twelfth Amendment was added in 1803, and from then until the time of the Civil War no others were adopted.

The Thirteenth, Fourteenth and Fifteenth Amendments were embodied in 1865, 1868 and 1870, respectively, as part of the Government's Reconstruction policy, securing to the liberated slaves the benefits of citizenship.

The Sixteenth (Income Tax) and Seventeenth (Election of Senators) Amendments were adopted on Feb. 25 and May 31, 1913, respectively.

The Eighteenth (Prohibition) Amendment came into force on Jan. 16, 1920.

The Nineteenth (Woman Suffrage) Amendment was adopted on Aug. 28, 1920.

The Twentieth ('Lame Duck') Amendment: Ratification formally announced Feb. 6, 1933.

The Twenty-first (Prohibition Repeal) Amendment was adopted Dec. 5, 1933. See PROHIBITION.

A proposed Child Labor Amendment, passed by both Houses of Congress in 1924, had (by July, 1933) been rejected by 24 States and ratified by 15.

See CONSTITUTION, POLITICAL.

Bibliography.—N. D. Baker, *Progress and the Constitution* (1925); G. Bancroft, *History of the Formation of the Constitution* (2 vols. 1882); J. M. Beck, *Constitution of the United States* (1922); *idem, Changed Conception of the Constitution* (1925); G. S. Boutwell, *Constitution of the United States at the End of the First Century* (1895); Viscount Bryce, *American Commonwealth* (2 vols. 1911); J. A. C. Chandler, *Genesis and Birth of the Federal Constitution* (1924); J. Elliot, *Debates in the Several State Conventions on the Adoption of the Federal Constitution* (5 vols. 1836–1845); E. M. Eriksson and D. N. Rowe, *American Constitutional History* (1933); M. Farrand, *Reports of the Federal Convention* (1911), including all the sources of knowledge of the secret sessions of the Constitutional Convention; *idem, Framing of the Constitution* (1913); J. Fiske, *Critical Period of American History 1783–1789* (1888); R. Foster, *Commentaries on the Constitution of the United States, Historical and Juridical* (1895); A. B. Hart, *Introduction to the Study of Federal Government;* H. C. Lodge, *Democracy of the Constitution* (1915); A. C. McLaughlin, *Confederation and the Constitution* (1905); *idem, The Courts, the Constitution and Parties* (1912); S. E. Morison, *Sources and Documents Illustrating the American Revolution, 1764–1788,* and the *Formation of the Federal Constitution* (1923); W. B. Munro, *Constitution of the United States* (1930); J. Schouler, *United States under the Constitution* (6 vols. 1899); R. L. Schuyler, *Constitution of the United States* (1924); P. S. Smith, *New Approach to the American Constitution* (1931); C. E. Stevens, *Sources of the Constitution of the United States* (1927); F. J. Stimson, *Constitution As It Protects Private Rights* (1923); W. H. Taft, *Popular Government* (1913); *Our Chief Magistrate and His Powers* (1917); C. E. Martin, *Introduction to the Study of the American Constitution* (1928); Miss Eva March Tappan, *The*

Story of Our Constitution (1922); H. Taylor, *Origin and Growth of the English Constitution, and out of it that of the Republic of the United States* (2 vols. 1899); *Origin and Growth of the American Constitution* (1911); S. B. Thomas, *Our Weakened Constitution* (1932); F. N. Thorpe, *American Charters, Constitutions and Organic Laws* (7 vols. 1909); *The Essentials of American Constitutional Law* (1918); W. K. Wallace, *Our Obsolete Constitution* (1932); C. Warren, *Making of the Constitution* (1928); W. W. Willoughby, *Constitutional Law of the United States* (1910); Woodrow Wilson, *A History of the American People* (5 vols. 1902); *idem, Congressional Government* (1914).

Constitution. POLITICAL.—The word constitution primarily signifies establishment, settlement, enactment, appointment. In its widest political sense it means the establishment of a polity, or the enactment, by the sovereign power, of an articulate form of government. In this sense, most nations possess a constitution.

If a nation is more or less autonomous or 'self-governing'—if it can control its own government, make its own laws, and define and guarantee its own rights and liberties—it usually carries out these objects by means of an organized form of government, or a constitution in the proper political sense of the word.

But while some forms of government are heteronomous, and others, whether monarchic or republican, are autonomous, there is a considerable intermediate class which partakes of both characters. In this case the nation does not possess undivided control of its government, but shares that control with a monarch, or with a privileged aristocracy or bureaucracy. Its government is to some extent of a feudal or paternal character. The sovereign power of the state resides partly in the monarch and the privileged classes, while in the more advanced autonomous states it resides in the general community, or at least in its efficient members.

A political constitution, in the strict sense, may therefore be described as the body of rules which define the functions of the government and its departments, and which regulate the relations between the government and the persons governed. These rules may be written or unwritten. They may be embodied in 'fundamental' or 'organic' laws enacted by the supreme legislative power, as in the case of the Federal and State constitutions in the United States; they may take the form of statutes; or they may exist in the no less binding form of customs, traditions, or conventions. For example, the English Habeas Corpus Act is a constitutional law embodied in a statute; the rule that a ministry must resign on an adverse vote in the House of Commons is a customary and unwritten rule, but is equally obligatory. In the former case the law has a legal sanction, and can be enforced by judicial authority; in the latter case the rule has no such sanction, and cannot be so enforced; but both are constitutional laws in the wider acceptation of the term, and both must be obeyed.

The main objects of constitutional law are: (1) to guarantee the rights and liberties of the community; (2) to maintain an orderly and stable form of government; (3) to organize the legislative, executive, judicial, and administrative departments of government, and to supervise their action; (4) to subordinate all these departments to the law of the land and the legally expressed will of the nation. These objects are seldom perfectly attained, for under several of modern constitutions, the government can sometimes infringe popular liberties and evade legal and national control.

Three of the principal constitutions—those of the United States, France, and Switzerland—are purely democratic—*i.e.*, the sovereign power emanating from the electorate is more or less fully delegated to representative chambers and elective officials. In Great Britain the sovereign power, vested legally in Parliament, composed of Crown, Lords, and Commons, and politically in the electorate is effectively wielded by the representative house and a cabinet responsible to it and ultimately to the electorate. In most of these cases a proportion of the sovereign power also resides in a fundamental law or constitution occupying a more authoritative position than the private or civil law.

In all constitutions a representative chamber is an invariable feature, having in some instances a maximum, in others a minimum, of legislative powers. Common to constitutional government is also a cabinet (q. v.).

United States.—The Constitution of the United States is treated under CONSTITUTION OF THE UNITED STATES.

Great Britain.—The great landmarks in the history of the British constitution are briefly as follows. From early Anglo-Saxon times the central government was carried on by a king, originally elective, assisted by a council of magnates and *sapientes,* and the local government by representative shire, hundred, and township assemblies. In 1215 the Great Charter guaranteed the fair administration of justice, and prohibited taxation without consent of the Great Council. In 1295 that council became a fully representative Parliament. Between that date and the Wars of the Roses the two houses of Parliament gradually acquired control of all national business. After the reaction of the Yorkist and Tudor periods, Parliament gradually reasserted its former supremacy in such documents as the Apology and Satisfaction, the Protestation, and the Petition of Right (1628); and it finally established the modern limited monarchy by means of the Bill of Rights (1689) and the Succession Act (1701). Under the first two Georges was developed the cabinet system, whereby the effective sovereignty of the nation was transferred from the monarch to a ministry supported by a majority in the House of Commons.

Although the British constitution is the only unwritten one in existence, its principles may be gathered from the documents and statutes and parliamentary customs and traditions. They may be summoned up as follows:

(1) The sovereign power, nominally vested in the crown and in the two houses of Parliament, is actually wielded by a cabinet of ministers selected by the king from the party which has a majority in the House of Commons. The hereditary House of Lords may alter or temporarily reject a bill passed by the Commons, but must ultimately yield to the will of the lower house. The king has a nominal right to veto bills passed by both houses; but his veto has become obsolete.

(2) The ministers, individually and collectively, are responsible for all their acts to the House of Commons, and ultimately to the electorate. If charged with an unconstitutional act, they cannot take shelter behind the throne.

(3) There is one law of the land only; the legislature alone can alter or add to it, and the courts of law alone can administer it, whether it affects private or constitutional rights. Martial law stands apart.

(4) All are equal before the law. No one is exempt from its operation. There exists no 'benefit of clergy' no privilege of

class, no shelter of royal protection. The law recognizes a certain 'divinity that doth hedge a king,' but denies any sanctity to civil officials, or to naval or military officers.

(5) The principle of self-government by means of elected representatives applies to local as well as to central affairs. Counties, cities, towns, parishes, and villages manage their own business on this principle. They may legislate, levy rates, and borrow money for public purposes without permission or interference from the central government.

There might be added a list of the rights and liberties of the subject, such as freedom of speech, liberty of the press, and religious toleration; but the special importance of the above five leading principles consists in the fact that they are rejected in whole or in part by the more oligarchic polities.

For centuries the British constitution has been extolled by political philosophers, from Sir John Fortescue and Montesquieu onward; but it has not escaped adverse criticism. On the one hand, the power of the cabinet while in office is said to be too despotic: the absence of a written constitution enables a powerful minister to change the whole system of government. On the other hand, the necessity for securing popular support for every step is said to render ministers timid, time-serving, and short-sighted. (See PARLIAMENT.)

Canada.—The Constitution of the Dominion of Canada is embodied in a fundamental statute of the Imperial Parliament known as the British North America Act. It differs from the Constitution of the United States in two particular respects. First, the British Parliamentary system is adopted throughout, with the difference that in the Dominion Parliament the second chamber is composed of senators appointed for life by the Governor-General-in-Council. Second, in the distribution of sovereignty between the federal government and its federated parts, the provincial, and not the federal, authority acts within limitations imposed by the statute, the Dominion Government having otherwise an unrestricted sovereignty.

The executive authority is vested in the King of England, whose representative in Canada is styled the Governor-General. He is appointed by the Imperial Government, but is advised by the Canadian Government. Nominally, he has the power to reserve his assent to any bill passed by the Canadian Parliament; but this power is seldom exercised, and only upon the ground that the proposed legislation encroaches upon the prerogatives of the Imperial Parliament.

The Canadian Parliament consists of two chambers—the Senate and the House of Commons. The Senators are appointed by the Governor-General-in-Council, and hold office for life. All bills affecting taxation and revenue must originate in the House of Commons, and may not be amended by the Senate. Members of the House of Commons are elected by the people for a period of five years, unless the House is sooner dissolved. The speaker of the Senate is chosen by the Governor-General-in-Council. The House of Commons elects its own speaker.

The jurisdiction of the Dominion Parliament extends over the public debt, expenditure, taxation, and public loans; treaties; custom and excise duties; trade and commerce; navigation, shipping, and fisheries; lighthouses and harbors; the postal, naval, and military services; public statistics; monetary institutions, banks, banking, currency, coining and insolvency; criminal law, marriage, and divorce; public works, railways, and canals; sea coast and inland fisheries.

The provincial governments have jurisdiction over direct taxation; provincial loans; provincial offices, lands, prisons, hospitals, and asylums; municipal institutions; local improvements; public works which are confined to any particular province; education, civil rights, and provincial courts. All matters not specifically granted to the provincial governments are under the control of the Dominion Government.

France.—The present constitution came into force in 1875, and has since been twice amended. The amendment of 1884, copied from the United States Constitution, declared that 'the republican form of government is not liable to revision.' A majority of the nation thus finally abandoned the idea of a monarchical restoration.

The present constitution eschews the declarations of the 'inalienable rights of man' common to the American and the earlier French constitutions, and omits all reference to the sovereignty of the people. It vests the government in a president and a national assembly, consisting of a Senate and a Chamber of Deputies. The president is elected for seven years by the National Assembly—*i.e.*, by the chambers united for the purpose—a very simple method. He governs through ministers responsible in theory to both chambers, but in practice to the lower only. He is chief of the executive, and civil head of the army, but he cannot declare war without the consent of both chambers. He 'can do no wrong' when governing through his cabinet, but he may be impeached for high treason. Concurrently with the chambers he may initiate legislation; and he may, with consent of the Senate, dissolve the lower chamber before the expiry of its mandate. He neither assents to nor vetoes legislation. His ministers may sit in either chamber, and have free access to both.

Both chambers are elective. The deputies are elected by almost universal suffrage for four years. The senators are elected by 'colleges' in each department, consisting of the deputies, the councillors-general, the councillors of arrondissements, and delegates from the municipal councils. They sit for nine years, one-third of their number retiring every three years. The chambers, when agreed, have the usual legislative powers. If they both resolve that the constitution needs amendment, they unite for the purpose of revising it.

This constitution resembles the American in some respects and the British in others. The president has the usual powers and duties of a limited monarch, but little of the prestige; hence the taunt that 'he neither reigns nor governs.' That he does not reign as a monarch has its advantages, financial and other. That he does not govern is also an advantage, as he might govern badly. The French president is therefore a safe, useful, and by no means an undignified official. In two respects he may even claim superiority to his American contemporary. He may initiate legislation, and, with the consent of the Senate, he may dissolve the Chamber of Deputies.

The French cabinet is also very different from the American. The French ministers form the government, and may at any time be dismissed by the Chamber of Deputies, to whom they are chiefly responsible. The American Cabinet members, on the other hand, are responsible to the President alone, and are independent of Congress. In France, therefore, as in Great Britain, the cabinet, when supported by the lower chamber, is sovereign, and it directs the whole of the national policy, legislative and executive. Unlike the British ministers, however, the French enjoy an immense amount of patronage, shared by the senators and the deputies, as they appoint a host of departmental officials. With the president, too, they share the power, entirely alien to British principles, of 'secondary legislation.' The French statutes being expressed in somewhat general terms, the president and his ministers may issue supplementary rules for carrying them out in detail.

In theory the constitution of France is excellent, but the parliamentary system has not been a success. This is partly accounted for by the multiplicity of political parties, scarcely one of which ever commands a majority in the representative chamber. The cabinet, therefore, usually depends on a coalition, and a coalition is seldom durable. The result is that the the average life of a French ministry since 1875 has only been eight months. Another cause of instability is the system of 'interpellations.' Unlike the questions asked and answered in the British Parliament, interpellations may give rise to a debate, and in times of excitement have often caused the sudden fall of the ministry.

France has no less than five different systems of law—public or constitutional, private or civil, 'secondary legislation,' administrative law, and military law—which often lead to serious conflicts and miscarriage of justice. Under the administrative law every official enjoys a protection which the private law denies to ordinary citizens. All legal questions connected with the administration are tried by special administrative courts, in which private citizens get scant justice. Differences between the administrative and the ordinary courts are decided by a special 'Court of Conflicts.' Military cases, in like manner, are tried by the military courts, except in purely private matters; and these courts as recent experience has shown, may be ignorant of the principles of justice. This protection of the official classes, like the old 'benefit of clergy,' raises a large section of the community above the ordinary law. This is one phase of French paternalism, its theory being that the state and its interests are more sacred than the rights of private citizens.

Another striking phase of French paternalism is the denial of local self-government to the provinces. France is practically governed from Paris; the provinces are in *statu pupillari.* Every department is governed by a prefect from the central government; every district, town, and village by a *maire* or other official, who, though elected, and associated with an elective council, is a government official. The limited powers of the departments, districts, and communes can be exercised only with the consent of these officials, by whom even trifling matters are often referred to the central government.

Germany.—The German Empire, which ceased to exist as such with the termination of the Great War in Europe (1914–19), was a confederation of states each of which retained its sovereignty, in so far as not expressly deprived of it by the imperial government. Among the public affairs in which the empire was granted complete or original jurisdiction by the imperial constitution were citizenship, state insurance, colonization, emigration, immigration, commerce, customs, banks, coinage, navigation, railways, copyrights, patents, postal affairs, telegraphs, army, navy, foreign affairs, law and medicine, the press, and the right of association.

The legislature consisted of the Bundesrat, or Federal Council, and the Reichstag, or Imperial Diet. The Federal Council was composed of 61 members, nominated by the 26 states, each state being entitled to but one vote. The Bundesrat was both legislative and executive, functioning as an upper chamber and as an imperial cabinet. As an upper house it passed, amended or rejected bills passed by the Reichstag. As a cabinet or executive body it prepared bills to be submitted to the Reichstag. It superintended the execution of the imperial laws; it met whether the lower house was in session or not; with the consent of the emperor, it could dissolve the Reichstag; and its members had the right of access and speech in the Reichstag. It also acted in a judicial capacity in disputes between the states and the imperial government, especially as to the construction of statutes. Its members were diplomats, instructed to safeguard the interests of their states.

In practice the Bundesrat was the fountain head of all imperial legislation, even financial. On the executive side it wielded the effective sovereignty of the empire, which, however, belonged chiefly to the Prussian members, who were the majority of the council. They, again, were appointed by the King of Prussia, who, as Emperor, appointed the imperial chancellor — the president of the Bundesrat.

The Reichstag resembled other representative assemblies. Its 397 members, of which Prussia furnished 236, were elected by universal suffrage for a term of five years unless the body as a whole were dissolved earlier by the Bundesrat, with the Emperor's consent. Constitutionally the Reichstag might initiate legislation, but in actual practice the Bundesrat was apt to reject bills not initiated by itself. The Diet was consequently limited to criticising and amending bills drafted by the Council, rarely using its veto power for fear of dissolution. Even its taxation powers were limited.

The King of Prussia was president of the Confederation, with the title of German Emperor. As such he was the head of the executive branch of the imperial government, commander-in-chief of the army and navy, and representative of the empire in foreign relations. He made war or peace with the consent of the Federal Council and concluded treaties with the confirmation of the Diet. He summoned, opened, prorogued, and dissolved the Council and the Diet. The imperial chancellor, always a Prussian, was his sole minister and responsible to him alone.

The court of justice directly under imperial control was the Reichsgericht or Supreme Court of Appeal located at Leipzig; but the whole legal and judicial system, though administered by the state courts, was supervised by the imperial government.

The German Republic.—The German Republic was established, in November 1918, and on January 19, 1919, a German National Constitutional Assembly was elected for the purpose of framing and adopting a national constitution. The new constitution was adopted on July 31, 1919, and was published in the *National Legislative Journal* on Aug. 13, 1919, on which day it became the effective basic law of the nation.

Sovereign power is derived from the people and vested in a republican form of government. The national government has the exclusive right of legislation on foreign affairs, colonial matters, state property, right of changing residence, immigration, emigration, extradition, the military organization, coinage, customs regulations, posts, telegraphs and telephones. It also has the right of legislation over civil and criminal laws, judicial proceedings, passports, poor laws and vagrancy, press, associations and assemblies, population policies, national health, labor laws, organization of trade representations within the nation, alienation of property, socialization of natural resources, trade regulations, weights and measures, issue of paper money, banks and stock exchanges, industrial pursuits and mining, insurance, navigation, fishing, railways and other internal lines of communication whether by land,. water, or air, theatres and cinematographs, taxation, community welfare, and the protection of public order. Further it may lay down the principles concerning the rights and duties of religious associations, schools and scientific publications, the official rights of all public bodies, land rights and titles, and interments; it may also lay down principles for the permissibility and mode of collection of taxes, in order to prevent injuries to income or to trade relations of the nation, double taxation, excessive and burdensome taxes on lines of communication and other taxes disadvantageous to the whole people. Wherever the welfare of the community is involved, it may veto laws of the confederated states as applied to the foregoing matters. The national law transcends state laws. Every state is required to have a republican constitution.

The legislative branch of the government is vested in the Reichstag and the Reichsrat or National Council. The former is the lower house and its deputies are the representatives of the German people chosen on a basis of universal male and female suffrage in accordance with the principles of proportional representation, for a term of four years. The Reichsrat is composed of members who shall represent the states in national legislation and administration somewhat similar to the United Senate. Each state is entitled to one vote or member, and in the larger states one vote is accorded to every million inhabitants and an additional vote for an excess equal to the population of the smallest state, but no state shall be represented by more than two-fifths of all votes. The legislative sessions are held annually. All projects of legislation shall be introduced by the government or from the body of the Reichstag. The Reichsrat has the right of veto against laws approved by the Reichstag. In the case of a veto the Reichstag shall reconsider the law and on continuance of a disagreement the law shall be submitted to a national referendum. The will of the population is to be determined by referendum, and ample provisions are made for such procedure in all cases requiring such action. The President of the Republic may dissolve the Reichstag, but only once for the same cause, and elections for new deputies shall be within 60 days after such dissolution.

The executive authority is vested in a president chosen by the whole people for a term of seven years, with privilege of re-election, and in a Chancellor and other Ministers appointed by the president. The president has supreme command of all military forces of the nation and performs all duties generally incumbent on a national executive except that in many affairs the approval of the Reichstag is required. He may be deposed by a referendum at a request of the Reichstag, but a rejection of his deposition by a referendum entails the dissolution of the Reichstag and a new election. The Chancellor determines the lines of government policy and he, with his ministers, individually assumes responsibility therefor to the Reichstag.

Judges are independent and subject only to law, and judges administering regular justice are appointed for life subject to legal provisions. Regular justice is administered through national and state courts.

All Germans are equal before the law and men and women have fundamentally the same civil rights and duties. Freedom of speech, person, and the press is guaranteed according to legal provisions.

Austria-Hungary.—The former Empire of Austria consisted of seventeen different kingdoms, archduchies, principalities and territories, inhabited by Germans, Bohemians, Poles, Ruthenians, Slovenians, Italians, Croats, Serbs, and Roumanians, who were governed down to 1867 as an absolute monarchy. The constitution promulgated in that year and by later amendments possessed the liberal features of electoral equality and ministerial responsibility; but its authority was impaired by contradictory private legislation, while the administrative and the military laws placed a large part of the population above the ordinary law. The large bureaucratic system was autocratic throughout. Until the close of the Great War in Europe in 1918, Hungary was governed under the Constitution of 1867, which provided that the sovereign powers were to be exercised by the King through a ministry responsible to the Diet. The legislative powers were vested in a Diet of two chambers—the chamber of Magnates and the Chamber of Deputies. The upper Chamber was a perpetuation of an aristocratic body founded in the sixteenth century. Its 387 members were made up of members of the royal family, church dignitaries, *ex officio* members, hereditary nobility and royal nominated or elected members. In practice the upper house was subordinate to the lower house, to which alone the ministers were responsible. The lower chamber consisted of 453 members, 40 of which were from the subordinate kingdom of Croatia-Slavonia, all of whom were elected in accordance with an appointment made on the basis of population, territory, and economic conditions. Qualifications for the exercise of suffrage were based on age, property, taxation, profession, official position and ancestral privileges. All judges were appointed for life by the king and they were under the administrative control of the Minister of Justice. A curious political phenomena of Hungary was the existence of the subordinate kingdom of Croatia-Slavonia which had autonomous powers over local affairs, but returned members to the Hungarian Diet for the transaction of business common to the whole kingdom.

While both members (Austria and Hungary) of the dual monarchy were independent and autonomous, they were united by the *Ausgleich* or Compromise of 1867, which provided for the common administration of foreign affairs, joint financial affairs and war including both army and naval affairs, and by special treaties regarding customs duties, commerce and postal affairs. The common government established by the *Ausgleich* was vested in the emperor-king, three ministers, and two delegations of 60 members each, from each monarchy, elected under special provisions by the parliaments for a term of one year. These delegations sat, deliberated and voted separately, at Vienna and Budapest alternately, communicating only by messages, couched in German and Magyar. In the event of a lack of agreement after a third exchange of messages, a joint session was called on demand of either delegation for the purpose of voting only.

The Great War in Europe (1914–18) finally brought about the dissolution of the Austrian and Hungarian monarchies and the proclamation of a number of independent republics. These new states are at present (1920) engaged in framing their constitutional plan of government while also reconstructing their economic status.

Switzerland.—The history of the Swiss confederation dates from the death of the Emperor Rudolf of Hapsburg in 1291, when the three Forest Cantons of Uri, Schwyz (whence Switzerland), and Unterwalden formed a league of defence against feudal tyranny. In 1322 they were joined by Lucerne, in 1351 by Zürich, in 1352 by Zug and Glarus, and in 1353 by Berne. In 1393 the covenant of Sempach confirmed the confederation and organized its army. The confederation was next joined by Basel and Schaffhausen in 1501, and Appenzell in 1513. In 1648, by the Peace of Westphalia, the confederation was declared independent of the German empire. In 1803 Napoleon increased the number of cantons to nineteen; three more cantons were added after his fall; and the neutrality of the confederation was guaranteed at the Congress of Vienna in 1815. After the French revolution of 1830 most of the cantonal constitutions were remodelled and liberalized; and in 1848 a new federal constitution was adopted. In 1874 it was revised, and that revision is still in force.

The confederation embraces twenty-two cantons, each with its own constitution, each nominally sovereign; but all have delegated so much of their power to the central government that the confederation has become a unity rather than a union. The legislative authority is vested in a federal assembly composed of the National Council and the Council of States. Both sit for a fixed period of three years and both are renewed triennially. The National Council, or lower chamber, is elected by manhood suffrage. The Council of States, or upper chamber, consists of forty-four members, two from each canton, either nominated by the legislatures or elected by popular vote. The united councils elect the Federal Council, the Federal Tribunal, the chancellor, and the commander-in-chief, grant pardons, and adjust differences between federal authorities. A bill passed by both councils becomes law, unless objected to by thirty thousand voters or by eight cantons, in which case it must be referred to a plebiscite for adoption or rejection.

The executive power is vested in a Federal Council of seven members, elected for three years by the Assembly, or the two chambers united. The members of the Federal Council are usually selected from the members of the Assembly. Each member has the right of access and speech in either chamber.

The *initiative and referendum* are regarded as the bulwark of the Swiss constitution. The constitution may be revised in whole or in part. Total revision may be passed like an ordinary law, followed by a referendum. If either council votes for total revision and the other disagrees, or when fifty thousand voters demand such revision, the question of revision or not is referred to the electorate. If the majority is for revision, there shall be a new election of both councils to make it. Their work is then submitted to a final referendum for adoption or rejection. Partial revision may be made by popular initiative or passed like an ordinary law, subject always to the final referendum. The popular initiative may be used if fifty thousand voters petition for such revision, suggesting it generally, or in the form of a bill. If the Assembly accepts the suggestion or the bill, it becomes law if adopted by the final referendum. If it rejects the suggestion or the bill, the question of revision or not is referred to the electorate. An affirmative answer compels the Assembly to embody the revision in a law, which is finally referred to the electorate.

Conclusions. — The constitutions reviewed, and others besides, suggest the following general propositions:

(1) Those constitutions are the most satisfactory and enduring which have been developed as an integral part of the national life.

(2) As a community advances in development, it will demand increasing political power.

(3) Its members, however unequal in fact, will aspire to equal liberty and equal justice.

(4) No great community can govern itself directly, but must delegate its authority to trained and trusted representatives. If it delegates too much, it will run the risk of absolutism; if it delegates too little, it will lack cohesion, unity, and strength.

(5) The most advanced political community intrusts its sovereignty to a representative legislature, combined with a subordinate executive, responsible to the legislature and to the electorate; it lightens the task of the central government, and stimulates habits of self-reliance and a sense of public duty by giving the widest possible scope to local self-government; it establishes one law, and one only, sacred and inviolable, which it administers impartially to all; its government annually controls all national finance, and constantly supervises all national affairs.

(6) The community may further guarantee good government by creating a written constitution, placed high above political changes and chances, and unalterable except by special procedure. Or it must possess an unwritten code of the immutable principles of liberty and justice.

See GOVERNMENT; POLITICS; STATE.

Bibliography. — Consult the *English Constitutional History* of Stubbs, of Hallam, of Taswell-Langmead, and of May; Bagehot's *The English Constitution;* Sir F. Pollock's *History of the Science of Politics;* Borgeaud's *Adoption and Amendment of Constitutions;* Lowell's *Governments and Parties in Continental Europe;* Moore's *Constitution of the Commonwealth of Australia;* Bodley's *France;* Turner's *Germanic Constitutions;* Braekstad's *Constitution of Norway* (1905); Egerton and Grant's *Canadian Constitutional Development* (1907); Andrassy's *Development of Hungarian Constitutional Liberty* (1908); Lloyd's *Swiss Democracy* (1908); Brand's *Union of South Africa* (1909).

Constitutional Conventions. A constitutional convention is a body of persons met, under authority of an established government, for the purpose of framing the fundamental law or constitution of a sovereign state, or for the purpose of reviewing and revising or recommending amendments to an existing constitution. The assumed necessity for the periodical review and possible revision of written constitutions in which the fundamental law is set forth has, in the United States, in both Federal and State governments, led to provision in those constitutions for such conventions. Article v. of the United States Constitution provides that 'The Congress, . . . on the application of the legislatures of two-thirds of the several States, shall call a convention for proposing amendments'; and the constitutions of all but twelve of the States contain this provision. Conventions of this character are not unknown in other countries also—for example, similar provisions are contained in the constitutions of the first and second French Republics, and in the constitutions of several of the Central and South American Republics; but their use in the United States, in the sense in which they are here identified, has made them peculiarly American institutions.

A distinction must be made between persons acting under authority of an established government, and those who frame constitutions upon their own assumed authority. The latter are the product of revolution, and merely part of the apparatus of revolution. A notable example is the Continental Congress (q.v.) of 1777, which submitted to the colonies for ratification the Articles of Confederation (q.v.). A legislative body has the inherent right, in the absence of constitutional restrictions or directions, to call a constitutional convention. The most famous, the Federal Convention of 1787, which drafted the Constitution of the United States, met pursuant to the call of a legislative body, the Congress representing the States then working under the Articles of Confederation. So, also, the constitutional conventions of most of the original States, which met after independence was accomplished, were chosen at the behest of the legislatures of those States.

Some of the State constitutions require the submission of the question of calling a convention to the electors at stated intervals; others empower the legislatures to call a convention, or to submit the question of calling a convention to the people at such times as the legislature may see fit; and others provide for both methods. The practice in the choosing of the delegates is that of election directly by the people. Usually, the functions of the convention are limited to the drafting of a proposed constitution or revision, the adoption of which is effected by the votes of the people at an election held for the purpose. Many conventions have assumed, in the absence of express constitutional mandate, the right to amend constitutions without waiting for popular approval of their amendments; but such conventions belong, as a rule, to the times when constitutional government in the States was in an incipient stage.

The amendments recommended by recent conventions are filled with detail affecting the powers of the legislatures, suggested by changing social and political conditions. The following are a few typical subjects of recent constitutional provision: compulsory workmen's compensation in Arizona (1910) and Ohio (1912); direct primaries in Arizona (1910) and Ohio (1912); initiative and referendum in Michigan and Oklahoma (1907), Arizona (1910), and Ohio (1912); inheritance tax in New Hampshire (1912); acquisition and maintenance by the State of certain public utilities in Michigan (1907).

The *New York Constitutional Convention*, composed of 15 delegates at large and 153 district representatives, chosen by popular election in 1914, convened at Albany in April, 1915, for the purpose of revising the State constitution. The convention was organized into thirty standing committees, with Elihu Root (q.v.) as president. In all, 725 amendments were proposed in the convention, of which 33 were adopted. One of the most important of these amendments places in the hands of the governor the power and duty of constructing the annual State budget, to be then submitted to the legislature, which may reduce but cannot increase the amount of any of the items. Other amendments looking to the increase of efficiency in popular government include the extension of home rule to the larger cities of the State in the organization and management of their municipal affairs, with the privilege of revising their charters, except in regard to the power to contract debts and issue bonds; the short ballot measure, by which only the governor, lieutenant - governor, attorney-general, and controller are to be elected by popular vote; the reorganization and reduction in number of the State departments; an increase in the salaries of the governor and legislators; appointment of State officers by the governor; empowering the legislature to deal with problems of social welfare, election, and the Indians.

The amendments framed by the New York convention are to be submitted to the electors of the State on Nov. 2, 1915, for ratification; and if adopted, will become effective in 1916.

See CONVENTION; CONSTITUTION OF THE UNITED STATES. Consult Bryce's *The American Commonwealth;* Cooley's *General Principles of Constitutional Law in the United States;* Dodd's *The Revision and Amendment of State Constitutions;* Hart's *Actual Government;* Hazen and Vincent's *Adoption and Amendment of Constitutions in Europe and America;* Jameson's *A Treatise on Constitutional Conventions;* McClain's *Constitutional Law in the United States.*

Constitutional Union Party, a political party in the United States which took part in the campaign of 1860, and which was in reality a temporary union of the remnant of the old-line Whigs and of the Southern 'Know Nothings,' who wished to avert the threatened conflict between the North and the South, and who were strongly opposed alike to disunion and abolitionism. At a national convention held at Baltimore on May 9, 1860, twenty-two States being represented, John Bell (q.v.) of Tennessee was nominated for the Presidency and Edward Everett (q.v.) of Massachusetts for the Vice-Presidency—hence the name 'Bell and Everett Party' by which the party is often known. In lieu of a platform the convention adopted a resolution, the essence of which was that since partisan platforms 'had the effect to mislead and deceive the people, and at the same time to widen the political divisions of the country by the creation and encouragement of geographical and sectional parties, . . . it is both the part of patriotism and of duty to recognize no political principle other than the Constitution of the country, the union of the States, and the enforcement of the laws.' In the ensuing election, in which Abraham Lincoln was elected President, Bell and Everett received 39 electoral votes—those of Virginia, Kentucky, and Tennessee—and 589,581 popular votes, cast almost entirely in the Southern States.

Constitutions, Apostolic, a series of eight books, containing church ordinances, attributed to the apostles, and said to have been written down by Clement of Rome. They were never accepted in the West, and in the East were rejected by the Second Trullan Council (692). It is pretty generally agreed that Books I.–VI. are a working over of a *Didascalia* of the third century, which is extant in Syriac; Book VII. rests upon the *Didachê* (q.v.) of the second century; and Book VIII. upon Hippolytus. Internal evidence indicates a Syrian origin of the work.

The subjects of the eight books are: I. Ten chapters on moral and religious duties. II. Sixty-three chapters on episcopal, clerical, social, congregational, and penitential duties; oblations. III. Seventy chapters on clerical functions; against usurpation; on widows and alms; baptism; and the consecration of bishops. IV. Fourteen chapters on alms and offerings; relative and political duties. V. Twenty chapters on the duties of the persecuted martyrs; on fasts and feasts; and on Messianic prophecy. VI. Twenty-nine chapters on schism, heresy, and Judaizing error; apostolical preaching; spurious writings; rebaptism; clerical marriage. VII. Forty-nine chapters, chiefly on religious duties; fast days; meats, idolothyta; baptisms, catechumens, chrism; holy eucharist; the Lord's day; liturgica. VIII. Forty-seven chapters on the ordinal and liturgy; benediction of water and oil; offerings; canonical hours; commemoration of the dead. The last chapter contains the Apostolic Canons (q.v.). There is an English translation, with notes, by Donaldson, in vol. xvii. of *Ante-Nicene Library.*

Constitutions of Clarendon. See CLARENDON, CONSTITUTIONS OF.

Construc'tionists, Strict. See STRICT CONSTRUCTIONISTS.

Consubstantiation, kon-sub-stan'shi-ā'shun, the theory of impanation or substantial conjunction of the elements of bread and wine in the Lord's Supper with the elements of the body and blood of Jesus Christ. This doctrine, which is identical with the impanation theory of John of Paris and of Rupert, may be said to stand between the transubstantiation doctrine of the Roman Catholic Church and the teachings of Calvin and Zwingli. As compared with the former, it is dualistic in that it recognizes the actual presence of both the earthly and heavenly elements in the Sacraments; as compared with the latter, it is objective in that it asserts the corporeal presence of Christ, rather than merely His spiritual presence in the Lord's Supper.

Consubstantiation has been generally charged as being held by the Lutheran Church, but this charge is proven erroneous by the Augsburg Confession and by the teachings of the Lutheran theologians, who maintain that the two elements are really present—the earthly bread and wine and the heavenly Christ's body and blood—in sacramental conjunction; that is, a mystical mediating relation of the natural to the supernatural, each unchanged in its substance, and without substantial conjunction or consubstantiation.

Con'sul, the name by which the two chief magistrates of ancient Rome were generally known, though various evidences show that the original title was 'praetor,' and it was only when a third praetor was added that the senior pair came to be known as 'consuls.' This consulship was instituted in 509 B.C., on the expulsion of the kings. Originally, patricians alone were eligible for the office, and it cost a struggle of more than a century before the Licinian law of 367 B.C. enacted that one at least of the consuls should be a plebeian. Meanwhile the authority of the Consul had been further limited by the creation of the censorship, instituted in 443 B.C.; and in 366 B.C. the praetorship was instituted as the supreme judicial authority, and confined to patricians—a maneuver by which that order attempted to make up for the partial surrender of the consulate to the plebs.

The consul controlled the senate and the assembly, raised and commanded troops, imposed fines and even capital sentences, spent the public money without supervision, undertook public works of all sorts, and finally was irresponsible, except that he might be prosecuted as a private person. Again, there was no constitutional method of deposing a consul; and if he refused to lay down office, it was held that his acts were legal and valid, even after the term of his power was concluded. In practice, however, as a rule, the consuls merely executed the will of the senate. The symbol of their authority was the bundle of rods (*fasces,* q. v.), with the axe in the center, which was carried before them by twelve lictors.

In the later years of the republic—after 133 B.C.—the office was shorn of a good deal of its importance, being restricted to the administration of the domestic affairs of Rome; while the government of the provinces, military matters, and foreign affairs generally, were conducted by *proconsuls,* usually men who had previously held the consulship. The consulate finally became a municipal magistracy or a sort of lord mayoralty, an office of no real power. As such it existed down to the latest days of the empire, though its tenure was limited to six months, and later even to two months; and though a form of election existed, at any rate in the early empire, the consuls were really nominated by the emperor. The last consul was appointed at Rome in 536 A.D., and at Constantinople in 541 A.D.

The title of consul was revived in the French Republic after the revolution of the 18th Brumaire, and lasted till the coronation of Napoleon as emperor (May 18, 1804).

Consular Regulations. The Rogers Act of May 24, 1924 (Title 22, U. S. C., Section 1) amalgamated the diplomatic and consular services into the Foreign Service of the United States. As a consequence, the Consular Regulations and Diplomatic Regulations were combined into the Foreign Service Regulations of the United States, in use since that time.

The Foreign Service Regulations comprise the pertinent provisions of law, Executive orders, orders of the Secretary of State, orders of the Director General of the Foreign Service, and pertinent regulations, rulings, statutory interpretations, and decisions of other agencies of the Government, which prescribe the basic organization, functions, responsibilities, courses of conduct, and procedures of the Foreign Service, and provide instructions for its internal administration and background information for the guidance of the Foreign Service in its work.

Regulations established by the President or the Secretary of State under authority vested in them by law are published in the Federal Regulations of the United States. Executive orders appear under Title 3 of the Code; orders of the Secretary are codified under Title 22, Chapter I, Subchapter C, Foreign Relations. Regulations of other agencies affecting the work of the Service are published under various titles of the Code depending on the subject involved.

The regulations described above, together with all other permanent instructions and background information, from whatever source, of direct concern and general application to the Foreign Service are classified by subject and compiled in the Foreign Service Regulations manual issued by the Office of the Foreign Service, Department of State.

Con'sular Service. Personnel performing the consular functions of the United States Government are members of the Foreign Service of the United States (see DIPLOMATIC SERVICE). The United States has consular officers stationed in important cities or towns throughout the world. They hold the ranks of Consul General, Consul, Vice Consul, and Consular Agent, and must have an exequatur from the government of the country in which they are serving. Although all consular officers are under the jurisdiction of the United States diplomatic representative to the country concerned, this jurisdiction may be more theoretical than real in certain cases such as in distant colonies. Normally a supervising Consul General is maintained by the United States in important foreign countries to conduct the detailed supervision of the American consular officers stationed abroad.

Consular functions include issuance of passports to American citizens; registration of American citizens within the consular district of their residence abroad; issuance of bills of health to American and foreign vessels proceeding to the ports of the United States or its possessions; submission of reports on health conditions; issuance of visas to foreigners wishing to visit or immigrate into the United States; dissemination of information pertaining to the United States, its policies, and its way of life; promotion and protection of American shipping generally and reporting on shipping conditions; entry and clearance of American ships and aircraft; relief of seamen; shipment and discharge of seamen; settlement of disputes; certification of invoices of goods shipped to the United States; investigation of and reporting on foreign market values and undervaluations of merchandise for the protection of revenues; assistance in preventing the importation of prohibited articles; administration of regulations relating to plant and animal quarantine; supervision of disinfection of merchandise intended for export to the United States; custody, administration, and settlement of estates of American citizens and seamen who have died abroad; extradition cases; and functions in behalf of the Veterans' Administration, particularly relating to the education of veterans abroad under the 'G.I. Bill of Rights,' and the processing of claims for pensions and other compensation by veterans and their beneficiaries abroad.

Foreign Service officers perform notarial services in accordance with United States Federal, state, and local laws, and are frequently commissioned to take testimony.

Many services are performed only on payment of fees, prescribed under the law by the Tariff of United States Foreign Service Fees, and all fees received must be accounted for and remitted to the Treasury of the United States. Officers are responsible for the disbursement of government funds for the payment of the salaries and operating expenses of their offices.

At places where it is impracticable for the Foreign Service to maintain regular posts, the Secretary of State may appoint Consular Agents, who are generally local businessmen, either of American or foreign nationality. The principal duties of a Consular Agent include those related to shipping and the certification of invoices for which he receives a nominal salary.

Agents with powers similar to and more extensive than modern Consuls were provided by the commercial states of antiquity; and the name is the same as that of the chief magistrates of ancient Rome (see CONSUL). But the modern system has more clearly developed from the agents of Italian cities established in the Levant during the eleventh and twelfth centuries; and the title seems to have been taken from that of city officials of that period in Italy and southern France. A more extensive system of commercial representation was developed with the expansion of commerce in the sixteenth century; but the present highly organized consular services became general only during the nineteenth century.

In America agents with consular powers were appointed during the Revolution; and President Washington appointed a number of consuls. In 1788 a consular convention was made with France, which was confirmed by Act of Congress in 1792. But the service of the United States developed irregularly until reorganized by an Act of 1856, defining the powers and duties of officers, classifying offices, and regulating salaries and fees. In 1864 provision was made for the appointment of a force of consular clerks. Appointments and renewals in the consular service were, however, made largely on partisan lines, which led to frequent changes and prevented the development of an efficient service. An executive order of 1895 provided for a system of examinations. A more thorough change was made in 1906 by an Act of Congress reorganizing the service, followed by an executive order providing for a more effective system of examinations for appointments, and for promotions on the basis of efficiency records. In 1915 consular salaries were considerably improved, but it was in 1924 that the first establishment of a modern Foreign Service took place. The Rogers Act, passed in that year, consolidated the consular and diplomatic services. It also further developed the merit system within the Foreign Service. In 1931 Congress passed the Linthicum-Moses Act which carried this development another step forward.

In August 1946 Congress passed the Foreign Service Act of 1946. This Act established the present Governing Boards and Officers, new classification and salary structure, Foreign Service Institute, a 'promotion-up and selection-out' system, an improved retirement plan, and other administrative advancements, and serves as the basic legislation for the Foreign Service.

The United States Foreign Service consists of about 11,000 persons, including representatives in some 294 places in about 79 different countries and geographical divisions. In addition to combined diplomatic and consular offices, these 294 posts include 51 consulates general, 144 consulates, 7 vice consulates, and 22 consular agencies.

Sixty-two foreign governments have consular officers stationed in various cities throughout the United States.

Consum'ers' League, National. In the belief that the responsibility for some of the worst evils from which workers suffered rested with the consumers who sought cheap markets regardless of how cheapness was brought about, a small group led by Florence Kelley organized the National Consumers' League in 1899. Its special function was to investigate conditions under which goods were made so that the purchaser might be able to distinguish between the product of the sweatshop and that of a well-ordered factory. In the prosecution of this campaign was evolved the idea of the Consumers' League label, forerunner of the Union label.

In 1904 the League published the first handbook of child labor laws ever issued in this country. The National and New York Child Labor Committees were organized. The League worked for the establishment of the Federal Children's Bureau and for the ratification of the Child Labor Amendment.

A minimum wage bill, drafted by the League, was passed first in Massachusetts in 1912 and quickly followed by bills in other states. In 1923, the U. S. Supreme Court declared such laws unconstitutional. In 1933, therefore, the League drafted a new minimum wage bill, which was passed by seven state legislatures. The constitutionality of the minimum wage was finally established by a Supreme Court decision in 1937.

Unique in American history has been the League's defense of laws affecting the wages and hours of women. It established the legal concept that the constitutional phrase, 'freedom of contract,' should not be used to permit such exploitation of workers as undermines public health and welfare.

The League played a leading part in the passage of the first Federal wage and hour law in 1938, and in recent years has been engaged in a campaign to strengthen the law through an improved minimum wage and greater coverage. Its activities have also been extended to the states in an effort to place minimum wage laws on the statute books of states where no such laws now exist. The League is giving aggressive backing to the movement for Federal health insurance and a more extensive social security program. See SWEATING SYSTEM. Consult *Annual Report* of National and State leagues; Kelley's *Some Ethical Gains Through Legislation* (1905).

Contarini, kōn-tä-rē'nē, the name of a noble family in Venice, one of the twelve that elected the first doge. Between 1043 and 1684 eight doges were supplied by this family, which also included four patriarchs, and a large number of generals, statesmen, artists, poets, and scholars. The first Doge, DOMENICO (1043–71), began the rebuilding of St. Mark's. Among the men of learning were: AMBROGIO, ambassador to Persia (1473–7), who wrote an account of his voyage (1487); CARDINAL GASPARO, who flourished in the sixteenth century, and was Venetian ambassador at the court of Charles v, from whom he obtained the liberty of Clement vii (1527). He was created Cardinal in 1535; labored to reconcile Protestants and Catholics; and was sent as papal legate to the Diet of Ratisbon (1541). SIMONE (1563–1633) was Venetian ambassador at several Italian courts, in Spain, in Constantinople, etc., and was a Latin poet.

Conte, kôṅt (French, 'tale' or 'story'), is really the artistic elaboration of an anecdote; to be distinguished from *roman*, which is a long novel. Maupassant was the creator of the *conte* in modern French literature, although Voltaire may be said to have invented the philosophic *conte*. Perrault's fairy tales and the apologues of La Fontaine (in verse) also come under this classification.

Contemporaneity, kon-tem′-pō-*ra*-ne′i-ti, in geology, has a more extended signification than in ordinary language. When a geologist speaks of the Silurian systems of America and Europe having been accumulated contemporaneously, he simply implies that each occupies the same relative position in the succession of systems. Each was preceded by a Cambrian and succeeded by a Devonian system; but it is possible that the Silurian period may have commenced earlier or endured longer in one area than the other, though in face of all the evidence supplied by modern investigators it appears probable that the corresponding systems actually were accumulated during one long-continued period.

Huxley pointed out that two formations which are strictly contemporaneous may contain quite different fossils, and he proposed to call such groups of strata as have similar assemblages of organic remains, not contemporaneous, but *homotaxial* (see HOMOTAXIS).

Contem′porary Review, founded in London as a 'theological, literary, and social' review in 1866 by A. Strahan, its first editor being Dean Alford. He was succeeded in 1870 by James Knowles, who enlisted as contributors such men as Gladstone, Tennyson, Manning, Huxley, Morley, Froude, Ruskin, the Duke of Argyll, and Frederic Harrison. In 1877 Knowles was succeeded in the editorial chair by Alexander Strahan, who was followed in 1882 by Sir Percy Bunting. At present it has a distinct Liberal and Nonconformist tone.

Contempt of Court may be defined as any mode of conduct which implies disrespect toward the judiciary, or which shows a deliberate intention to lower it in the public estimation, or to set at naught or abuse its power and authority. Thus, insulting words spoken to a judge in his official capacity, or disorderly conduct in his presence, statements or writings which reflect on his capacity or integrity, disobedience by a witness to a subpœna, or refusal to answer legitimate questions, neglect by a party to comply with a judicial order or judgment, abuse of process or frauds practised on a court, are all instances of contempt. Superior courts have generally the right to punish summarily every such offence by fine or imprisonment; but the power of inferior tribunals in this direction is usually confined to such contempts as interrupt the actual course of their proceedings—*e.g.*, uproarious behavior in court, or neglect of a summons, but not slanderous statements uttered or published outside. Contempt of court may be a ground for a prosecution or indictment.

Fair criticism of the manner in which a court conducts its proceedings is not regarded as a contempt—at any rate if the aim of such criticism is the public utility, and not the attainment of private ends. Courts of equity regularly enforce their decrees for performance or non-performance of specific acts by punishing disobedience thereto as contempt. This is the origin of the popular phrase 'government by injunction.'

Content, a document signed by the master of a ship setting forth the vessel's destination, the stores shipped, and other matters. It must be delivered to the custom house searcher before the ship can clear outward.

Content, a term employed in logic to indicate the aggregation of attributes or notions which constitute the meaning and are expressed in the definition of a given concept.

Conti, kôṅ-tē′, HOUSE OF, a younger branch of the Bourbon House of Condé. Louis of Bourbon, first prince of Condé, uncle of Henry IV., married (1551) Eleonore de Roye, who brought him Conti. The title was renewed in favor of ARMAND DE BOURBON (1629–66), second son of Henry II., prince of Condé, younger brother of the great Condé.—FRANÇOIS LOUIS DE BOURBON (1664–1709), his son, was a gallant soldier, who was elected king of Poland after the death of Sobieski (1697), but did not ascend the throne. He took a brilliant part in the victories of Steinkirk and Neerwinden, and received the command of the army of Flanders (1709).—LOUIS ARMAND, elder brother of François (1661–85), fought with Turenne and Prince Eugene in Hungary.—LOUIS FRANÇOIS JOSEPH (1734–1814), only son of François Louis (1717–76), was the last of the line. He lived during the Revolution, and died an exile before the Restoration.

Conti, kôn′tē, AUGUSTO (1822–1905), Italian philosopher, was born at San Miniato in Tuscany. He served as a volunteer against Austria; subsequently taught philosophy at his birthplace; and became professor of philosophy at Lucca, of the history of philosophy at Pisa, and of mental and moral philosophy at Florence. Conti's main endeavor was to reconcile the conflicting theories of the philosophical schools. His works include: *Evidenza, amore e fede, o i criteri della filosofia* (1862); *Storia della filosofia* (1864); *L'armonia delle cose* (1878); *Dio come ordinatore del mondo* (1871); *Il vero nell' ordine* (1876).

Conti, NICCOLO DE', Italian trader and traveller, who made important pioneer journeys in the East during the fifteenth century. Having acquired a knowledge of Arabic, he passed through Persia, reached the coast of Malabar, ascended the Ganges, visited Gaur, Ceylon, Sumatra (Achin), Java, and Southern China, returning to Venice in 1444. His adventures were transcribed by Poggio Bracciolini, secretary to Pope Eugenius IV., and were published under the title *Historiæ de Varietate Fortunæ* in 1724.

Contigu′ity, LAW OF. See ASSOCIATION OF IDEAS.

Con′tinent, a convenient popular term for each of the larger continuous areas of land on the earth's surface. Topographically, the Old World island is divided by the Isthmus of Suez (72 miles wide) into Eurasia and Africa; the New World island by the Isthmus of Panama (36 miles wide) into North and South America; the island of Australia forms a fifth continent; and if Antarctica prove to be a vast island, it will form a sixth. Eurasia is by far the largest of these continents, and it is customary to call the smaller western peninsular region the continent of Europe, and the rest the continent of Asia. The boundary usually adopted between the two follows the Caucasus and the Ural River and Mountains.

Continent is used in a wider sense to include the islands adjacent to these continuous land masses. In this sense the British Isles are part of the continent of Europe, the Japanese islands part of Asia, and Tasmania and New Guinea of Australia. The boundaries of Europe in this wider sense include Iceland, connected with the Faroes and parts of the Outer Hebrides by its analogous recent volcanic deposits; Novaya Zemlya, which is a continuation of the Urals; Franz Josef Land, and Spitzbergen—all connected by shallow seas.

In the Mediterranean, however, the boundary must be arbitrary, as the structure of the lands on opposite sides of the Sicilian Strait and of the Ægean is homologous. Lampedusa, though on the African platform, and Linosa, on the African side of the deepest waters of the Sicilian Sea, are commonly reckoned as European because they belong to Italy. In the Ægean the boundary may be drawn along the axis of deepest water between the Cyclades and the Sporades.

The Asiatic platform ends at the Molucca Sea and the Lombok Strait, the latter of which was once supposed to separate Asiatic and Australian faunas (see Wallace's Line), and therefore to be the natural boundary between the two continents. This, however, has been shown not to be the case.

The Australian platform ends at the Jilolo Strait, and between the Aru and Kei Islands. Although the Moluccas have more Australian than Asiatic faunal affinities, the fact that the volcanic ring which bounds the east and southeast of Asia is continued through them leads us to take the edge of the Australian platform as the boundary line between the two continents.

Continental areas are subject to considerable change through elevation or subsidence; and stratigraphic geology shows that every part of the continents has been at some time beneath the sea level. Furthermore, the agencies of erosion are constantly at work transporting continental material into the sea, so that, if it were not for periodic renewal, all continents would long ago have disappeared. But they have been renewed by re-elevation from time to time, accompanied by more or less mountain folding; and besides, they seem to have been fairly permanent as to general position. The continental areas and the ocean basins seem to have held their relative positions with fair constancy. This has led to the idea of earth segments that are thought to act as units, all probably settling, but the larger more rapidly than the smaller, giving rise to continents and ocean basins.

The earth's surface is divided by the 1,000-fathom (6,000-feet) line of ocean soundings into two parts—one a region of depression surrounding the South Pole, and stretching north; the other a region of elevation surrounding the North Pole, and stretching south. All the land rising above sea level forms collectively the *continental area*, and amounts to 5/16 of the earth's surface. Around all continents the action of waves has carved out a ledge or terrace, the *continental shelf* (q.v.), on which the bottom slopes gently

STATISTICS OF THE CONTINENTS.

Elevation and Population.

	Mean Height (feet).	Percentage under 660 feet.	Percentage between 660 and 1,650 feet.	Percentage between 1,650 and 3,300 feet.	Percentage between 3,300 and 6,600 feet.	Percentage above 6,600 feet.	Highest Point (feet).	Population in Millions.	Density per sq. mile.
Eurasia	....	.....	.....	.....	.....	.....	29,000	1,248	60
Europe*	990	56.8	26.6	9.8	5.3	1.5	18,525	398	103
Asia	3,120	25.4	18.2	22.2	20.1	14.1	29,000	850	50
Africa	2,130	15.4	34.4	27.6	19.2	2.4	19,700	*ca.* 175	15
Old World	2,390	.....	.....	.....	.....	.....	29,000	1,423	44
North America	2,300	32.4	28.3	15.0	18.3	6.0	20,500	125	13
South America	1,900	42.6	26.4	15.6	6.4	9.0	23,500	38	5½
New World	2,130	.....	.....	.....	.....	.....	23,500	163	10
Australia	1,150	36.0	54.6	6.1	2.5	0.8	7,350†	6	2
Total Land Surface	2,300	29.8	27.1	19.0	16.4	7.7	29,000	1,587‡	35‡

* With Caucasus.
† On the island-continent of Australia. In New Guinea the highest mountains are estimated at from 15,000 to 20,000 feet.
‡ Including Oceania but not Antarctica in calculation of density.

Areas, Coast-Line Measurements, etc.

	Area of Mainland in 1,000 sq. miles.	Area of Islands, in 1,000 sq. miles.	Total Area, in 1,000 sq. miles.	Islands. Percentage of Total Area.	Peninsulas. Percentage of Mainland.	Coast-line measured on 1:6,000,000 Map.	Coastal Development of Mainland.	Mean Distance from Sea (miles).	Maximum Distance from Sea (miles).
Eurasia	19,515	1,347	20,922	6.4	21.0	67,000*	4.50	...	1,490
Europe	3,560	305	3,865	7.9	29.3	23,500	3.50	212	980
Asia	16,015	1,042	17,057	6.1	19.1	43,500*	3.19	485	1,490
Africa	11,273	233	11,506	2.0	0.0	19,000*	1.64	416	1,120
Old World	30,848	1,580	32,428	4.9	13.3	85,800†	4.74	...	1,490
North America	7,708	1,565	9,273	16.9	10.2	47,000	4.86	292	1,025
South America	6,814	55	6,869	0.8	0.0	17,800	1.96	342	995
New World	14,522	1,620	16,142	10.0	5.6	64,800	4.98	...	1,025
Australia	2,934	501	3,435	14.6	5.5	12,100	2.01	218	570
Total	48,304	3,701‡	52,005§	7.1	10.5	162,700	7.60	....	1,490

* With Suez Canal. † Without Suez Canal. ‡ Excluding Oceanic islands.
§ Including Oceanic islands and Antarctica, 55,500,000 square miles.

from the land to soundings of 100 fathoms, and then abruptly plunges to the oceanic depression (see OCEAN). The absolute elevation of continents or mountains above mean sea level cannot easily be determined. Sir John Murray calculates the average height of continental land above sea level as 2,200 feet.

The accompanying tables give the more important statistics about the continents. See GEOLOGY; GEOGRAPHY; AMERICA; EUROPE; AFRICA; ASIA; AUSTRALIA; ANTARCTIC REGION.

Con'tinen'tal Congress, the central body through which the English colonies in America acted in matters of common concern before and during the American Revolution. The name is also applied to the body, more properly designated the *Confederation Congress*, which met under the Articles of Confederation (1781–9).

The first Continental Congress met in Philadelphia on Sept. 5, 1774, and was composed of delegates, chosen by irregularly convened assemblies and conventions, from all the colonies except Georgia. Although actually without legal status, it voiced officially the sentiments of the united colonies, issued a declaration of their rights and grievances, prepared various addresses, and carried a resolution, known as 'the Association,' that no more goods should be imported from England and the other English colonies, particularly no slaves or tea. After recommending the immediate selection of delegates for a second congress, to be assembled in May, 1775, if no redress of grievances should have been obtained, the first body was dissolved on Oct. 26, 1774.

The second Continental Congress, which was convened on May 10, 1775, and continued, with occasional adjournments, till March 1, 1781, was composed of delegates appointed by the colonies (States) in varying number, in various ways, and for varying periods of service. At first acting as a centre for common consultation and protest, it soon assumed important administrative functions. It took necessary measures for the creation and administration of the Continental Army and for the carrying on of the war; it appointed a Committee of Secret Correspondence (Nov. 29, 1775), to which it intrusted the foreign relations of the colonies, and drew up and adopted (July 4, 1776) the Declaration of Independence. It did not levy taxes, although it made requisitions on the various States; it did not attempt to dictate in what manner or for how long its members should be chosen; and it did not usurp the jurisdiction of the various States over their citizens, though by correspondence and otherwise it greatly influenced the acts of the provincial and State governments. The vote in the Congress was uniformly cast by colonies or States, each having a single vote.

The dates and places of actual meetings of the Continental Congress are as follows: Sept. 5—Oct. 26, 1774, Philadelphia; May 10, 1775—Dec. 12, 1776, Philadelphia; Dec. 20, 1776—March 4, 1777, Baltimore; March 4, 1777—Sept. 18, 1777, Philadelphia; Sept. 27, 1777, Lancaster, Pa.; Sept. 30, 1777—June 27, 1778, York, Pa.; July 2, 1778–1781, Philadelphia. The meeting place of the Continental Congress, however, would uniformly have been Philadelphia but for the exigencies of the times. The presidents of the Continental Congress (1774–81) were successively Peyton Randolph, Henry Middleton, Peyton Randolph, John Hancock, Henry Laurens, John Jay, Samuel Huntington, and Thomas McKean.

There has been much controversy concerning the exact character of the Continental Congress, some writers maintaining that it was essentially a national body, exercising powers that implied the existence of a nation; others that it was merely a collection of delegates representing sovereign States, which had in no wise abrogated, impaired, or permanently delegated their sovereignty. Though primarily a temporary and deliberative body, the Continental Congress became, by the acquiescence of the people, a provisional government, until the Articles of Confederation gave Congress a constitutional basis.

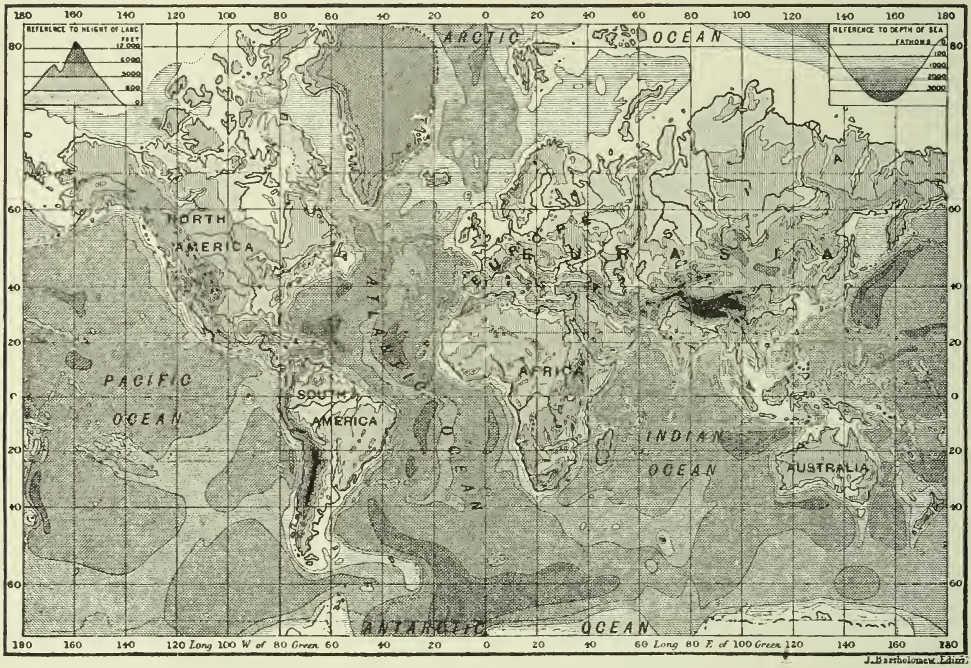
For further information concerning the Continental Congress, see UNITED STATES, *History;* REVOLUTION, AMERICAN. The official proceedings may be found in the *Journals of Congress.* Consult J. Fiske's *Critical Period of American History.*

Continental Shelf, CONTINENTAL LEDGE, or CONTINENTAL PLATFORM. On a hypsometric map of the globe each continent is seen to be bordered by a submarine platform or ledge, termed the Continental Shelf, not over 600 feet below sea level. Beyond it the sea bottom slopes steeply down toward depths measured in thousands of feet. This shelf is really a part of the continental unit, and is beneath sea level because the seas more than fill the true ocean basins. The contour line of 600 feet is used to define the margin of the continental blocks. The Old and New Worlds are united by it in the Bering Sea and Strait, but Australia is separated from them by deep waters. The continental shelf is narrow round all the south continents, but is continuous between the Falkland Islands and South America, between Tasmania and New Guinea and Australia. It forms a wider platform round the north continents, and attaches Newfoundland and Greenland to North America, the British Isles and Novaya Zemlya to Europe, the Japanese islands and most islands of the Malay Archipelago to Asia. The shallow seas of these continental shelves are the richest fishing grounds in the world—*e.g.* the Newfoundland Banks, the North Sea, Dogger Bank, and the Agulhas Bank off the southern extremity of the Cape Peninsula, South Africa.

Continental System, which was Napoleon's plan for shutting Great Britain out from all connection with the continent of Europe, began with his Berlin Decree (q.v.) of 1806, declaring the British Isles in a state of blockade, and prohibiting all commerce and correspondence with them. All merchandise belonging to an Englishman became a lawful prize, and all trade in English goods was prohibited.

The peculiarity of the war between France and Great Britain at that time was that neither could directly attack the other. The defeat of the Russians and Austrians by Napoleon at Austerlitz (1805) had shattered Pitt's attempt to form a military coalition on the Continent; and the Battle of Trafalgar (q.v.), in the same year, removed all possibility of the invasion of Britain. British trade and industry meanwhile were prospering in their security, and Napoleon saw that if he were to be successful he must attack Britain through her trade. But the latter had command of the seas, and Napoleon's only resource was to forbid the importation of British goods into the Continent. This was the object of the Berlin Decree, to which Britain answered with the Orders in Council of 1807, practically declaring the Continent in a state of blockade, and forbidding all trade.

Most of the countries of Europe were coerced by Napoleon into joining the Continental System; but with the breaking up of Napoleon's power it fell to the ground. The policy of England in connection with the Continental System was not without its mischievous results, for the measures adopted in regard to neutral commerce led to the American War of 1812. Consult *Cambridge Modern History* (vol. IX., chap. xiii.; 1907).



Orographical Chart of the World, Showing the Continental Shelf.

Contingent Liability, a liability which is dependent upon some future event. Thus, if a bank underwrites $50,000 worth of shares in an issue by a new company, it incurs a contingent liability of $50,000. If it can find subscribers for that amount among its customers or correspondents, it need not pay anything itself; but if it cannot, it must then take up the shares and pay for them to the extent to which it has failed to obtain subscribers. For taking this risk, of course, a bank or other underwriter exacts commission. Such a liability may be proved in the bankruptcy of the person liable.

Contingent Remainder, a remainder so limited as to depend upon a condition which may not be fulfilled until after the determination of the estate upon which the remainder is limited. For example, if land is given to A for life, with remainder to the first son of B, and B has no son at the date of the grant, this is a contingent remainder, contingent on the birth of a son to B. As soon as a son is born, it becomes vested. See REMAINDER.

Con′tinu′ity, in geometry, one of the most important properties of functions, and the subject of much recent work. For instance, a function to be differentiable must be continuous, and many of the well known theorems of analysis are valid only if the function dealt with and its differential coefficients are continuous. A function $\phi(x)$ of one variable x is defined as continuous if it is possible to find a quantity ϵ such that

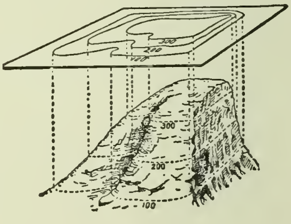
$$|\,\phi(x+h)-\phi(x)\,|<\sigma$$

for all admissible values of h, such that $|\,h\,|<\epsilon$, where σ is as small as we please. This definition can be extended to a function of more variables. As an example of a discontinuity, we may take the curvature at a cusp. See FUNCTION. Consult Forsyth's *Theory of Functions;* Hobson's *Theory of Functions* (1907).

Contin′uous Service. See ARMY ENLISTMENT.

Contort′ed Strata. Among the rocks of the earth's crust, and especially those which are of greatest age, many have been subjected to great compression, which has thrown them into complicated folds, crushed them, and much disturbed their bedding planes. Such rocks are said to be 'contorted'; and as the forces which produced these results are those which are active in mountain building, contorted strata are commonest in folded mountain ranges, such as the Himalayas, the Alps, the Appalachians, and the Highlands of Scotland. Not only are the rocks crumpled, but changes in their minute structure have also taken place; so that by increasing alteration shales and sandstones may be converted into various types of schist and gneiss. See GEOLOGY.

Contour, kon-tōōr′ *or* kon′tōōr, in physical geography, an outline. The form of the surface of the ground is commonly indicated on maps by *contour lines* drawn at fixed intervals, each passing through points at the same height above sea level. Where the slope of the ground is steep, the lines lie near to one another, and recede as the slope becomes more gentle. A line drawn from a point on a contour line to the nearest point of the one below it—*i.e.*, at right angles to the latter—is the *stream line,*



Contours.

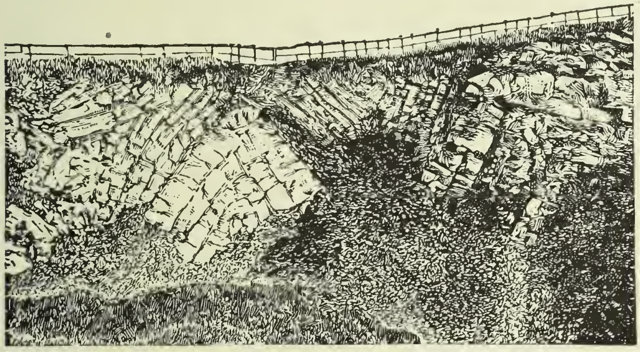
or line of most rapid descent. Thus in any given system of contour lines the corresponding system of stream lines can be obtained by drawing a system of orthogonal curves. Contour lines, however they may vary in form in different cases, have certain common properties which render them of assistance to the surveyor, engineer, and geographer.

The method of contours has found many applications in science. In meteorology (q.v.), isothermals and isobars are simply contour lines drawn through points having the same temperature and barometric pressure respectively. Similarly, lines of equal magnetic dip, variation, and intensity are examples of applications in terrestrial magnetism. The method is also applicable to other dimensions in space. The contours of a curve are points; of a surface, curves; while those of a solid are surfaces. See MAPS; SURVEYING.

Con'traband of War is a term of international law used to designate goods which are useful in operations of war, and which are liable to confiscation by a belligerent when in transit to a destination in the enemy's country. All goods may be divided into three classes, *viz.:* (1) *contraband,* which are useful solely for war purposes, such as arms, ammunition, military clothing, etc.; (2) *conditional contraband,* which are used for both war and peaceful purposes, such as coal, oil, provisions, etc.; (3) *free goods,* which are used solely for peaceful purposes in their existing form, such as raw materials, wool, hemp, flax, metallic ores, machinery for agriculture, furniture, etc.

The foregoing classification is based upon the works of Grotius and later publicists of acknowledged authority, upon the average practice for the past hundred years, and upon the *Declaration of London* of 1909.

Declaration of London. — In 1909 a convention of the principal naval powers was held in London, which drew up an agreement as to what should and should not be considered contraband of war. The convention established three classifications for cargoes in neutral vessels—(1) absolutely free cargoes, or parts of cargoes, (2) absolutely contraband, and (3) conditionally contraband.



Contorted Strata, as Seen in a Quarry.

(1) The absolutely free articles included raw cotton, raw wool, silk, jute, flax, hemp, and other raw materials of textile industries, as well as fabrics woven therefrom; oleaginous nuts and seeds, copra, india rubber, resins, gums, hops, raw hides, horns, bone and ivory, natural and artificial fertilizers, comprising nitrates and phosphates susceptible of use in agriculture; ores, earths, clays, lime, chalk, stone, chinaware and glassware, soaps, paints, varnish, soap ash, caustic soda, sulphate of soda, ammonia, machinery used in agriculture; and many other articles which by their nature would not be of value in warfare.

(2) Absolutely contraband articles consisted of arms and powder of every description, military equipment of every kind and character, and saddle, draft, and pack horses.

(3) The list of conditional contraband articles included food supplies, fodder and grain, gold and silver, coined and in bars, and paper representing money, air ships and flying machines, and articles which might possibly be used as munitions of war.

While this Declaration is not really a part of international law, because many nations have not ratified it, nevertheless, since it was prepared by distinguished representatives of nearly all the important states of the world, it embodies in a general way (and in most respects in detail) the present accepted views as to maritime war. Even the governments (including those of the United States and Great Britain) which did not ratify it have signified their approval of most of its provisions. Among the articles which were unacceptable to the British government were those giving lists of conditional contraband and free goods. Pursuant to her views and previous policy, Great Britain has in the present Great War of Europe (q. v.) extended the declaration list of conditional contraband to include certain raw materials such as cotton, flax, copper, nitrates, etc. Nearly all gunpowder is now made from cotton by the action of nitric acid, and copper is used for cartridge cases.

Contraband goods are liable to confiscation if they are shown to be destined for territory belonging to or occupied by the armed forces of the enemy. It is immaterial whether the carriage of the goods is direct or entails trans-shipment or a subsequent transport by land. A neutral vessel is liable to seizure and condemnation for carrying contraband goods. But it has not been the custom for prize courts to condemn the vessel if the contraband was a very small part of her cargo, especially if the owners (or charterers) and captain were unaware of its character. The Declaration of London provides that if the contraband goods form more than half the cargo, reckoned either by weight, volume, or value, the vessel may be condemned.

Conditional Contraband goods have been a cause of much dispute. Most of the Continental nations have opposed such designation, and have divided all goods into contraband and free. Great Britain and the United States have always supported the 'conditional' idea, which made the goods subject to condemnation only when there was strong proof that they were intended for the use of the enemy's forces. The Declaration of London is a compromise. It provides for conditional contraband, and gives a list of articles. These may, without notice on the part of any belligerent, be seized as contraband if bound to any territory owned or controlled by a belligerent, or to his naval or military forces; but not if bound to a neutral port, no matter what the ultimate destination of the goods. Under the 'Rhine' treaty, Holland is bound not to stop or interfere with shipments to her ports bound for Germany; and it was partly because of this condition that Great Britain established her patrol lines in such a way as to enable her to examine such shipments. When conditional contraband has been seized in the present war, Great Britain has so far, in place of confiscation, merely exercised a power of preemption, purchasing the goods seized.

Free goods of neutral ownership are not liable to confiscation, even if on board the vessel of an enemy. A neutral vessel may carry on a trade in such goods, through any port of a belligerent that is not blockaded, without incurring penalty; and any interference with such trade is a just ground for a claim of damages.

The sale and transportation by neutrals of contraband of war are not forbidden by international law, but belligerents have the right to stop them, if they can; and the right to seizure and confiscation is recognized, but the latter can only take place after trial in a prize court. If a captor destroys a neutral prize, he must make provision for the safety of the crew and passengers; and if he cannot show that the destruction was necessary to secure the safety of his vessel or the success of his operations, he must pay the full value of the vessel and cargo, without regard to whether the capture was valid or not.

Consult H. W. Halleck's *International Law* (4th ed. 1908); W. E. Hall's *Rights and Duties of Neutrals*, and *International Law* (6th ed. 1910); Admiral Stockton's *Outlines of International Law* (1915); A. B. Hall's *Outline of International Law* (1915).

Contract. A contract is a promise or agreement enforceable at law, either oral, or in writing, or under seal. When under seal it is called a *specialty*, otherwise it is a *simple* contract. In every contract there must be mutual assent and consideration. Mutual assent is arrived at by means of offer and acceptance, while consideration is a technical requirement of the common law of somewhat doubtful origin. It is based on the idea that no gratuitous promise is binding at law, but that anything, no matter how slight, given in return for the promise will make it enforceable, provided the other requirements are present.

An offer comes from the offerer, and is the expression of his wish to enter into an agreement with the offeree. Therefore an offer must be communicated, by which is meant that it must be actually received and brought home to the mind of the offeree. So an offer is made in the place where it is communicated, and not in the place where the offerer starts it upon the way of communication. This is important in determining where a contract arose, or if it arose at all, for everything in connection with the formation of a contract is governed by the law of the place where the contract arises.

An offer once made remains open a reasonable time unless accepted, rejected, or revoked. What constitutes a reasonable time must depend upon the circumstances of each case. If two or more persons are together, and one offers to sell his watch to another for $10, the offer would naturally terminate when the parties separated. It would not be in the contemplation of either that the offer might be accepted in a month or a year's time. The secret intention of the offerer that his offer shall terminate in less than a reasonable time is not enough; he must take steps to revoke it. It is generally agreed that a revocation must be communicated; although it has been held that actual notice to the offeree through a third party of an act on the part of the offerer inconsistent with keeping the offer open is sufficient revocation; *e.g.*, the sale of a house to a third party, of which the offeree is informed. If not revoked or accepted, an offer may be terminated by a rejection by the offeree; but such rejection must also be communicated. In any case, an offer terminates instantly upon the death of the offerer.

These rules become of great importance when the offer is made by mail to an offeree at some distance. In almost every jurisdiction it is held to become effectual upon the mailing of the letter. This is in harmony with the general rule that an acceptance need not be communicated, but may be completed by the doing of an overt act capable of proof. In some States, however, it has been held that an acceptance must be communicated, and that the contract arises when it is received.

Contracts are divided into two classes, Unilateral and Bilateral. A *Unilateral Contract* is one in which the consideration is some act done by the offeree in exchange for the offerer's promise; and since the full consideration asked for must in every case be given, a contract does not arise until the act is fully completed. For instance, if A says to B, 'I will give you $10 if you will wash all the windows in my house'; and if B washes half the windows, and is then stopped by A, no contract has arisen, because the consideration has not been fully performed. But the moment all the windows are washed a contract arises, whether A knows it or not, and he is bound to pay the $10. However, if B's failure to fully perform should be attributable to A, A might still be obligated to pay B at least the value of the service actually rendered.

A *Bilateral Contract* is one in which a promise is given in exchange for a promise; and a contract arises at once which both parties are bound to perform. An offer can be accepted only by the offeree; but an offer may be made to an indefinite number of people, or to some one undetermined person, as when A calls out at a fire, 'I will give $100 to any one who will bring me a rope.' An offer must be accepted in the terms of the offer; any variation has the effect of a rejection. This, however, may be treated by the offerer as a counter offer, and accepted by him as such. Any mistake of terms or parties will also prevent a contract from arising.

Consideration in a contract may be anything, however slight, provided it is given or done by the offeree at the request of the offerer, and is something the offeree has a legal right to do or to refrain from doing. It is a totally different thing from value, which is properly money or money's worth, while consideration may be of no actual or real value whatsoever so long as it is what the offerer demands. An illegal act, or one against public policy, will not be recognized as consideration.

Under the *Statute of Frauds* (see FRAUD), which is in force in most of the United States in one form or another, certain contracts must be in writing. The effect of this provision is that the defendant must plead the statute, and set up that the contract was not in writing, or the plaintiff may still win, although the words of the statute make the contract voidable; however, that is the interpretation—it is held to be a defence only. A contract must be in writing—(1) if by its terms it cannot be performed within one year from the making thereof; (2) if it is a special promise to answer for the debt, default, or miscarriage of another person; (3) if it is made in consideration of marriage, except mutual promises to marry; (4) if it is a new promise to pay a debt discharged in bankruptcy; (5) if it is the personal promise of an administrator or executor to be personally responsible for payment, etc., in respect of the estate of the deceased; (6) if it is a contract for the sale of an interest in real estate; (7) if it is a contract for the sale of personal property of a value in excess of an amount often fixed by statute.

Only such persons as are mentally competent in the eyes of the law may make a contract, so that minors, idiots, insane persons, etc., may not do so, nor married women in those States—now few in number—where there are no statutes giving the right. In almost every jurisdiction married women may contract as freely as unmarried women, which is as freely as men.

An infant is said to be able to enter into a contract for necessaries, and this is true to the extent of binding him to pay the market price for necessaries, but not always the contract price. An infant may repudiate or affirm his contracts when he attains his majority. A contract between an infant and an adult is always binding on the adult.

Certain contracts are under seal and are governed by special rules with regard to consideration. Consideration was not necessary at common law in such contracts, the use of a seal being held to 'import' the existence of legal consideration, so that the allegation of consideration need not be set up, but will be presumed until it is questioned; but then it must be shown. In New York, a third person for whose benefit a contract was made may sue upon it, though otherwise an entire stranger to the contract. This theory has been repudiated in England.

A very important question in contract is that of *conditions*. These may be express or implied, and the performance of a condition must always be alleged. They are of frequent occurrence, and are sometimes difficult to construe: it is hard to say, that is, whether it is a condition or a promise. The courts will always give effect to an express condition, however unreasonable it may seem; but implied conditions are only enforced when justice will thereby be done. (See CONDITION.)

Certain contracts are void because of illegal subject matter, and sometimes voidable for the same reason. Gambling contracts are illegal in most jurisdictions; so are contracts in restraint of trade, or to commit a crime. A contract may be discharged—that is, terminated—by mutual consent of the parties; by performance becoming impossible, as by death of one of the parties in case of a contract for personal services; by its own terms; or by complete performance. Death of a party, except where his contract was for personal services, does not terminate the contract: and his heirs can be held to the extent they have inherited property, as on a contract to convey real estate Where one party breaks his promise, the other may treat the contract as terminated.

Consult Langdell's *Summary of Contract;* Pollock's *Principles of Contract;* Anson's *Principles of the Law of Contract.*

Con'tractil'ity. See MUSCLE.

Contrac'tions. See ABBREVIATIONS.

Contract Labor. Since the first settlement of America, scarcity of labor has led to devices for importing cheaply paid labor from Europe, under agreement to work for a specified time to repay passage money. In the colonial period the importation of contract laborers assumed extensive proportions. Such laborers, known as indentured servants, were bound out for periods varying from three to seven years, according to the efficiency of the laborer and the expenses incurred in bringing him to the colonies. A system of laws regulating such labor contracts was developed, and under these the status of the contract laborer was little better than slavery. With the increase in African slavery the importation of contract laborers diminished, and after the Revolution the system had fallen into disuse. Throughout the early history of the Federal Government, however, instances of importation of contract laborers occur. These became more numerous in the Northern States in the period beginning with the Civil War; and in the Far West the importation of contract laborers from China played an important part in the development of the country.

By Act of Congress of Feb. 26, 1885, it was declared unlawful for any person, company, or corporation to prepay transportation or in any way aid aliens to immigrate into the United States under express or implied contract to labor; and all such contracts were declared void. The penalty for violation is a fine of $1,000 for each immigrant so brought into the country; while the master of a ship who knowingly lands passengers who have been induced to immigrate in contravention of this provision of the law may be fined not more than $500, and imprisoned for not more than six months.

At first the courts construed the law as applying only to unskilled laborers imported under contract to perform manual labor. The labor organizations, however, regarded such an interpretation as inadequate, and on March 3, 1903, the law was amended to include all kinds of skilled and unskilled labor.

The law has been found exceedingly difficult to execute, and in spite of it the importation of contract laborers is carried on extensively at the present day. Special effort has recently been made, through the U. S. Immigration Bureau, to check this evil, and in 1914, 2,793 immigrants were debarred and 51 expelled from the United States under the law's provisions. Other important advances in 1914 were the decision of the U. S. Supreme Court, upholding the law, in a bitterly contested case against the Grant Brothers Construction Co., which had attempted to supply itself with 45 needed laborers by importing them from Mexico; and the payment by another company of $50,000 in settlement of claims against it. See LABOR; IMMIGRATION; CHINESE IMMIGRATION.

Contract Notes, BOUGHT AND SOLD NOTES, or ADVICE NOTES, are memoranda sent by a broker or agent to his principal, informing the latter of a sale or purchase of goods or stock on his behalf. These are valid evidence of the transactions therein referred to.

Contract Surgeon in the United States Army, is a civilian surgeon employed under contract with the surgeon-general of the army. He is not a commissioned officer, and can, after his official duties are over, carry on a private practice. He occupies the same position as an assistant surgeon of the rank of first lieutenant, and may be detailed for all duties except on courts martial. A contract surgeon may be a physician or a dental surgeon; he must be between the ages of twenty-four and forty, and must pass an entrance examination. Contracts are made for three years.

Contralto, kon-tral'tō (sometimes termed *alto*), the name given to the lowest or deepest variety of the female voice. The tone color is serious, generally sympathetic, often of peculiar richness, and, in the lower range especially, of great fulness. The contralto voice has now a definite position in choral music. As a solo voice it was long neglected, and to Italian composers, especially Rossini, belongs the honor of fully recognizing its capabilities in this direction. The high contralto has generally the same range of compass as the mezzo-soprano, but differs from it in its character of tone. Contralto voices generally consist of two registers, the lowest beginning at F or G below middle C, and reaching as high as the A or B above it. The higher notes up to the next F or G partake more of the character of the soprano. See VOICE.

Contrat Social, kôṅ-trä' sō-syȧl' ('Social Contract'), is the title of the chief work (1762) of J. J. Rousseau (q.v.), and is descriptive of the doctrines of a school of political thinkers, English and French chiefly, to whose views of the origin of society Rousseau gave the most brilliant but not the soundest expression. The English philosopher Thomas Hobbes (q.v.) was practically the first exponent of the view that society originated in a contract made by free individuals with each other, by which, in order to obtain certain obvious advantages, they abandoned their primitive freedom in the state of nature, which in Hobbes' view was a state of war. Locke followed, but as a defender of the right of revolution he modified Hobbes' doctrine, which in practical politics was a defence of absolutism. The idea of a social contract was popular during the eighteenth century, but it was not until it came to be believed that the age of freedom had been a golden age, that the revolutionary aspect of the doctrine became important. Rousseau's work was one of the forces which made the French Revolution (q.v.).

Con'travalla'tion, Lines of, form a chain of works around a besieged place to resist the sorties of the garrison. See FORTIFICATION; SIEGE.

Con'trayer'va, a medicine once in much repute against low fevers, and as a mild stimulant and diaphoretic; also as efficacious against snake bites. It consists of the root stocks (rhizomes) of different species of *Dorstenia,* a tropical American plant of the natural order Artocarpaceæ.

Contreras, Battle of, kōn-trā'-*ras* (Aug. 19–20, 1847), in the Mexican War (q.v.), forms one of three engagements, the other two being at Churubusco and San Antonio, fought by Gen. Winfield Scott on his march from Vera Cruz to the City of Mexico. The village of Contreras is 12 miles southwest of the City of Mexico, and the Mexicans, under Generals Valencia and Santa Anna, occupied a strong position on rising ground. The Mexican troops held their own until the morning of Aug. 20, when General Scott attacked both in front and rear, and they then retired in confusion. The American forces numbered 4,500, of whom less than 100 were killed and wounded; the Mexicans, about 19,000, of whom over 1,500 were killed or captured.

Contribu'tion, in general, the act of giving conjointly with others. In law, it denotes a payment made by each of several persons as his share in a common loss or a common expense. In maritime law (q.v.), the principle is exercised when losses have arisen from the sacrifice of the cargo to prevent the ship from destruction or capture. In American politics the term refers to the payment of money, both by individuals and corporations, for campaign purposes, a practice which has been the subject of State and Federal legislation (see ELECTIONS).

In a military sense, contribution indicates the imposition, by an enemy, of a levy upon the citizens of a town or country for forage, conveyances, etc., for the use of invading troops. Such a contribution is collected as an extraordinary tax, the ordinary tax being appropriated by the invaders as a part of the public property. Except when a portion of territory has been surrendered in order to protect the country as a whole, the losses sustained by contribution are not considered a matter of state control, and the state is not held liable for them.

International agreement or convention has sought to regulate the demands for military contribution. In the Crimean, Mexican, and Boer Wars, contributions were not levied; but the Germans exacted indemnity in the Franco-Prussian War, and they have levied contributions in Belgium and Russia during the present Great War (see EUROPE, GREAT WAR OF). See INVASION; TAXATION.

Contrib'utory Negligence. See NEGLIGENCE; EMPLOYERS' LIABILITY.

Contri'tion, or sorrow for sin, in Roman Catholic theology signifies 'a sorrow of mind and a detestation for sin committed, with a firm purpose of not sinning in the future.' See CONFESSION; PENANCE.

Control'ler Bay, at the mouth of the Bering River, Alaska, came into prominence as a result of President Taft's action in throwing open to private entry a tract of land containing 12,800 acres, taken from the Chugach National Forest (Oct. 28, 1910). In his message to Congress the President declared the importance of the Bay to be that 'it lies about 25 miles from very valuable coal deposits known as the Bering Coal Fields,' and that the construction of a railroad would materially assist the development of Alaska. See ALASKA, *Mining.*

Contucci, kōn-tōōt'chē. See SANSOVINO.

Contu'sion. See BRUISES.

Conularia, kon-ū-lā'ri-*a,* a genus of fossil shells which resemble cones open at the base, and which are variously ornamented with grooves, ridges, furrows, tubercles, etc. They are sometimes six inches in length. A great number of species is known, belonging mostly to the Silurian, Devonian, and Carboniferous formations. Their affinities are somewhat doubtful, but they are believed to represent the pteropods. The shell of the Conularia shows four prominent longitudinal ridges. See PTEROPODA.

Conun'drum, a kind of riddle (q.v.), usually in the form of a question, the answer to which involves a pun (q.v.). Examples are: Q. Why is a shoemaker like a true lover? A. Because he is faithful to the last. Q. When is a bill not a bill? A. When it is dew (due).

Convallaria, kon-v*a*-lā'-ri-*a.* See LILY OF THE VALLEY.

Convec'tion Currents. See EXPANSION.

Convent. See MONASTERY.

Conventicle, kon-ven'ti-k'l (Latin *conventiculum,* a diminutive of *conventus*), originally meant a cabal among the monks of a monastery. The word was given as an appellation of reproach to meetings of the English and Scottish Nonconformists in the seventeenth century: The Conventicle Act of 1664 was passed for the suppression of these conventicles, being repealed by the Toleration Act of 1689.

Conven'tion, in general usage, a rule of conduct established by custom or agreement; in diplomacy and in military affairs, an international compact or agreement other than a treaty; in a political sense, an extraordinary gathering of representative delegates for a definite purpose.

Numerous international conventions have been made, covering a wide range of subjects, military, economic, industrial, etc. The Convention of Cintra (1808), under which the French evacuated Portugal with the honors of war; the Geneva Convention (q.v.) of 1864, regulating the care of the sick and wounded in war; and the Convention of Safety of Life at Sea (1914) are typical.

In its political significance, the term convention is to be distinguished from the formal meeting of a regularly constituted legislative body, though it may be applied to such a body when irregularly convened. It is thus used of those Parliaments in British history which have met without the royal summons—notably the Convention Parliament or Free Convention of 1660, which restored Charles II. to the throne; and the meeting, in 1689, of the Lords and Commons, on the summons of the Prince of Orange, to transfer the succession of the crown and kingdom from the House of Stuart to William and Mary. The First

French Republic was established by the Convention of 1792, and the government was in its hands until it was assumed by the Directory in 1795. In the United States, joint meetings of the two branches of Congress or of the State legislatures are sometimes designated as conventions.

A *Constitutional Convention* is a body of elected representatives or delegates chosen for the specific purpose of framing or revising a national or State constitution, such as the Constitutional Convention at Philadelphia in 1787, and the New York State Constitutional Convention in 1915. (See CONSTITUTION; CONSTITUTIONAL CONVENTIONS.)

Political Conventions, in the United States, are local, State, or national assemblies of representatives of the various political parties for the express purpose of selecting candidates for elective offices. Prior to 1824, candidates for the office of President of the United States were chosen by caucuses of the State legislatures. The first National Convention was called by the Anti-masonic Party at Baltimore in 1831, and since that time, all presidential nominations have been made at national conventions in which the representation is usually determined by the party vote at the preceding election. In the National Conventions of the Republican Party, a majority of the delegates is necessary to nominate candidates; in the Democratic National Conventions, each State votes as a unit, the State delegation being governed by the majority of its delegates, and a two-thirds vote is necessary to nominate.

The primary and convention systems are now the chief modes of nominating candidates for elective offices. The primary, which is the meeting of the party voters of a district, nominates candidates for local offices, and selects delegates to the higher nominating bodies. The facility with which party organizations and party leaders have been able to use this system to control the elections has led to efforts on the part of some States to regulate the system by law, causing the primaries and conventions to represent more directly the will of the voters. Some favor the direct primary as a method of choosing candidates for public office, and would restrict the convention system to determining the details of party policy, and formulating the party platform. See ELECTIONS; REPRESENTATION; REPUBLICAN PARTY; DEMOCRATIC PARTY. Consult J. Bryce's *American Commonwealth* (1914).

Conver'gence, in mathematics. See SERIES.

Convergence, in biology, a term used to designate the appearance in two forms, not nearly related, of similar characters, which have been developed as an adaptation to similar conditions, and are not derived from a common ancestor. Thus, both in America and in Europe, a cave-inhabiting amphibian occurs (see CAVE ANIMALS), the two forms displaying similar characters, though they have certainly been derived independently from ancestors living at the surface. In the same way the Tasmanian wolf (*Thylacinus*), a marsupial mammal, shows much similarity to the eutherian wolf, but these resemblances cannot be ascribed to a common ancestry. See BIOLOGY.

Conversano, kōn-ver-sä'nō, town and episcopal see, Italy, in the province of Bari; 16 miles southeast of Bari. It has a fine thirteenth-century cathedral and an ancient castle. Wine and oil are exported. Pop. 15,000.

Converse, FLORENCE (1871–), American author, was born in New Orleans, La. She was graduated from Wellesley College (1893; M.A., 1903) and was a member of the editorial staff of *The Churchman* (1900–08), and of *The Atlantic Monthly* (since 1908). Her writings include *Diana Victrix* (1897); *The Burden of Christopher* (1900); *Long Will, a Romance* (1903); *The House of Prayer* (1908); *A Masque of Sibyls* (1910); *The Children of Light* (1912); *The Story of Wellesley* (1915); *The Blessed Birthday* (1917); *Garments of Praise* (1921); and numerous short stories.

Converse, FREDERICK SHEPHERD (1871–), American composer, was born in Newton, Mass. He was graduated from Harvard University (1893), and from the Royal School of Music, Munich (1898). From 1899 to 1901 he was instructor in harmony at the New England Conservatory of Music, Boston; and from 1901 to 1907 instructor and assistant professor of music at Harvard. Since 1907 he has devoted himself to composition. His opera *The Pipe of Desire* was the first work by an American to be performed at the Metropolitan Opera House, New York City. His works include *Sonata in A; Suite for Piano; La Belle Dame sans Merci; Quartet in A Minor; Laudate Dominum;* an oratorio, *Job;* four operas, *The Pipe of Desire, The Sacrifice, Beauty and the Beast,* and *The Immigrants;* the symphonic poems, *The Festival of Pan, Endymion's Narrative, The Mystic Trumpeter, Ormazd, Ave atque Vale,* and *Song of the Sea;* a cantata, *The Peace Pipe; Symphony in C Minor; Symphony in E Major;* Orchestral Fantasy '*Flivver Ten Million*'; Tone Poem *California;* Suite for Piano *From the Hills;* Cantatas *There were Shepherds Abiding in the Field,* and *I will Praise Thee, O Lord;* and various songs.

Converse, GEORGE ALBERT (1844–1909), American naval officer, was born in Norwich, Vt., and was educated at Norwich University and the U.S. Naval Academy. He attained the rank of captain in 1899, and was commander of the cruiser *Montgomery* during the Spanish-American War. He served with the Bureau of Navigation (1899–1901), was chief of the Bureau of Equipment (1903–04), chief of the Bureau of Ordnance (1904), and chief of the Bureau of Navigation (1904–07). He became a rear admiral in 1904.

Conversion, kon-vûr'shun, a conscious change of heart prompting to a new life. Conversion differs from *regeneration* (q.v.) in that while the latter may take place in infancy or without consciousness, conversion is a conscious act. The word is applied also to a change of creed, as that of John Henry Newman from the Anglican to the Roman Catholic Church.

Conversion, in law, is an unauthorized or unlawful taking of personal property and assumption of ownership over it. The taking may be with honest intention, or it may be with dishonest intent, in which case it may also constitute larceny. The person entitled to possession may replevin the goods or may sue for damages.

Equitable Conversion is the constructive changing of real estate into personal property, or personalty into realty, under certain rules in equity. It is a familiar maxim that equity considers as done that which ought to be done. Therefore, when a will or conveyance contains a valid and enforceable direction to convert the real estate conveyed into personalty, it is treated as if this had already been done by courts of equity. This maxim is also applied to contracts affecting marriage settlements, and to some extent to contracts for the sale of real estate. The doctrine is of importance in determining the character of property conveyed. For example, if real estate is converted into personalty immediately on a testator's death, dower rights will not be vested in a beneficiary's wife, and judgments against him will not attach as liens. See EQUITY.

Conversion, in logic, signifies that one proposition is formed from another by interchanging the subject and predicate. Thus, 'No A is B' has for its converse, by simple conversion, 'No B is A.'

Convert'er, a vessel used in the Bessemer process of making steel. See Casting; Steel.

Convert'ible Paper Currency, paper currency, chiefly of bank notes, which can be converted into cash on demand. Such is the nature of the bank notes of all modern states with any pretensions to financial stability. Wherever there is an inconvertible paper currency, as formerly in the United States and to-day in many of the South American states, gold is at a premium, high in proportion to the relative amount of paper and cash in circulation. See Paper Money.

Convex Lens. See Lens.

Convey'ancing may be defined as the art of creating, transferring, and extinguishing legal rights over real property. Sometimes it is used with reference to rights over personal property also. In ancient times, delivery, actual or constructive, by which the grantee or transferee was put in possession of the property, was necessary to effect a conveyance; and even after the introduction of written instruments this rule continued in force. The Roman lawyers said, 'By delivery and prescription, not by bare agreement, is the ownership of property transferred.' In accordance with strict feudal principles land could only be conveyed by symbolical delivery of a part of it—*e.g.*, a clod of earth and a stone; and this was the law of Scotland until 1845. In England, symbolic delivery was not insisted on, provided the parties went in sight of the land, and the grantor then declared that he gave seisin (q.v.).

A written grant has been for a long period indispensable over and above symbolical delivery, and livery of seisin is now obsolete both in England and those few parts of the United States where it took root. In the latter country real property is generally conveyed by an instrument of bargain and sale, which must generally be recorded in a public register. Goods and chattels are, as a rule, transferred by actual delivery; but a bill of sale is also competent, more particularly in the case of ships, and where actual delivery is impossible.

The preparation of legal instruments should be in the hands of competent practitioners. In England the highest branches of the work are performed by barristers, who make it their special sphere. In some parts of the United States conveyancing is done by companies which guarantee the validity both of the documents themselves and of the title conferred. It is not as a rule necessary that a conveyancer should be a qualified lawyer, though he generally is so. In old countries with a system of land tenure which dates back for many centuries and which has constantly been undergoing modifications, conveyancing has often developed into a system of vast complexity. This is particularly so in England, and many attempts have been made to remedy the defect. In more modern countries the forms are usually much simpler.

The instrument of conveyance by which real estate is transferred is known to-day as a *deed* (q.v.). It should contain the names of the parties; words of conveyance describing the tenure, as to A, or to A and his heirs forever, by which a fee would pass, or to A for life, etc.; describe the property accurately; and may contain certain covenants on the part of the grantor as a covenant for quiet enjoyment, or a warranty of the title. The instrument is dated, and is under seal, and in most States, in order to be recorded, must be witnessed or acknowledged before a notary or other proper officer. It is not necessary to name the consideration. If the property is subject to mortgages or other liens, these should be mentioned, and either described or the names of the parties and time and place of record set forth. Personal property is sometimes transferred by an instrument known as a *bill of sale* (q.v.), which is less formal than a deed.

See Recording Acts; Title; Torrens System. Consult L. A. Jones' *Forms in Conveyancing;* Brewster's *Conveyance of Estates in Fee by Deed.*

Conveying and Elevating Machinery, various types of equipment used in the transferring of material in bulk or package, either horizontally or vertically.

Elevators.—A type of elevator used extensively in warehouses, flour mills and wholesale groceries for the handling of bags, boxes, barrels and miscellaneous articles, is the swinging tray or straight lift elevator shown in Figure 1. It serves the double purpose of elevating and lowering the articles, which in all instances pass over the head of the elevator. Material may be taken from and delivered to any floor, and the receiving points are on the ascending side, and the discharge points on the descending side. The loading and discharge stations are so arranged that they may be opened or closed. When open, they allow of the free passage of the carriers, but when closed, will either pick up material on the ascending side or discharge it on the descending side. The opening and closing of the stations may be automatic or manually controlled through levers.

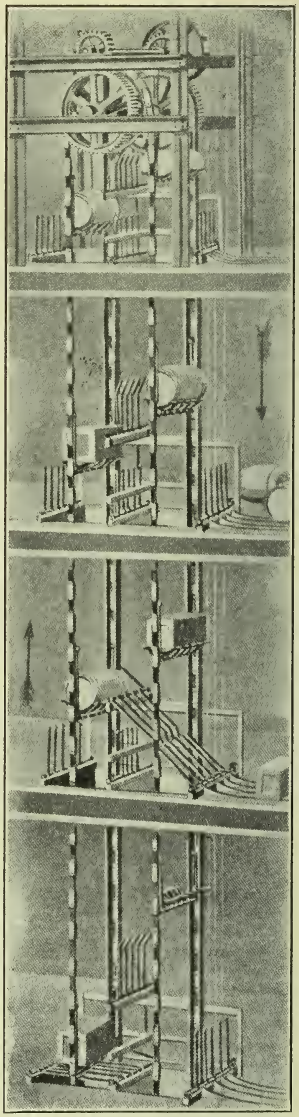


Fig. 1. *Straight Lift Elevator*

This type of elevator consists of two strands of chain running in guides at its sides, and over head and foot sprockets. The chains are fitted at intervals with extended pins for carrying the trays, whose number, type and size for the capacity required depend upon the size and class of material to be handled. The chain used may be of malleable iron or steel, and with or without rollers. The trays in general consist of fingers, either straight or curved, projecting from each side of a horizontal bar attached to vertical arms secured to the extended pins on the chain. The loading and discharge stations consist of a steel bar with projecting fingers, one set fastened to the floor and the other set to the frame of the elevator between the ascending and descending trays. This type is suitable for barrels weighing 900 pounds. This same type, although generally used vertically, may also be run horizontally, being termed an elevator-conveyor. The trays always carry in a horizontal position, making it possible to carry fragile material and liquids in cans, pails or buckets. The chain used on the elevator-conveyor is, in most instances, of the roller type.

A type of elevator shown in Figure 2 is especially adapted to industries handling large numbers of barrels, bags or boxes of uniform size. It may be loaded at any floor but discharges at one point over the head. It is entirely automatic and has large capacity. Another type is a barrel and bag elevator which elevates and lowers articles at the same time, automatically delivering from the ascending or descending leg at any floor, but not taking the article over the head. The tray is so arranged that it will automatically tilt on the ascending leg at the floor desired through a tripping device set in the floor. On the descending side are skids for barrels, or specially designed unloading fingers for bags or boxes, so that they may be discharged away from the elevator opening.

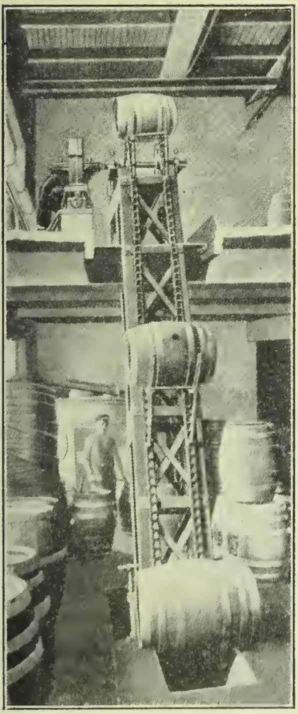


Fig. 2. *Elevator for handling barrels and boxes*

Bucket elevators of various types are used in the handling of bulk material such as coal, coke, grain, ashes and the like. The spaced bucket type centrifugal discharge elevator, Figure 3 *a*, consists of malleable iron or steel buckets spaced at intervals and mounted on single or double strands of chain or on rubber or canvas belts attached to the back of the buckets. The elevator travels at a speed which will throw the material from the buckets by centrifugal force when they pass around the head sprocket or pulley. Its speed ranges from 200 to 300 feet per minute for chain, and up to 400 feet per minute for belt, depending on the size of the head pulley and the material to be handled. The material passes into the ascending buckets at the top of the boot, the material that passes between the buckets and into the boot being scooped up by the succeeding buckets.

The continuous bucket type centrifugal discharge elevator, Figure 3 *b*, consists of malleable iron or steel buckets mounted on single or double strands of chain or rubber belt. The front of the bucket is flanged and forms a chute for the discharge of the material from the succeeding bucket. The speed of this type when using chains is 100 to 125 feet per minute; when mounted on belts it may be increased to 200 feet per minute. This type, receiving the material directly into the bucket through a chute slightly narrower than the bucket, loads material directly into it, and saves the wear and strain of digging through the material at the bottom of the boot necessary in the case of the spaced bucket elevators.

The positive discharge type elevator, Figure 3 *c*, is used for wet or sticky material. The buckets are fastened at their ends to a double strand of chain, which passes over sprockets set back under the head sprockets, causing the bucket to invert when dumping over the discharge chute, and giving a positive discharge. All of these bucket elevators may be used vertically or inclined. The selection of any one type will depend upon the material to be handled and the capacity, although in the case of lumpy material, it may be necessary to use a larger bucket to accommodate the lumps than would be required for the desired capacity.

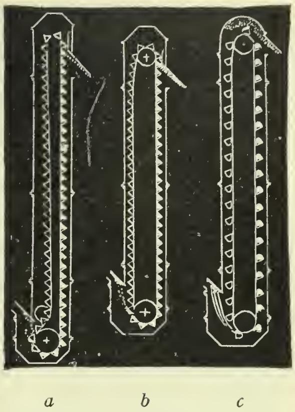


Fig. 3. *Bucket Elevators*

a. Spaced bucket centrifugal discharge type. *b*. Continuous bucket centrifugal discharge type. *c*. Continuous bucket positive discharge type.

Elevators are generally enclosed in steel or wood casings. They are practically dust proof and protect the moving parts of the elevator; also taking care of any spillage from the buckets, returning same to the boot. The typical casing is made of a head section, intermediate and foot or boot section. The head section is designed to carry both head and countershaft for which it requires no additional support. It is made in two parts, the upper half being removable for the proper inspection of the mechanical parts. A short discharge spout is part of the lower half to which chutes are connected. The bottom or boot section is fitted with removable end and inspection doors on both sides, giving easy access to the foot end of the elevator.

The Gravity Discharge or 'V' Bucket Elevator pictured in Figure 4 both conveys and elevates, and may receive or discharge at any point along the horizontal runs, or receive on the vertical. The buckets are rigidly attached at the ends to a double strand of chain. On the vertical lift the buckets are upright, but as they turn from the vertical to the horizontal, they are at right angles, and discharge as they turn to the horizontal into a steel trough where the material is dragged along as in a scraper conveyor. At the turn from the vertical to the horizontal, the trough bottom is extended in a curve over the corner shaft and so fitted that the bucket on the turn just clears the trough bottom, preventing any spilling. The bottom of the horizontal trough is fitted with gates and

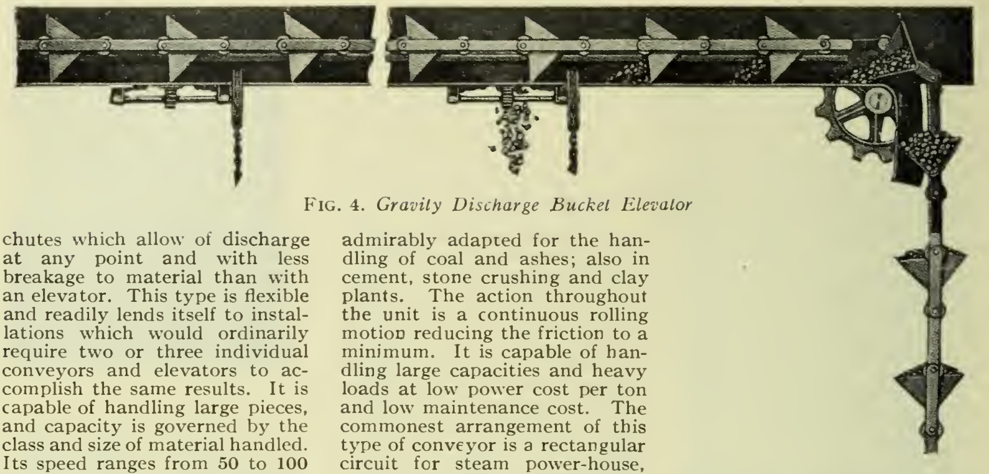
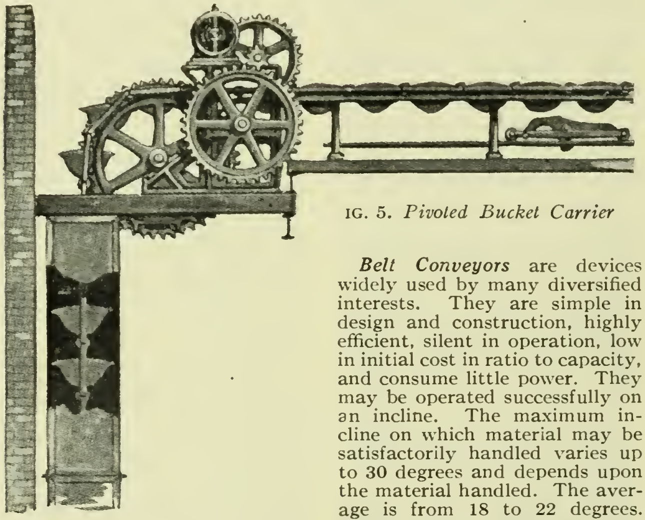


FIG. 4. *Gravity Discharge Bucket Elevator*

chutes which allow of discharge at any point and with less breakage to material than with an elevator. This type is flexible and readily lends itself to installations which would ordinarily require two or three individual conveyors and elevators to accomplish the same results. It is capable of handling large pieces, and capacity is governed by the class and size of material handled. Its speed ranges from 50 to 100 feet per minute, and it is principally adapted to the handling of coal or semi-abrasive material.

The *Pivoted Bucket Carrier*, shown in Figure 5, is undoubtedly the most highly developed and most efficient type of coal and ash handling equipment. It consists of a series of overlapping buckets pivoted between two strands of roller chain, and conveys and elevates material, receiving at any point along the horizontal run, filling the buckets to capacity and completely discharging them at any point, either through fixed tripping devices or a travelling tripper. It is actually a continuous type of elevator conveyor. Whatever plane of travel it may be following, either vertical or inclined, the bucket will always automatically retain its carrying position. It is largely used in power-house work, for which it is admirably adapted for the handling of coal and ashes; also in cement, stone crushing and clay plants. The action throughout the unit is a continuous rolling motion reducing the friction to a minimum. It is capable of handling large capacities and heavy loads at low power cost per ton and low maintenance cost. The commonest arrangement of this type of conveyor is a rectangular circuit for steam power-house, coal being lifted in the ascending vertical run and discharged into the bunkers as it is carried along the top horizontal run. When not being used for coal, ashes are carried along the horizontal bottom run, up the ascending vertical run into an ash bunker from which they can be readily drawn off.



IG. 5. *Pivoted Bucket Carrier*

Belt Conveyors are devices widely used by many diversified interests. They are simple in design and construction, highly efficient, silent in operation, low in initial cost in ratio to capacity, and consume little power. They may be operated successfully on an incline. The maximum incline on which material may be satisfactorily handled varies up to 30 degrees and depends upon the material handled. The average is from 18 to 22 degrees. When a belt conveyor is part horizontal and part incline in one unit, the radius of the curve between the horizontal and incline portions should never be less than 150 feet. Separate conveyors horizontal to incline, or incline to horizontal, can also be used. The capacity of a belt conveyor when operating on the incline is reduced to 5 to 10 per cent.

Belt conveyors may receive material at several points from movable loading hoppers, and discharge at any point on either side of the belt along the line of travel through trippers on the horizontal run. The trippers may be any one of three types: stationary, hand-propelled, or self-propelled automatic reversing, as in Figure 6. The belt being the one part which comes directly in contact with the material, and subject to the actual wear, is the vital part of the conveyor, and the most expensive from a maintenance standpoint. The selection of the belt, therefore, must be given careful consideration and must be specified according to the conditions. Belts may be of rubber, canvas or steel. The correct feeding of the material to be conveyed on to the belt adds to its life as well as maintains full capacity. The belt should receive its load in the direction the belt is travelling, and at a speed as near the belt speed as possible. To be economical the belt should carry its full load, and should run true and centrally along the entire length of the conveyor. Careful selection of the carriers is necessary for the handling of the different commodities. Guide rollers are used in some instances, but if the belt is properly aligned at the beginning, these are not necessary. The drive should be at the delivery end wherever possible, with driving pulleys of ample diameter not less than four or five times the number of plies of fabric in the belt. It is often necessary to use rubber-covered or lagged pulleys to prevent slipping of the belt on the driving pulley. Conveyors under heavy load use a tandem or geared drive. In order to maintain a uniform tension on the belt, take-up pulleys are used. On short conveyors screw take-ups are used, the length of adjustment depending on the length and capacity of the belt.

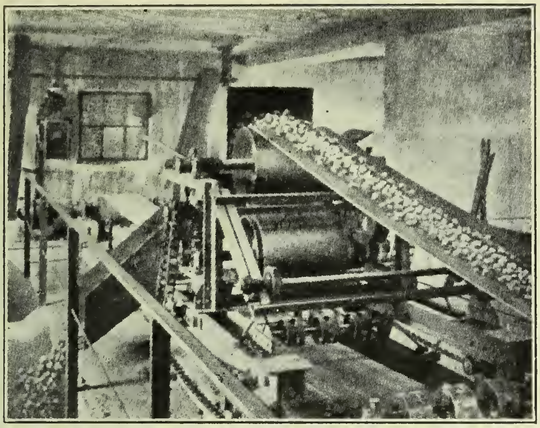


FIG. 6. *Belt Conveyors*

Careful attention and frequent adjustment is required with this type of take-up. Longer conveyors with large capacity, especially when inclined, use gravity take-ups, which at all times automatically maintain a uniform tension on the belt. In the handling of bulk material such as coal, coke or stone, sand, or grain, a troughed belt is used. The upper run of the belt is carried on three or five pulley troughing carriers or rolls, the return belt on flat carriers. The troughing carriers are of the plain bearing type fitted with grease cups, or anti-friction bearing of the roller or ball-bearing type. The latter are most frequently used on account of the low maintenance cost, requiring little attention for lubrication.

Troughed belt conveyors ranging in width up to 72″ and 2000′ centres with capacities of 4,000 tons per hour, are in successful operation. The length of the belt is limited only by its tensile strength and the development of a satisfactory method of splicing joints. The width of belt for a given capacity is often governed more by the size of the largest pieces of material handled than by the actual rated capacity of the belt for uniform material. The speed of belt conveyors varies according to the width of belt, capacity and material to be carried. For coal, coke, ashes, or stone 250 to 600 feet per minute; for grain 300 to 1000 feet per minute.

Magnetic separator pulleys are used in many instances where it is necessary to separate pieces of iron which may have been picked up with the material handled, and prevent them from entering grinding or crushing machinery. Flat steel belts are adapted to the handling of coal, cement and products of like nature where it is required to discharge at several different points, and where space does not allow of the use of trippers. The material is scraped off by plows set at the discharge points. Pulleys for steel belts must be much larger, usually about 40 inches diameter, due to the fact that they are not as flexible as rubber or canvas. Specially treated steel is necessary for conveyor belting. When handling wet or sticky material, there is a tendency for the material to adhere to the belt and cause trouble by collecting on the return idlers. In order that the belt may be kept clean and prevent this, a rotating cleaning brush driven from the head shaft of the conveyor, is used.

Picking or sorting belt conveyors may be troughed or flat, the material being spread in a thin layer so that foreign substances may be easily discerned and removed. They are used mostly in the sorting of ore, coal and the like. The average width of belt is 36″ and speed 50′ per minute depending on the material to be sorted. For package conveyors a flat belt is used. The width of the belt is governed by the size of the largest package measured across the outside

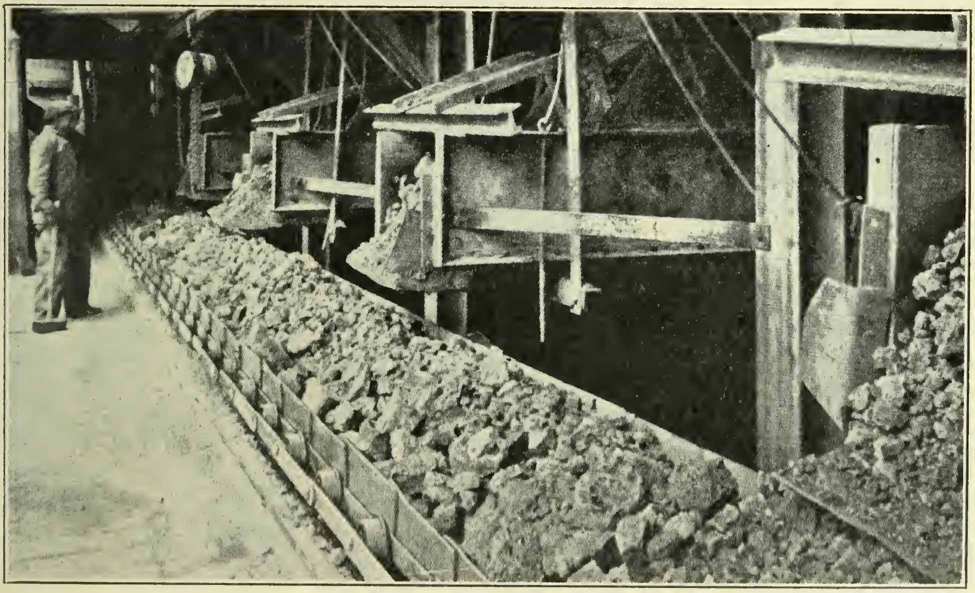


FIG. 7. *Steel Apron Conveyors*

diagonal; the capacity, by the weight and number of pieces to be handled; the average speed 100 feet per minute.

Steel Apron and Pan Conveyors: The former (Fig. 7) consist of a series of beaded steel or malleable iron flights or aprons overlapping one another and having fixed steel ends. These flights are carried between two strands of roller chain, the ends of the flights being fastened rigidly to the inner link of the chain, thus making a flexible trough in which material can be carried. This type of conveyor may be installed to run on the horizontal or incline up to 30 degrees. They are used extensively for feeding at a uniform rate crushers or other conveyors from railroad track dump hoppers fitted with stationary side skirt boards to prevent side spillage and increase capacity. They run at slow speed up to 100 feet per minute, and are potentially capacious. The conveyors with fixed ends may in certain cases be used as their own feeders without additional skirt boards. Coal, ore, stone and ashes are the principal material handled.

The *Pan conveyor* is made up of a series of steel pans overlapping one another and of a shape and depth to carry the desired load. They may run on the horizontal, incline or vertical, and are of much larger capacity than the apron conveyor. Pan conveyors are now in operation handling up to 2,000 tons per hour. Running silently and at slow speed there is little wear on the mechanism and practically no breakage of material handled. (See Figure 8).

Apron conveyors for the handling of boxes, bales, barrels and miscellaneous packages, are made up of two strands of roller chain with hard wood or steel flights either continuous or at intervals, attached rigidly to the chain. They are run on the horizontal or incline varying up to 40 degrees, according to the material to be handled, cleats being attached to the flights to prevent the sliding back of the material on the greater inclines. This type of conveyor is used extensively in the assembly of parts in automobile plants and other plants where high production of one class of material is manufactured. Since this type of conveyor is reversible, material may be carried in either direction and receive and discharge at any point along the horizontal line of travel. The capacity is governed by the number of packages that may be conveniently placed on the conveyor at the receiving point. Packages weighing up to 1,500 pounds have been successfully carried at slow speed.

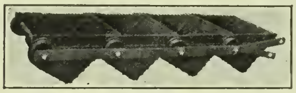


Fig. 8. *Pan Conveyors*

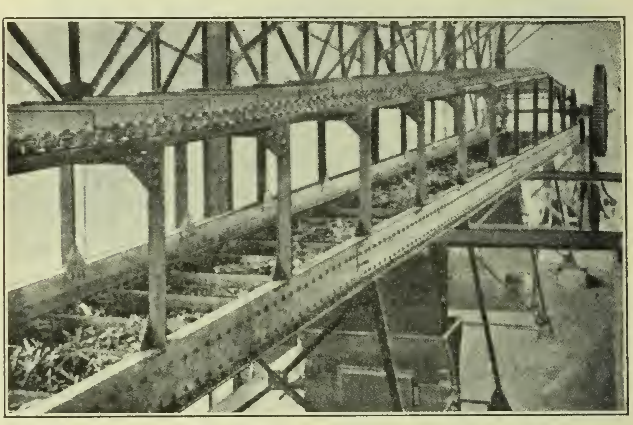


Fig. 9. *Scraper Conveyor*

The *Scraper conveyor*, one of the oldest types of conveyors, as seen in Figure 9, is also one of the most dependable. It handles material horizontally and on steep inclines up to 45 degrees, where it would be impossible to use an apron or belt conveyor. It is also admirably adapted for use as a retarding conveyor at coal tipples where hundreds of tons of coal are lowered down steep inclines. It consists of wood or steel flights attached to single or double strands of chain, and receives material at any point along the line of travel on the carrying side of the conveyor, which runs in a wood or steel trough fitted with gates at intervals for the discharge of material. In single strand conveyors the chain is fastened to the flight at the top, and either drags on the bottom of the trough or on shoes attached to the ends of the flight. The double strand chain may be of roller or plain chain type to which the flights are attached at the ends. This type of conveyor is especially adapted for coal, farm products, sugar mills, and for carrying all classes of non-abrasive material. It is simple in construction, has few moving parts, and is easily kept in repair.

In recent years what is known as the *Portable conveyor* has been developed to such a high state of efficiency that it is indispensable in many lines of industry. It is a modification of standard types of conveyors, belt, apron and scraper, and bucket elevators; is made light and strong, easily operated and used extensively in the handling of coal, sand, stone, ashes, grain, bags and packages. Capacity depends on the method for feeding the conveyor, and the material to be handled. The power consumption is low, and it is a valuable aid in the reducing of operating costs. In the large cities where heavy snow storms occur, this type of conveyor has been found to be very efficient in the loading of snow into trucks and wagons. It requires little attention at the feeding end, being practically self-loading and discharging directly into the wagons or motor trucks. The method of operation is generally by an electric motor, but gas or gasoline engines, are used quite extensively in remote sections.

Spiral or screw conveyors are adapted to the use of loose, fine bulk material such as coal, sand, ashes and grain; also for fine and dusty materials, as the trough or box may be totally enclosed. They consist of a solid steel bar or cast iron pipe to which are attached spiral, steel or cast iron flights suspended in a trough, and are made in lengths of from 8 to 12′ and up to 24″ in diameter. The conveyor may be made up of sectional flights riveted together, or of a continuous flight commonly called 'Helicoid.' The latter is the most commonly used. They discharge at any point through openings or gates attached to the bottom of the trough, which may be of steel or wood with steel lining. Special designs are used for the handling of wet and sticky material, also for the mixing of material in transit. Steam jacketed troughs are used for the drying and cooling of material in transit.

The *Cable conveyor* is primarily used in the handling of large quantities of bulk material such as pulp wood, logs, and saw mill refuse; also as a retarding conveyor, in the lowering of mine coal down steep inclines from the mine to the tipple. Conveyors 1,000 feet long with capacities of 300 tons per hour are in successful operation. It is simple and cheap in construction, reliable, and of long service at a minimum cost of maintenance and operation. The construction consists of an endless wire rope running over large specially designed gap wheels or sheaves, at head and foot ends of conveyor. Attached to the rope at regular intervals are circular discs or flights which run in a U or V shaped steel or wood trough dragging the material to the point of discharge. The material may be loaded at any point along the run, and by the use of gates located in the bottom of the trough, delivery may be made at points desired.

The *Drag Chain conveyor* is especially adapted to the handling of ashes under boilers, clinkers in cement plants, and other abrasive materials, where the capacity required is not large. It consists of an endless chain, made of malleable iron or cast steel links passing over sprockets at the head and foot ends. The links drag the material along slowly in a concrete or cast iron trough. Chain links vary in length from 6 to 9 inches, width 8 to 16 inches and 2½ inches high. The average capacity is 20 tons per hour of ashes at a speed of fifty feet per minute. Material may be received at any point along the carrying side, and by the use of gates located in the bottom of the trough be discharged at any point desired.

Gravity Carriers, as the name implies, are used in the transferring of materials from one point to another by gravity at a fixed grade, the material itself moving over the conveyor. They consist of steel or wooden rollers, either concave or straight, fitted at the ends with ball or roller bearings, revolving on studs or through shafts, and mounted at regular intervals on the frame rails. The rollers vary in diameter, length and spacing; also in type of construction according to the commodities to be handled. This system has a large range of service, is very flexible, and lends itself to many combinations. When it is required to lower the commodity from floor to floor, spiral roller or steel chutes are used.

The *Spiral Roller*, due to the slight grade required, and the number of turns necessary for slow and easy descent, gives the advantage of allowing for storage, and also for the handling of open boxes without spilling the contents.

Live Roll conveyors consist of cast iron, steel or wood rollers, spaced at intervals, depending on the size of the units to be conveyed. The rollers are supported at the ends by through shafts, and revolve in fixed bearings. They are driven either by chains running over sprockets attached to each roller or by a longitudinal shaft supported on the frame and connected to the rollers by bevel or miter gears. They are largely used in the handling of lumber.

Pipe Line ash conveyor equipment comprises steam jet systems used universally in the average industrial plant where the ashes consist of from one to seven tons of ash per day, whose motive power is a steam jet inserted approximately one half way in the conveyor line, creating a suction on one half of the line and a pressure on the discharge end; steam vacuum systems, a type used primarily in hospitals and institutions requiring noiseless and dustless operation, whose motive power is a steam vacuum producer located on top of a storage tank; and the pneumatic (fan) conveyor, a type similar in detail with the steam vacuum except that the motive power consists of a positive pressure or centrifugal exhaust fan. A comparatively new system as applied to ash handling equipment is the Hydraulic System. The motive power is water at a pressure of 60 to 100 pounds inserted in the conveyor line at various intervals, in most cases at the bends or turns. This type of system is used in special installations especially along the water front where considerable fill is available and the ashes can be discharged directly to the fill.

Power Drag scrapers consist of bottomless scraper buckets which are pulled back and forth by means of wire cables operated by double-drum hoists. They are used extensively on all types of excavating and material-handling work where sand and gravel, earth, clay, and the like, is to be dug and conveyed over distances of 100 to 600 feet. *Slackline Cableway Excavators* combine in a single machine the four functions of digging, conveying, elevating and automatic dumping. See EXCAVATION and EXCAVATORS. Consult *Material Handling Cyclopedia* (1921); Zimmer's *Mechanical Handling and Storing of Material* (1922); Broughton's *Electrical Handling of Materials* (1923).

Convict Labor, a term applied to work done by inmates of penitentiaries. It is now generally conceded that a convict should be kept at work both for his own good and for the good of the State, but a difference of opinion exists as to just what this work should be, how it should be done, and what should be the disposal of its product.

In the United States there are several systems under which convicts are employed, chief of which are the Contract System, the Piece-Price System, the Public Account System, the State-Use System, the Public Works and Ways System, and the Lease System.

Under the contract system the State feeds, clothes, houses and guards the convict. A contractor engages the labor of the convicts, supplies the raw material, superintends the work and pays the State a certain amount per capita for the convicts' services. The work is usually performed within or near the penitentiary. In 1909 the National Committee on Prisons and Prison Labor was established for the purpose of studying the problem of labor in prison and causing the abolition of the contract system which is rather generally losing ground. The piece-price system is merely a modification of the contract system, in which the contractor pays the State a certain amount for the work done on each piece manufactured by the convicts. Prison officials usually supervise the work and dictate the daily quantity. About two-fifths of the States have either of these two systems.

In the public-account system the State buys the raw material, manufactures and puts the product on the market, and sells it either direct or through an agent. It has the entire care and control of the convicts. This system is found in all but two States and the District of Columbia but in several of them it is practically negligible. In the State-use system the method is much the same as the public-account system but the use or sale of the product is limited to its own or other State institutions, the idea being that the State shall not compete with manufacturers employing free labor. The system is in use in all the States. The public works and ways system is very like the State-use system except that instead of manufacturing articles for use it employs the convicts in construction or repair of the prison and other public buildings, roads, highways, and parks. It is found in 28 States and in the District of Columbia.

Under the lease system, which is now practically obsolete, the State leases the convict to a company or individual to feed, clothe and house and to pay the State a specified sum for his labor. This system was open to great abuse and has generally disappeared.

The system of wage payments to prisoners has been tried in several of the States and in England, Germany and Holland. Advocates of this reform claim that if the convict is a married man, his wife and children are entitled to all the support he can give them; that it increases the convict's self respect to be supporting his family and furnishes him a vital factor in a desire for reformation; that it develops a sense of responsibility and makes it possible for those who have caused financial loss to others, to make restitution. On the other hand it is maintained that the criminal is already an enormous cost to the State and the paying of wages is only a premium on crime and that money in the hands of the convicts is a positive injury to them as it is the direct means of their immediate return to a life of crime.

Consult *Bulletins* of the U. S. Department of Labor, Bureau of Labor Statistics; *Reports* of the National Committee on Prisons and Prison Labor; Whitin's *Penal Servitude.*

Convocation, a deliberative assembly of the bishops and clergy in the Anglican Church. The clergy first established a representative assembly near the beginning of the 13th century. This body, known as Convocation, had, till 1664, the exclusive power of taxing the clergy, and it exercised other legislative functions until the Reformation. From 1817 until 1825, Convocation, though regularly summoned, never transacted any business. Since 1852 in the case of Canterbury, and 1861, in the case of York, Convocation has met concurrently with the sessions of Parliament, but without parliamentary sanction it can do nothing except pass resolutions. Convocation is divided into the two provincial synods of Canterbury and York, each divided into an upper and lower house, and recently a house of laymen has also been created which, although not actually a part of Convocation, yet exercises considerable influence by its discussions.

A session of the governing bodies of the University of Oxford is also known as Convocation.

Convolvulus, or BINDWEED, a genus of shrubs and herbs, chiefly climbers or trailers, of wide distribution. The flowers are funnel-shaped, and of many colors. There are some 150 species, including both hardy and tender perennials and hardy and tender annuals. The annuals are raised from seed sown in spring; the perennials are generally propagated by root division or, in the case of the greenhouse species, by cuttings. The perennial species spread so rapidly as to sometimes become a nuisance in gardens. The hardy bindweeds are easily grown in any well-dug garden soil. The small or field bindweed (*C. arvensis*) is a pretty little trailing or twining perennial species, naturalized from Europe, bearing white and pink flowers in summer. *C. cneorum*, a small shrub which bears white or pink flowers in summer, is not quite hardy, but is a good greenhouse or window plant. *C. scammonia* is a hardy trailing plant, which bears cream-colored flowers in July. Its root provides the drug known as scammony. *C. tricolor* is the hardy annual dwarf convolvulus of gardens. Its flowers are blue, yellow, and white, and are borne profusely throughout the summer. The common morning-glory, or bindweed, of our thickets, is *C. sepium*, a decorative species with hastate, triangular leaves, and large, pink or white flowers. The bright-pink, Asiatic *C. taponicus*, or California rose is a cultivated, hardy perennial, which quickly usurps the garden soil; it has a charming double form, which is sparingly scaped, and which bears a profusion of very double ragged flowers, of a most delicate shell-pink hue. Consult L. H. Bailey's *Cyclopedia of American Horticulture.*

Convoy (Fr. *convoi*), the name given to ships of war sent to accompany unarmed vessels in time of war to prevent them from being captured or sunk. The question whether merchant ships under convoy of ships of war of their own nation are liable to visit by a belligerent for the purpose of ascertaining whether they have or have not been guilty of any breach of law is a controverted point. The name is also given to a body of troops escorting persons, goods, provisions, or munitions of war.

Convulsionaries, a name given to those of the Jansenists who were identified with the excesses committed at the cemetery of St. Médard in Paris about 1730. It was said that miracles were wrought at the grave of a Jansenist priest, and so great were the crowds that gathered and such hysteria was manifested that the cemetery had to be closed.

Convulsions, INFANTILE, involuntary muscular contractions, first 'tonic,' then 'clonic.' They are rarely fatal in themselves, except to an already exhausted child, but often indicate a serious condition. They are epileptiform in nature, and are followed by exhaustion and sleep (see EPILEPSY); but the great difference between infantile convulsions and the epilepsy of adults is that, owing to the instability of the infant's nervous system, convulsions in many cases occur from comparatively slight causes, and cease on their removal. In some children an attack of this kind may be the first symptom of serious brain trouble. In infants they are of reflex origin, as from teething, worms, rickets, fever, or diarrhœa. Proper attention to the cause—*e.g.* improper feeding —frequently soon brings them to an end. In any case a child with nervous instability which suffers from fits in infancy should be watched with particular care all through its childhood.

The general treatment of convulsions must be directed against the exciting cause. Immediate treatment consists in seeing that the child lies where it cannot injure itself by its movements, and that all clothing is loose; also when teeth are present, something which will not slip down the throat—*e.g.* the folded or knotted corner of a handkerchief should be pushed between them, so that the tongue may not be injured. Emetics and aperients are also useful. A warm bath is sometimes recommended, but a mustard pack is often preferred as being less exhausting. The inhalation of chloroform or of nitrite of amyl is useful, but obviously these drugs can be administered only by a medical man. Injections of chloral into the bowels are also recommended in severe cases; and bromides or tonics are used between the attacks, according to the circumstances of the case.

Conway, town, Arkansas, county seat of Faulkner County, on the Missouri Pacific Railroad; 28 miles northwest of Little Rock. It is the seat of Hendrix College (Methodist), Central Baptist College, and the Arkansas State Teachers College. The manufactures include lumber, flour, cotton and cotton-seed oil. Dairying is important. Pop. (1910) 2,794; (1920) 4,564.

Conway, town, New Hampshire, in Carroll County, on the Saco River and on the Boston and Maine Railroad; 60 miles northeast of Concord. North Conway, one of the main gateways of the White Mountains, is itself a beautiful resort. The town also includes Conway, Conway Centre and Kearsarge. Granite is extensively mined and there are spool and lumber mills. Pop. (1910) 3,413; (1920) 3,102.

Conway, or ABERCONWAY, market town, Wales, Carnarvon, at the mouth of River Conway, 4 miles south of Llandudno. The town is enclosed by a wall with gates and round towers. The castle, built by Edward I. in 1284, and one of the most perfect of its kind, stands on a rock overlooking the river. The Cistercian Abbey, of which there are now no remains, was founded in 1185. The Elizabethan building, Plas Mawr, is the headquarters of the Royal Cambrian Academy of Art. John Gibson, the sculptor, was born near here (1790). Two bridges cross the river: one a tubular railway bridge (412 ft. long), built by Stephenson in 1846-48; the other a suspension bridge (327 ft. long), designed by Telford in 1826. Conway was the Roman Conovium. There are a small coasting trade in slates, and some shipbuilding. Pop. (1901) 4,681. (2.) River, Carnarvonshire, Wales, after a northerly course of 30 m. falls into Beaumaris Bay. The valley of Conway, which is exceedingly picturesque, contains Bettws-y-Coed, Llanrwst, and Trefriw.

Conway, HUGH, the 'pen-name' of Frederick John Fargus (1847-85), an auctioneer at Bristol, England and author of *Called Back* (1883), a tale which sold by hundred of thousands, and *Dark Days* (1884). He died at Monte Carlo. See Life prefixed to illustrated edition of *Called Back.*

Conway, MONCURE DANIEL (1832–1907), Amer. lecturer and man of letters, was born in Stafford co., Va., and graduated (1849) at Dickinson College, Carlisle, Pa. He began the study of law, but abandoned it to become a Methodist minister. In 1854 he entered the Unitarian ministry. He was dismissed from a Washington pastorate for anti-slavery views, and accepted a call from the Unitarian Church at Cincinnati, O., where he preached from 1856 to 1861, and edited *The Dial.* During the Civil War he visited England, where he lectured from the anti-slavery point of view. He was for more than twenty years (1864–85) pastor of the Religious (later Ethical) Society at South Place, London, but made his home in New York after 1897. His chief works are a *Life of Thomas Paine* (2 vols. 1892) and an edition of Paine's *Works* (4 vols. 1894–6), *Demonology and Devil Lore* (1878), *The Wandering Jew* (1881), monographs on Thomas Carlyle (1881), Emerson (1882), and Hawthorne (1890); and a novel, *Pine and Palm* (1887). See his *Autobiography* (1905).

Conway, THOMAS (1733–1800), an Irish soldier of fortune, who served on the American side in the Revolutionary War. He served in the French army, in which he attained the rank of colonel, and through the agency of Silas Deane came to America to serve against Great Britain, being made a brigadier-general in the Continental Army in May, 1777. Aside from leading the advance at Germantown he rendered no services of any importance, and he is remembered only because of his opposition to Gen. Washington and his participation in what, through an accident, became known as the 'Conway Cabal.' He was characterized by overweening conceit and strove to secure promotion to the rank of major-general; this Washington opposed on the ground that 'his merit and importance exist more in his imagination than in reality.' Conway intrigued with others to secure the removal of Washington, as commander-in-chief, in favor of Gen. Gates; and a strongly disparaging remark about the former, which he made to Gates and which he was unable to explain away, became known, indirectly, through Gates's aide, Wilkinson, to Washington. Conway, however, secured his coveted promotion (Dec., 1777), and at the same time was made inspector-general of the army; but soon afterward he wrote an impertinent letter to Congress threatening to resign, and Congress, much to his chagrin, accepted his resignation (April, 1778). Gen. Cadwallader challenged him because of his abuse of Washington, and in the ensuing duel Conway, 'with almost poetic justice,' was shot in the mouth, apologizing to Washington from what he thought was his death-bed. Subsequently Conway re-entered the French service and became a count, a field-marshal, and governor of the French East Indies. The so-called 'Conway Cabal' quickly collapsed, and it is not definitely known who took part in the secret intrigue against Washington, though Thomas Mifflin and Benjamin Rush were certainly among those involved. d 37

Conway, SIR WILLIAM MARTIN (1856), English traveller and mountaineer, born at Rochester, England, became professor of art, University College, Liverpool (1885–8), and Slade professor of fine arts at Cambridge (1901). In 1889 he travelled for nine months in the East, and in 1892 made many ascents in the Himalayas. He traversed the whole range of the Alps (1894), explored Spitzbergen (1896–7), and The Bolivian Andes in 1898, ascending Aconcagua, and exploring the glaciers of Tierra del Fuego. He was knighted in 1895. He has published *Woodcutters of the Netherlands in the Fifteenth Century* (1884); *The Artistic Development of Reynolds and Gainsborough* (1886); *Dawn of Art in the Ancient World* (1891); *The Domain of Art* (1902); *Climbing and Exploration in the Karakoram-Himalayas* (1894); *The First Crossing of Spitzbergen* (1897); *Climbing and Exploration in the Bolivian Andes* (1901); *Tierra del Fuego* (1902), etc.

Conway Cabal, See CONWAY, THOMAS.

Conwell, RUSSELL HERMAN (1842), American clergyman, was born at Worthington, Mass., and entered the Yale Law School, which he left to serve in the Union army, 1862–5. After the war he practised law in Minnesota, was foreign correspondent for the N. Y. *Tribune* and Boston *Traveller,* and again practised law in Boston, Mass., 1870–9. In the latter year he was ordained to the ministry and was pastor of Grace Baptist Church in Philadelphia, 1881–91, and subsequently of the Baptist Temple in the same city. Dr. Conwell founded Temple College in connection with the latter church, and supported it with the proceeds of his lectures. He published, among other books, *Why and How the Chinese Emigrate* (1870), *Life of Bayard Taylor,* and *Lives of the Presidents.*

Conybeare, JOHN JOSIAS (1779-1824), English divine, scholar, and geologist; educated at Westminster and Christ Church, Oxford; became vicar of Batheaston; appointed Anglo-Saxon professor at Oxford (1807), professor of poetry (1812), and Bampton lecturer (1824). He translated portions of the *Song of the Traveller* and *Beowulf* from the Anglo-Saxon.

Conybeare, WILLIAM JOHN (1815-57), English divine; was appointed first principal of the Liverpool Collegiate Institution (1842); after his resignation (1848), owing to ill-health, he succeeded his father as vicar of Axminster. In conjunction with Howson (afterward dean of Chester) he wrote the *Life and Epistles of St. Paul* (1852), and was also author of *Essays, Ecclesiastical and Social* (1855), and a novel, *Perversion* (1856).

Cooch Behar. See KUCH BEHAR.

Cook or HERVEY ISLANDS, a group of six islands and some nine islets between 18° and 21° 47′ s. lat. and 157° and 170° w. long., about 1,700 m. by steamer N.N.E. of Auckland, New Zealand; total area, 280 sq. m. The products include copra, coffee, oranges, limes, cotton and pineapples, besides native foods—taro, breadfruit, and yams. There is trade (about $350,000) with New Zealand. The largest island is Raratonga, 20 m. in circuit, and rising to 3,000 ft., its port, Avatiu, being the trade centre of the group; pop. 2,100. The other islands are Mangeia, Atiu, Mauki, Mitiero, Aitutaki, and Hervey Islands proper. They were discovered by Captain Cook in 1777. In 1888 they were placed under British protection. Their annexation (1901) to New Zealand is understood to include also the Penrhyn group of Suvaroff Island. The natives, about 12,000 in 1900, belong to the large brown Polynesian race, and their speech is closely allied to Samoan. There is a distinct strain of Melanesian blood, conspicuous especially in Mangeia, where frizzly black hair and a very dark complexion predominate. Fifty years ago all were fierce cannibals; at present they are in a somewhat advanced state of civilization: all are Christians, dress after the European fashion, and live in stone houses grouped in small townships. See F. J. Moss's *Through Atolls and Islands in the Great South Sea* (1889); *New Zealand Official Year Book.*

Cook, Albert Stanburrough (1853), American educator, was born at Montville, N. J., and graduated (1872) at Rutgers. In later years he studied for short periods at German universities and in London. After several years of teaching, he was associate in English at Johns Hopkins, 1879–81, professor of English at the University of California, 1882–9, and professor of the English language and literature at Yale after 1889. The list of his text-books and editions of English classics is a very long one, including an edition of the *Christ* of Cynewulf (1900). His own books include *The Phonological Investigation of Old English* (1888), *The Bible and English Prose Style* (1892), *The Province of English Philology* (1898), and *The Artistic Ordering of Life* (1898).

Cook, Clarence Chatham (1828–1900), American art critic, was born at Dorchester, Mass., and graduated (1849) at Harvard. He studied architecture under Andrew J. Downing and Calvert Vaux, but turned his attention to teaching, with which he was occupied for twenty years. A series of able articles on the American art exhibit at the Sanitary Fair in New York in 1863, published in the N. Y. *Tribune*, gained him a long connection with that paper as art critic. His searching criticism often aroused ill-feeling among the painters. Mr. Cook published *The Central Park* (1869), *The House Beautiful* (1878), and *Art and Artists of the Day.* He founded (1884) and edited *The Studio* for several years.

Cook, Edward Dutton (1829–83), English dramatic critic and author, the son of a London solicitor, was dramatic critic to the *Pall Mall Gazette* (1867-75) and to the *World* (1875-83). He produced in 1860 a melodrama, *The Dove and the Serpent,* in collaboration with Lepold Lewis. Of his novels the most successful were his earliest, *Paul Foster's Daughter* (1861) and *The Trials of the Tredgolds* (1864). On dramatic affairs he wrote *A Book of the Play* (1876) and *Hours with the Players* (1881).

Cook, Eliza (1818–89), English poet, born in Southwark, London, and lived in the metropolis. Early contributing to periodical literature, she conducted *Eliza Cook's Journal* from 1849 to 1854, when her health broke down, and she received a civil list pension of £100 (1863). She published four volumes of verse (1835-45), and *Jottings from my Journal* (1860). Her collected works appeared in 4 vols. (1851-3, illust. 1860), and there have been reissues. An edition was published in New York in 1882. Several of her lyrics — *e.g. The Old Arm-Chair* and *Home in the Heart* — gained wide popularity.

Cook, Francis Ames (1843), American naval officer, born at Northampton, Mass. He graduated at the U. S. Naval Academy in 1863, was an ensign on the *Seminole,* West Gulf Blockading Squadron (1863–5), became a lieutenant-commander (Mar., 1868), and was instructor in mathematics at the U. S. Naval Academy (1869), where subsequently (1879–83) he was in charge of the department of seamanship. In 1896, as captain (commissioned Feb., 1896), he was placed in command of the newly constructed cruiser *Brooklyn;* he represented the U. S. navy at Queen Victoria's jubilee; and during the Spanish-American War commanded the flag-ship *Brooklyn,* which took a conspicuous part in the destruction of Cervera's fleet at Santiago (July 3, 1898). In 1904 he retired with the rank of rear admiral. died 1916

Cook, Frederick Albert (1865), American physician and explorer, was born at Callicoon Depot, N. Y.; settled in Brooklyn in 1878; graduated at N. Y. Univ. Med. School in 1890; was surgeon of the Peary Arctic expedition in 1891–92, and of the Belgian Antarctic expedition in 1897–99; claimed to have ascended Mt. McKinley in 1906. In 1909 he claimed to have reached the North Pole on April 21, 1908, but the Univ. of Copenhagen, to whom he submitted his proofs, decided that the documents did not contain observations and information which could be regarded as proof that Dr. Cook reached the North Pole. Author of *Through the First Antarctic Night* (1900); *To the Top of the Continent* (1907).

Cook, James (1728–79), English mariner, was born at Marton, Yorkshire. After some years spent in the North Sea and the Baltic trades, he entered the navy (1755), and from 1759 was for eight years principally engaged in surveying the St. Lawrence and the coasts of Newfoundland. In 1768 he was sent out to the Pacific by the Admiralty, at the instance of the Royal Society, with an expedition to observe the transit of Venus. Voyaging westwards, Cook completed the first circumnavigation of New Zealand, and charted the coast. Passing on to Australia, he surveyed the east coast northwards, and, sailing through the strait separating it from New Guinea, showed that these two lands were not connected. From Batavia Cook sailed for the Cape of Good Hope, and thence to England (1771). Cook next year received command of an expedition, which was sent out to determine the extent of the reported southern continent. The expedition entered the Antarctic Circle in January, 1773. After skirting the ice in high latitudes, they reached New Zealand in the following October. Sailing again to the south and east, in January, 1774, Cook reached his highest latitude—71° 10′ s. He spent the southern winter cruising among the islands of the Pacific, and in spring set out to explore the high latitudes south of Cape Horn, whence, after discovering S. Georgia and sighting Sandwich Land, he sailed for home, reaching England on July 29, 1775. This was the first circumnavigation of the globe eastwards.

Cook was now promoted to the rank of captain, and received an appointment at Greenwich Hospital. In the next year he sailed again in command of an expedition to the Pacific, to seek a passage round the north coast of N. America. He sailed from Plymouth (July 12, 1776). His first discovery was the Sandwich group; whence, passing on to the west coast of N America, he explored it from about the 45th parallel to Icy Cape, where he was stopped by the ice. Cook then returned to the Sandwich Isles, with a view to surveying them; and it was at Hawaii, in consequence of some trouble with the natives, that he met his death (Feb. 14, 1779), being murdered in attempting to reach his boat.

See *Life* by Kippis (1788), by Besant (1890), by Professor Laughton in the *Dict. of Nat. Biog.* The account of the first voyage, written by Cook, is in vols. ii. and iii. of Hawkesworth's *Voyages* (1773); that of the second, also written by Cook, was published in two vols. in 1777; that of the third is in three vols., of which the first two are written by Cook, and the third by Captain King (1784).

founded in 1185. The Elizabethan building, Plas Mawyr, dating from 1584 and said to have been inhabited by Queen Elizabeth, is the headquarters of the Royal Cambrian Academy of Art. Two bridges cross the river: one a tubular railway bridge (412 ft. long), built by Stephenson in 1846–48; the other a suspension bridge (327 ft. long), designed by Telford in 1826. There are a small coasting trade in slates, and some shipbuilding. Conway was the Roman *Conovium.* John Gibson, the sculptor, was born near here (1790). Pop. (1921) 6,506.

Conway, river, Carnarvonshire, Wales, follows a northerly course of 30 miles and falls into Beaumaris Bay. The valley of Conway, which is exceedingly picturesque, contains Bettws-y-Coed, Llanrwst, and Trefriw.

Conway, Hugh, pseudonym of Frederick John Fargus (1847–85), an auctioneer of Bristol, England, author of *Called Back* (1883), a tale which sold by hundreds of thousands, and of other sensational novels. He died at Monte Carlo.

Conway, Moncure Daniel (1832–1907), American lecturer and man of letters, was born in Stafford county, Va. He was graduated from Dickinson College, Carlisle, Pa. (1849), and began the study of law, but abandoned it to become a Methodist minister. In 1854 he entered the Unitarian ministry. He was dismissed from a Washington pastorate for anti-slavery views, and accepted a call from the Unitarian Church at Cincinnati, O., where he preached from 1856 to 1861, and edited *The Dial.* During the Civil War he visited England, to lecture against slavery, and for more than twenty years (1864–85) he was pastor of the Religious (later Ethical) Society at South Place, London. The last years of his life were spent in New York. Conway's chief works are a *Life of Thomas Paine* (2 vols. 1892) and an edition of Paine's *Works* (4 vols. 1894–6), *Demonology and Devil Lore* (1878), *The Wandering Jew* (1881), monographs on Thomas Carlyle (1881), Emerson (1882), and Hawthorne (1890), and a novel, *Pine and Palm* (1887). He was a member of the National Institute of Arts and Letters. Consult his *Autobiography* (1905).

Conway, Thomas (1733–1800), an Irish soldier of fortune, who served on the American side in the Revolutionary War. He had attained the rank of colonel in the French Army when, through the agency of Silas Deane, he came to America to serve against Great Britain. He was made a brigadier-general in the Continental Army in May 1777. Aside from leading the advance at Germantown, however, he rendered no services of importance, and is remembered only because of his opposition to General Washington and his participation in what, through an accident, became known as the 'Conway Cabal.' Washington having opposed his promotion to major-general, Conway intrigued with others to secure the removal of the commander-in-chief, in favor of General Gates. Though failing in this, he secured his coveted promotion (December 1777), and at the same time was made inspector-general of the army. Soon afterward he wrote an impertinent letter to Congress, threatening his resignation, which was forthwith accepted (April 1778). A few months later he was wounded in a duel, to which he was challenged by General Cadwallader because of his abuse of Washington. Subsequently he re-entered the French service and became a count, a field marshal, and governor of the French East Indies.

Conway, Sir William Martin (1856–), English traveller and mountaineer, was born in Rochester, England. He was professor of art, University College, Liverpool (1885–8), and in 1901 became Slade professor of fine arts at Cambridge. In 1889 he travelled for nine months in the East, and in 1892 made many ascents in the Himalayas. He traversed the entire range of the Alps (1894), explored Spitzbergen (1896–7), and the Bolivian Andes (1898), ascending Aconcagua and exploring the glaciers of Tierra del Fuego. He was knighted in 1895. His publications include *Woodcutters of the Netherlands in the Fifteenth Century* (1884); *The Artistic Development of Reynolds and Gainsborough* (1886); *Dawn of Art in the Ancient World* (1891); *Climbing and Exploration in the Karakoram-Himalayas* (1894); *The First Crossing of Spitzbergen* (1897); *Climbing and Exploration in the Bolivian Andes* (1901); *The Domain of Art* (1902); *Tierra del Fuego* (1902); *Great Masters* (1904); *No Man's Land* (1906); *The Crowd in Peace and War* (1915); *Mountain Memories* (1920); *The Van Eycks and their Followers* (1921).

Conway Cabal. See Conway, Thomas.

Con'well, Russell Herman (1842–1925), American clergyman, was born in Worthington, Mass. He entered the Yale Law School, which he left to serve in the Union Army (1862–5). After the war he practised law in Minnesota, was foreign correspondent for the New York *Times* and the Boston *Traveller*, and again practised law in Boston (1870–9). In the latter year he was ordained to the ministry. He was pastor of Grace Baptist Church in Philadelphia (1881–9) and subsequently of the Baptist Temple in the same city. In connection with the latter church, he founded Temple University, which he supported with the proceeds of his lectures. Dr. Conwell was known as an educator, author, lecturer, and philanthropist. It is said that by his famous lecture, *Acres of Diamonds*, he earned more than $2,000,000, which he devoted to the education of boys. He also established and financed two hospitals, and in 1923 received the Edward Bok award of $10,000, as the man who had done the greatest service for the city of Philadelphia during the previous year. He published, among other books, *Why and How the Chinese Emigrate* (1870), *Life of Bayard Taylor*, and *Lives of the Presidents.*

Conybeare, kun'i-bâr, John Josias (1779–1824), English divine, scholar, and geologist. He was educated at Westminster and Christ Church, Oxford, became vicar of Batheaston, was professor of Anglo-Saxon (1807) and of poetry (1812) at Oxford, and Bampton lecturer (1824). He translated portions of the *Song of the Traveller* and *Beowulf* from the Anglo-Saxon.

Conybeare, William John (1815–57), English divine, first principal of the Liverpool Collegiate Institution (1842–8). In 1848 he succeeded his father, Wm. D. Conybeare, as vicar of Axminster. In conjunction with Howson (afterward dean of Chester) he wrote the *Life and Epistles of St. Paul* (1852). Other works are *Essays, Ecclesiastical and Social* (1855), and a novel, *Perversion* (1856).

Cooch Behar. See Kuch Behar.

Cook, Albert Stanburrough (1853–), American educator, was born in Montville, N. J. He was graduated (1872) from Rutgers and studied with Henry Sweet in London, and at the universities of Göttingen, Leipzig, and Jena (Ph.D. 1882). He was associate in English at Johns Hopkins, 1879–81, professor of English at the University of California, 1882–9, and professor of the English language and literature at Yale, 1889–1921 (emeritus). In 1897 he was president of the Modern Language Association of America, and in 1906 founded the Concordance Society, as a result of which there have been published concordances to Wordsworth, Spenser, Keats, Browning, and others. Among his numerous publications are the following: *The Art of Poetry*

(1892); *The Bible and English Prose Style* (1892); *First Book in Old English* (1894); *The Christ of Cynewulf* (1900); *The Higher Study of English* (1906); *Literary Middle English Reader* (1915); *The Historical Background of Chaucer's Knight* (1916); *The Possible Begetter of the Old English Beowulf and Widsith* (1922); *The Old English Andreas and Bishop Acca of Hexham* (1924). He edited *Yale Studies in English* (over 70 volumes).

Cook, CLARENCE CHATHAM (1828–1900), American art critic, was born in Dorchester, Mass. He was graduated from Harvard (1849), and studied architecture under Andrew J. Downing and Calvert Vaux, but turned his attention to teaching, with which he was occupied for twenty years. A series of able articles on the American art exhibit at the Sanitary Fair in New York in 1863, published in the N. Y. *Tribune*, gained him a long connection with that paper as art critic. He published *The Central Park* (1869), *The House Beautiful* (1878), and *Art and Artists of the Day*, and founded (1884) and for several years edited *The Studio*. His searching criticism often aroused ill-feeling.

Cook, EDWARD DUTTON (1829–83), English dramatic critic and author, was the son of a London solicitor. From 1867 to 1875 he was dramatic critic to the *Pall Mall Gazette* and from 1875 to 1883 to the *World*. In 1860 he produced a melodrama, *The Dove and the Serpent*, in collaboration with Leopold Lewis. Of his novels, the most successful were his earliest, *Paul Foster's Daughter* (1861) and *The Trials of the Tredgolds* (1864). On dramatic affairs he wrote *A Book of the Play* (1876) and *Hours with the Players* (1881).

Cook, SIR EDWARD TYAS (1857–1919), English journalist, was born in Brighton. He was educated at Oxford and entered the journalistic field as a contributor to the *Pall Mall Gazette*, of which he was subsequently assistant editor and editor (1890–92). He was the first editor of the *Westminster Gazette* (1893–6), editor of the *Daily News* (1896–1901), and during the World War was one of the heads of the official Press Bureau. He was knighted in 1912, and in 1917 was created K.B.E. His published works include *Popular Handbooks* to the National Gallery and to the Greek and Roman Antiquities in the British Museum; *Studies in Ruskin* (1891); *The Rights and Wrongs of the Transvaal War; Life of Ruskin* (1912); *Life of Florence Nightingale* (1913); *Delane of the Times* (1915); *Literary Recollections* (1918–19).

Cook, ELIZA (1818–89), English poet, was born in Southwark, London, and lived in the metropolis. She early contributed to periodical literature, and from 1849 to 1854 conducted *Eliza Cook's Journal*. She published four volumes of verse (1835–45) and *Jottings from my Journal* (1860). Several of her lyrics—*e.g.*, 'The Old Arm-Chair' and 'Home in the Heart'—gained wide popularity.

Cook, FRANCIS AMES (1843–1916), American naval officer, was born in Northampton, Mass. He was graduated from the U. S. Naval Academy (1863), was ensign on the *Seminole*, West Gulf Blockading Squadron (1863–5), became a lieutenant-commander (1868), and was instructor in mathematics at the U. S. Naval Academy (1869), where he was subsequently in charge of the department of seamanship (1879–83). He attained the rank of commander in 1880 and was in the Boston Navy Yard as inspector of ordnance from 1889 to 1893. In 1896, as captain, he was placed in command of the newly constructed cruiser *Brooklyn;* he represented the U. S. Navy at Queen Victoria's jubilee; and during the Spanish-American War commanded the flagship *Brooklyn*, which took a conspicuous part in the destruction of Cervera's fleet at Santiago (July 3, 1898). In 1904 he retired with the rank of rear-admiral.

Cook, FREDERICK ALBERT (1865–1940), American physician and explorer, was born in Callicoon Depot, N. Y. He was graduated from the New York University Medical School in 1890; was surgeon of the Peary Arctic expedition in 1891–92, and of the Belgian Antarctic expedition in 1897–99. In 1909 he acquired some notoriety by claiming to have reached the North Pole, a feat later disproved by the University of Copenhagen. He wrote *Through the First Antarctic Night* (1900) and *To the Top of the Continent* (1907).

Cook, JAMES (1728–79), English mariner, was born in Marton, Yorkshire. After some years spent in the North Sea and the Baltic trades, he entered the navy (1755), and from 1759 was for eight years engaged principally in surveying the St. Lawrence and the coasts of Newfoundland. In 1768 he was sent out to the Pacific by the Admiralty, at the instance of the Royal Society, with an expedition to observe the transit of Venus. Having observed the transit from Tahiti, he voyaged westward, completing the first circumnavigation of New Zealand and charting the coast. Passing on to Australia, he surveyed the east coast northwards, and, sailing through the strait separating it from New Guinea, showed that these two lands were not connected. From Batavia he sailed for the Cape of Good Hope, and thence to England (1771).

The following year (1772) Cook received command of an expedition which was sent out to determine the extent of the reported southern continent. The expedition entered the Antarctic Circle in January 1773. After skirting the ice in high latitudes, they reached New Zealand in the following October. Sailing again to the south and east, in January 1774, Cook reached his highest latitude—71° 10′ s. He spent the southern winter cruising among the islands of the Pacific, and in spring set out to explore the high latitudes south of Cape Horn, whence, after discovering South Georgia and sighting Sandwich Land, he sailed for home, reaching England on July 29, 1775. Cook's second voyage covered more than 20,000 leagues, and was the first circumnavigation of the globe eastwards. It was notable, also, for the measures introduced by Cook for the prevention of scurvy, then such a serious menace on long voyages. By dietetic and hygienic precautions he was able entirely to prevent the occurrence of the disease. An account of these measures was presented before the Royal Society and won for him the Copley gold medal.

Cook was now promoted to the rank of captain, and received an appointment at Greenwich Hospital. In the next year he sailed again in command of an expedition to the Pacific, to seek a passage round the north coast of North America. He sailed from Plymouth (July 12, 1776), discovered the Sandwich Islands (1778), and passing on to the west coast of North America, explored it from about the 45th parallel to Icy Cape, where he was stopped by the ice. Having returned to the Sandwich Isles, with a view to surveying them, Cook met his death at Hawaii, in consequence of some trouble with the natives, being murdered in attempting to reach his boat (Feb. 14, 1779). In 1874 an obelisk was erected on the site where he perished.

Consult *Life* by Kippis (1788), by Besant (1890), and by Kitson (1907). The account of the first voyage, written by Cook, is in vols. ii. and iii. of Hawkesworth's *Voyages* (1773); that of the second, also written by Cook, was published in two vols. in 1777; that of the third is in three vols., of which the first two were written by Cook, and the third by Captain James King (1784).

Cook, JOSEPH (1838–1901), American lecturer on ethics, was born at Ticonderoga, N. Y., and graduated (1865) at Harvard. He studied divinity for four years at Andover, and was licensed to preach. He was acting pastor at Lynn, Mass., 1870–1, and then passed two years in study in Germany and England. He began his popular 'Boston Monday lectures' at the Tremont Temple in 1874 and continued them with some interruptions until his death. In 1880–2 Mr. Cook made a successful lecture tour of the world. He published *Boston Monday Lectures* (1876–88), *Current Religious Perils, The Higher Levels of Arbitration* (1900), and *New Defenses of the Lord's Day* (1900).

Cook, THOMAS AND SON, English tourist agents. Thomas (1808–92) was born at Melbourne, Derbyshire. In 1841 he organized an excursion by train from Leicester to Loughborough. The experiment, as it was then, proved successful. An office was opened in London with three assistants, one of whom was Mr. Cook's son, John Mason Cook (1834–99), who became the head of the firm in 1892. The firm has now a hundred offices in various parts of the world. The system of international tickets or coupons has facilitated foreign travel. In 1884 J. M. Cook was entrusted by the British government with the conveyance of the Gordon Relief Expedition to Khartoum. This involved the transport of about 18,000 troops and 40,000 tons of stores from the Tyne to the Nile. At the request of Lord Dufferin, who was then viceroy of India, Mr. Cook organized a system which ensured safe travel to the thousands of Mohammedan pilgrims of British India to the sacred cities of Mecca and Medina.

Cooke, GEORGE FREDERICK (1756-1811), English actor, born in Westminster, made his first appearance at Brentford (1776) as Dumont in *Jane Shore*, but his reputation was assured by his *Othello* in Dublin (1794). In London he acted in Covent Garden as the rival of Kemble. Scott preferred his Richard III. to Kemble's, and Edmund Kean rated Cook very highly. His great impersonations were Iago, Shylock, Sir Giles Overreach, and Sir Pertinax MacSycophant. He came to the U. S. in 1810, and played in the principal northern cities, being received everywhere with great enthusiasm. He acted for the last time in Providence, Rhode Island. He died in New York city, and was buried in St. Paul's churchyard there. See Dunlop's *Memoirs* (1813); Genest's *Account of the Stage* (1832).

Cooke, JAY (1821–1905), American financier, born in Sandusky, O. He was educated in the common schools and at home, became a clerk at Philadelphia in the well-known banking house of E. W. Clark & Co. (still existing) in 1836, and from 1842 to 1858 was a member of the firm. He then engaged, with great profit, in the promotion of railroad and canal enterprises, and in 1860 he founded at Philadelphia the well-known banking house of Jay Cooke & Co. During the Civil War he was the sole agent of the U. S. Government—he styled himself 'General Subscription Agent of the Government Loan'—in negotiating the enormous government loans in 1863, 1864, and 1865, employing more than 2,500 sub-agents throughout the country; and McCulloch, Secretary of the Treasury, said of him, 'I am very sure that by no other banker could the work have been so successfully accomplished. . . . To my predecessors, Mr. Chase and Mr. Fessenden, and to myself, his services were invaluable.' After the war Jay Cooke & Co. were leaders of the syndicate which handled the refunding of the public debt. The firm having become too heavily involved in the Northern Pacific Railroad enterprise, failed disastrously in the panic-year 1873 (Sept. 18), but Cooke subsequently made a new fortune, partly by investments in Western land, and paid his creditors in full, principal and interest.

Cooke, JOHN ESTEN (1830–86), American author, was born at Winchester, Va., studied law with his father, and after practising for a few years, took up literature as a profession, of which he was one of the leading exponents in the South. He served through the Civil War in the Confederate army, and at its close was inspector-general of horse-artillery. He published a great number of novels, and several biographies and sketches of the war, besides much miscellaneous prose and verse for periodicals. His books include *The Virginia Comedians* (1854), *Leather Stocking and Silk* (1854), *Surrey of Eagle's Nest* (1866), *Hill to Hilt* (1869), *The Virginia Bohemians* (1880), lives of Stonewall Jackson and Robert E. Lee, and *Virginia: A History of the People* (1883) in the American Commonwealth series.

Cooke, PHILIP PENDLETON (1816–50), American poet, brother of John Esten Cooke (q.v.), was born at Martinsburg, Va., and graduated (1834) at Princeton. He studied law with his father, and practised to some extent, but gave more attention to literature and out-of-door life than to law. His lyric, 'Florence Vane,' is the best known of his poems. Mr. Cooke was an early contributor to the *Southern Literary Messenger*. His verses were collected as *Froissart Ballads, and Other Poems* (1847).

Cooke, PHILIP ST. GEORGE (1809–95), American soldier, born in Va. He graduated at West Point in 1827, served as a major of dragoons in the Mexican War (1846–8), receiving the brevet of lieutenant-colonel for 'gallant and meritorious services in California,' and commanded the cavalry in the Utah expedition of 1857–8. As brigadier-general in the regular army (commissioned Nov., 1861) he served on the Federal side in the Civil War and in Mar., 1865, received the brevet of major-general for his services during the war. In Oct., 1873, he retired from the active service. He published *Scenes and Adventures in the Army, or Romances of Military Life* (1856); *The Conquest of New Mexico and California* (1878), and *New Cavalry Tactics* (1884).

Cooke, ROSE TERRY (1827–92), American poet, was born (Terry) at West Hartford, Conn., and was educated at Hartford Female Seminary. Her father, Henry Wadsworth Terry, was at special pains with her education, and soon after her graduation she began the composition of poems and sketches which made the name of Rose Terry a favorite one throughout New England. She was married to R. H. Cooke, a manufacturer of Winsted, Conn., in 1873, and lived there until their removal to Pittsfield, Mass., in 1887, where she died. Her verses were published in various editions beginning with *Poems by Rose Terry* (1860) and ending with *Poems by Rose Terry Cooke* (1888). Her volumes of fiction include *Happy Dodd* (1879), *Somebody's Neighbors* (1881), and *The Sphinx's Children* (1886).

Cooke, SIR WILLIAM FOTHERGILL (1806-79), English electrician, born at Ealing, Middlesex; served for five years in the Indian army (1826-31). In partnership with Professor Wheatstone (1837) he took out a patent for improvements in signals for railways. The single-needle apparatus was not, however, invented until 1845. Wheatstone was knighted in 1868, and Cooke in 1869. See R. Sabine's *Hist. and Progress of the Electric Telegraph* (1869); W. T. Jeans's *Lives of the Electricians* (1887).

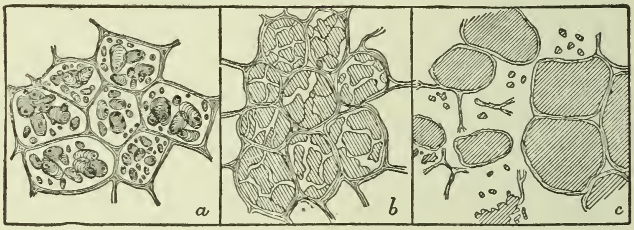
Cookery is the art of preparing food for the use of man, and though commonly understood to include the preliminary cleansing, dressing, and preparing of the food, and all processes by which foods are prepared for the table, it should strictly be limited to those processes which involve the application of heat to food.

The cooking of food has much to do with its nutritive value. Many articles which, owing to their mechanical condition or other cause, are quite unfit for nourishment when raw, are very nutritious when cooked. There are three chief purposes of cooking. The first is to change the mechanical condition so that the digestive juices can act upon the food more freely. Heating often changes the structure of food materials very considerably, so that they are more easily chewed and more easily and thoroughly digested. The second object is to make it more appetizing by improving the appearance or flavor, or both. Food which is attractive to the taste quickens the flow of saliva and other digestive juices, and thus digestion is aided. The third is to kill by heat any disease germs, parasites, or other dangerous organisms it may contain. This is often a very important matter and applies to both animal and vegetable foods.

The application of Heat to Cookery is of two types. (1) *Through moisture,* as by boiling, stewing, braising, fricasseeing, casserole-ing, simmering, steam cooking, and double boiler cooking. (2) *Through dry heat,* as by baking, roasting, broiling, frying.

In the first process, heat-moisture, a portion of the minerals in the food, as well as the soluble proteins, starches or sugars, pass into the cooking water. This is a danger to good cookery and tasteful food and nutrition which was gravely overlooked for years, the valuable food elements thus dissolved in water being poured down the kitchen sink as a rule. Today good cookery calls for the steaming process, the 'waterless' cooker process, or very careful conservation of the cooking juices. Vegetables in particular call for such caution and conservation, and because of these dangers in the boiling process the use of the baking, braising and even the broiling processes for vegetables have made great strides. In the case of meats boiled the juices are as a rule preserved by the preparation of sauces.

Vegetables most readily losing their flavor in cookery are cabbage, brussels sprouts, cauliflower, turnips, onions, carrots. As vegetables are composed of 80% water the waterless cooker method merely makes use of the water in the vegetables themselves. Color in vegetables should not be sought solely by the use of baking soda in the water, but by boiling in cold water, with the lid off, and cooking but a short time. Cities which, like Chicago, have alkaline water need no aids whatsoever to preserve color, while in hard water a teaspoon of sugar, plus a little salt, and a very small amount of baking soda is sufficient to preserve color (this not applying to peas, beans, lentils). A half cup of vinegar to each quart of water when cooking red cabbage will prevent a purple color; while 2 tablespoons in water when cooking beets will do the same. The baking process for cabbage, onions, stuffed cucumbers, beets, cauliflower, carrots, eggplant, peas, parsnips, mushrooms, squash, turnips, is a modern cookery triumph, as is the broiling of these same vegetables. Peas are best when not boiled at all but simmered, but if boiled, with only enough water to cover.



Changes of starch cells in cooking: a, cells of a raw potato with starch grains in natural condition; b, cells of a partially cooked potato; c, cells of a thoroughly boiled potato.

(From U. S. Dept. of Agriculture, Farmers' Bulletin 244.)

In the broiling, baking, roasting, frying processes the principle used is the application of powerful dry heat rapidly upon the food, so that the outside of the food is seared, and this searing serves in large degree as a seal to retain the juices inside. This, for meats especially, is a technique of primary importance. In broiling a steak this is best accomplished of course by broiling both sides at once but as facilities for this are usually lacking except in very modern ranges which have a two-sided vertical broiler attachment, it is accomplished by searing one side for one minute and then turning it.

The application of dry heat to a piece of toast or on a baked potato gives some idea of the chemistry of cookery. Dry heat acting on starch, as in baking, converts the starch into dextrine. As starch is insoluble, and dextrine soluble, it is obvious that cooked starch, in so far as it is converted into dextrine, is more readily digestible than raw. To some extent the changes involved in the cooking of starchy foods form, in fact, an anticipation of the changes involved in the process of digestion. The crust of the bread and the outside portion of toast consist quite considerably of dextrine. A potato contains something more than starch, *viz.,* water, nitrogenous matters, and mineral matter, largely potash salts. Numerous experiments prove that when boiled without its skin the potato loses a large part of its potash and other salts, and a considerable amount of its nitrogenous matters. Hence a potato should be cooked with the skin on if it is desired to retain as much as possible of the nutritive material.

Though potatoes contain other materials besides starch they are composed essentially of cells containing granules and moisture. When a potato is cooked the starch in the cells absorbs the water present and expands, and the cell walls burst, provided the water and starch are in the right proportion. When the requisite amount of starch is not present the cell walls do not burst when the potato is boiled and the tuber retains its form and is soggy. It is evident, therefore, that mealiness depends to a considerable extent upon the starch content, and it has been found that mealy potatoes usually contain from 18 to 20 per cent starch. The distribution of the starch cells in the potato, the method of cultivation, and similar factors also affect the cooking quality, and in general it may be said that certain varieties are normally waxy when cooked and others mealy. If a potato is overcooked or stands in water after it is cooked the starch absorbs too much water and becomes soggy.

The application of *slow* dry heat is an old technique which accounts for the delicious flavor of food baked in the old wood-fired 'Dutch' ovens; also for the remarkable manner in which a good stew brings out the taste and nutriment of a poor cut of meat. Even cookery by the 'fireless cooker' has a flavor of its own due to slow tempo, as has the potato roasted in ashes. High temperature cookery is often too intense for foods to retain their flavor and character. Good cookery calls for the lowest temperature consistent with the other factors involved. High temperatures harden proteins, for instance, and make them indigestible. While roasting meat and fish calls for 400° to 425° F. most other foods taste best when cooked at 212° F. or less, and not overdone.

On the other hand starches, being indigestible raw, need to be cooked thoroughly, 'converting' the starch. In the case of fats, they break up and decompose into indigestible elements when overcooked. This is why the frying pan has made for bad cookery—it introduces into the stomach new irritating factors (for instance acroleine) as a result of overcooking. All foods fried in the smoking fats do this. Deep-fat frying does not permit food to absorb as much fat as does frying. As for minerals, no temperature change affects them, but to get them into the food as served requires strategy—first, care not to pour away the boiling juices, into which they have dissolved; and second, care to cook or serve with the food the parts which contain the minerals (for instance apple sauce cooked with skins and cores and then sieved).

Modern cookery in homes has come to use more cooking thermometers. Ovens are built with temperature dials or even automatic temperature controls, and special cooking thermometers are available (frying thermometer, candy thermometer, sugar thermometer). Heat is molecular motion, and when combined with moisture hardens albumen (as in eggs), softens fibre (as in meat), loosens cellulose (as in vegetables), swells and bursts starch-grains (as in potatoes). In breads, cakes, pastry, and other foods prepared from flour, the aim is to make a palatable and lighter porous substance more easily broken up in the alimentary canal than the raw materials could be. Sometimes this is accomplished simply by means of water and heat. The heat changes part of the water in the dough into steam, which, in trying to escape, forces the particles of dough apart. The gluten of the flour stiffens about the tiny bubbles thus formed and the mass remains porous even after the steam has escaped. More often, however, other things are used to 'raise' the dough—such as yeast and baking powder. The baking powder gives off the gas carbon dioxide, and the yeast causes fermentation in the dough by which carbon dioxide is produced. This acts as the steam does, only much more powerfully. When beaten eggs are used, the albumen incloses air in bubbles which expand, and the walls stiffen with the heat and thus render the food porous.

As the art of cookery advanced, greater attention was given to various ways of preparing foods, instead of eating them in simple, ordinary fashion. Sauces are made to affect more tasty combinations for meat and fishes deficient in flavor; egging and crumbing is undertaken to add to the effect; larding, spicing, stuffing is undertaken, also boning, jellying, combining and dressing. The French have highly developed these arts, taking many neglected types of food and making delightful dishes from them by careful combination, slow cooking, and ingenious preparation. The end sought is always to tempt the palate as well as feed; even to tempt the eye, for the French have always been more aware of *eye-appeal* in cookery; the English more aware of *savor;* the Hungarians more aware of *spices;* the Italians more aware of *simplicity;* the Chinese more aware of *variety;* the Spanish more aware of *high strong flavor;* the Germans more aware of *heartiness of appetite and quantity.* In the art of combination of foods many authorities rank the Chinese the highest, others the French.

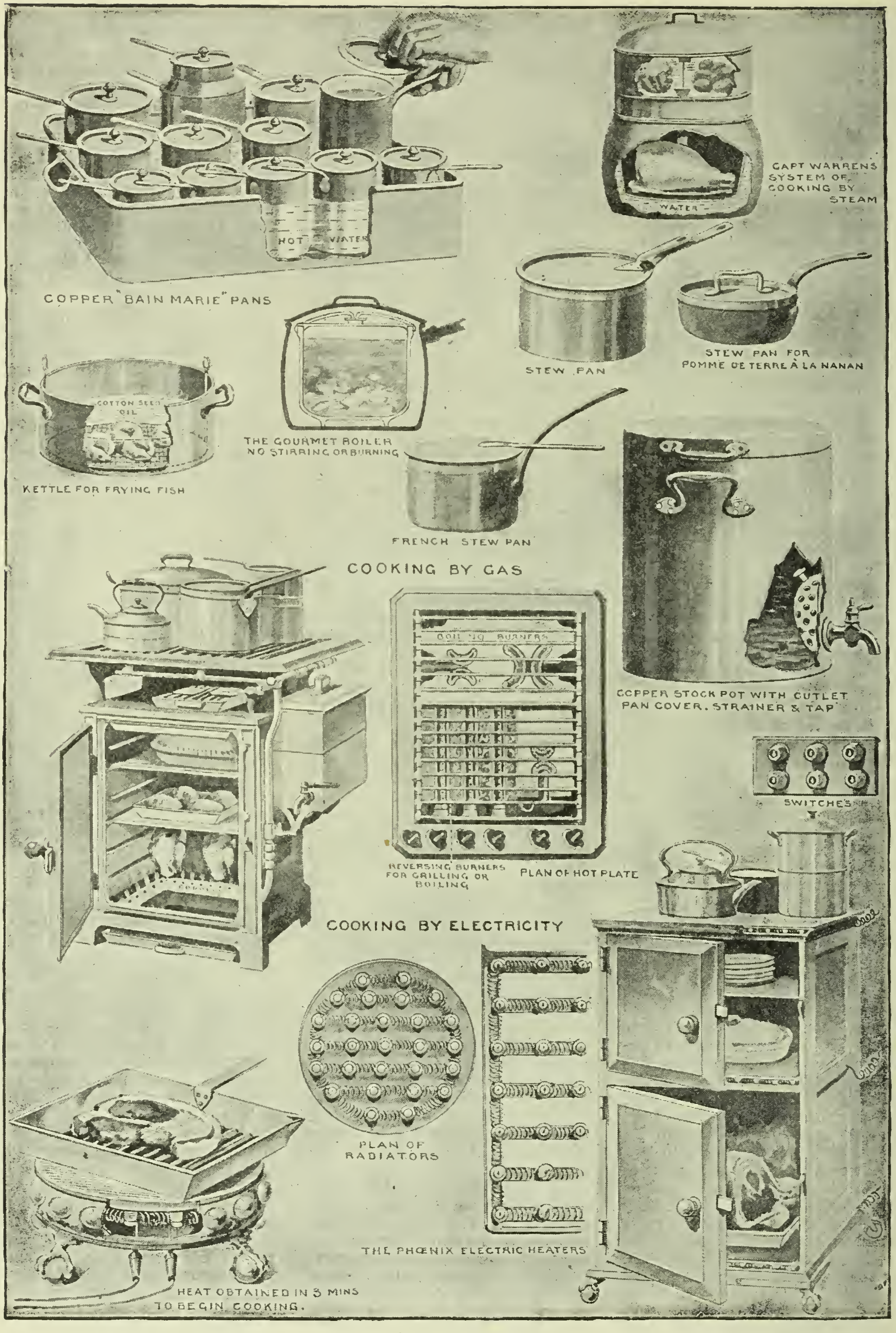
Sea food cookery is a severe test both of food preservation, preparation and cookery skill. Sea food is more delicate in structure, subtle in flavor and more perishable than most other foods, and this is a cookery challenge. Fresh fish is of two broad types, (1) diffused with fat, as salmon, shad, mackerel, bluefish, sturgeon, eel, etc., and (2) dry-fleshed, as cod, halibut, whitefish, haddock, bass, trout, flounder, pike. Naturally the presence of fat indicates different treatment in cookery. Although with all fish dishes an acid should be provided, with the fatty fish this is particularly desirable. Frozen fish are now available and this requires a technique of handling and of quick use after thawing. The use of sauces for boiled or steamed or broiled fish is an added touch.

In the combination of food ingredients there are three main methods: (1) *stirring,* for the purpose of mixing, best accomplished by a circular motion starting at the center and widening the circles; (2) *beating,* for the purpose of enclosing as much air as possible, best accomplished by turning ingredients over and over, raising the under part to the surface and *vice versa;* (3) *cutting and folding,* for the purpose of introducing one ingredient into another, and preventing air introduced from escaping, best accomplished by a repeated downward vertical motion to bottom with a spoon, and a turning over of mixture.

Preserving of foods is in modern times accomplished by a wide variety of methods: (1) freezing, (2) refrigeration (both by natural ice and dry ice), (3) canning, (4) sugaring, (5) exclusion of air, (6) drying (dehydration), (7) evaporation, (8) salting, (9) pickling, (10) smoking, (11) antiseptics, (12) oil.

An important advance in the science of cookery arrived when measurements were standardized. Old recipes are full of most confusing references to a 'teacupful' or 'a handful' or 'a pinch of' whereas these quantities are susceptible of much variance and consequent unreliability. Good cooks were possible under such circumstances only by a kind of instinctive sureness or fixed habit. Cookery was thus hard to transmit accurately to other persons. Then the half pint (liquid measure) or eight fluid ounces was adopted as a 'standard measuring cup,' with grooved sides to indicate fractions of this measure. Next a standard set of measuring spoons was adopted, consisting of 1 tablespoon, 1 teaspoon, and a half and a quarter. Level measuring was adopted for these. Next the more widespread use of thermometers for cookery was urged, and recipes indicated correct temperatures. Then followed an era of more widely used *tested recipes,* which represented checked instructions under standard conditions. This has insured good cookery results as never before and made it possible for any intelligent person to cook without any long experience. As a result there are many 'amateur' cooks today, even among men, who enjoy the practice of the art as an occasional pastime.

Stoves and Utensils.—Great advances have been made in recent years in cooking ranges and utensils. Because coal, gas and electricity have been available only to urban and some semi-urban localities in former years, cookery over wood stoves was still widespread. This was of course an advance over the open fireplace cookery of colonial days, but laborious and unreliable for continuous controlled heat. Coal ranges gradually displaced most of these, and about 1900 kerosene and gasoline stoves began to make their way. Still later manufactured gas in tanks spread in use, also electric ranges. In a survey made in 1933 among small towns it was found that 45% cook with gas and 5% with elec-


COPPER "BAIN MARIE" PANS
HOT WATER
CAPT WARRENS SYSTEM OF COOKING BY STEAM
WATER
STEW PAN
STEW PAN FOR POMME DE TERRE À LA NANAN
COTTON SEED OIL
KETTLE FOR FRYING FISH
THE GOURMET BOILER NO STIRRING OR BURNING
FRENCH STEW PAN
COPPER STOCK POT WITH CUTLET PAN COVER, STRAINER & TAP
COOKING BY GAS
BOILING BURNERS
REVERSING BURNERS FOR GRILLING OR BOILING
PLAN OF HOT PLATE
SWITCHES
COOKING BY ELECTRICITY
PLAN OF RADIATORS
THE PHŒNIX ELECTRIC HEATERS
HEAT OBTAINED IN 3 MINS TO BEGIN COOKING.

MODERN COOKING UTENSILS: THE USE OF GAS AND ELECTRICITY.

tricity, 35% with coal and 15% with wood. Very extensive improvement has occurred in coal-burning ranges, some being made for combination wood or coal, coal or gas. The electric range has been amazingly perfected; in 1934 an electric range in one unit with an electric refrigerator was made available. Ranges (electric or gas) of fully modern type have vertical broiling compartments, electrical control of cooking time and temperature, and even fireless cookery compartments.

Fireless cookers in separate units have many devotees and continue cookery without fuel when once started. Pressure cookers are very valuable and effective, particularly in high altitudes, and especially for effective cookery of the lesser cuts of meat. Temperature in such pressure cookers goes above the boiling point and reduces cookery time, also excludes air.

The use of electric appliances permits new cookery convenience, as in waffle irons which show a red light or cut off current when waffles are done; or electric egg cookers which cook eggs without attention to precisely the desired time; or toast browned to precisely the right crispness and ejected; or coffee percolated on several new principles.

Kitchen mixers, grinders, etc., have been evolved from original over-bulky machinery to light devices which mix dough, chop meat, grind coffee, turn ice cream freezers, beat eggs, etc., all in one device. There is an amazing array of electrical kitchen aids of many kinds from peelers to juicers, etc. Among the most practical are an electric refrigerator, electric casserole, electric dishwasher, electric ventilator, electric grill or chafing dish or cooker, electric baking oven, electric appliance side table for dining room.

Electric refrigerators have opened new doors to cookery; even ice cream now being made in them. The electric refrigerator has reduced food spoilage and made easily possible a wide variety of dishes by cold cookery, such as aspics, frozen desserts and pudding, etc. The electric casserole has likewise made easy and economical many baked dishes and thus widened the ordinary range of cookery.

General Principles.—Cookery is probably our most ancient art. Since the discovery of fire man has cooked his food; no savages exist today who do not use some form of cookery however crude. It may safely be said that cookery is a general principle of human nutrition, despite the fact that raw food cults have won large numbers of advocates. It is true that fats and carbohydrates go through very little change or increase in digestibility when cooked. The same is true of mineral constituents. As for proteins, digestibility is very definitely improved by cookery. Even the white of an egg (contrary to many claims) is more digestible after cooking. Much controversy has ranged around the question of what cookery does to vitamins. Although Vitamin C is definitely affected, Vitamins A, B and D are not so readily affected. It is not heat alone which has dangers for vitamins, but the effect of atmospheric oxygen at high temperatures. Thus the exclusion of air in cookery is a step toward vitamin preservation; also toward the conservation of other volatile substances. Vitamins are also easily affected by alkalies, which is a warning against use of baking soda in vegetable cookery.

Meal planning is an integral part of good cookery, but it is in considerable part dependent on the understanding of nutrition (q. v.). However from the point of view of appetite and food enjoyment meal planning is also important, since there is an instinctive reaction of the palate corresponding roughly (when normal) to sound nutrition, but most important from a psychological point of view. Such meal planning in cookery has four separate aspects:

(1) ***Balance of food values:*** to secure desirable number of calories per day or per meal, since men doing hard work require about 4150 calories; men doing moderate muscular work 3600; men doing a small amount of muscular work 2800; men in sedentary work 2450. Also to have in sound proportions in a meal the various food elements—protein, fats, carbohydrates, mineral matter and vegetable fibre or bulk; and also to maintain the proper alkaline balance.

(2) ***Suitability of Time, Season, Place, etc.:*** indolent people on a hot day need and want quite different food at noon than a gang of field workers on a farm who have been working since an early hour. A nice adjustment of kind and quantity of food to the situation, time, place and persons is an indispensable good cookery consideration.

(3) ***General provision plan from an economy basis:*** good cookery management includes meal series planning, arranging for a desirable, economical purchase and succession of meals; avoidance of waste, duplication and over-feeding or under-feeding; also wise rotation and change.

(4) ***Setting, garnishing, eye-appeal planning:*** French cookery rates eye-appeal very highly, and goes to unusual pains to 'dress' dishes and tables, from the points of view of color, form, accessories, ensemble.

In cookery a very basic general principle is also *cleanliness.* Not only are the flavors and appetite values of many raw foods, both in cookery and preparation easily dissipated, spoiled, are rendered unfit, or unappetizing by lack of absolute care and cleanliness; but in storage also, such as the absorption of odors. Like the famous Gresham law of finance (that bad money drives out good) so in cookery it is a law that a bad strong odor will drive out or contaminate natural wholesome odors. Flavor and natural goodness is a basic cookery asset which must at all times be protected, preserved and brought to the dining table at its best. Such volatile flavor as coffee or tea is a case in point, since much tea or coffee-making failure arises simply from uncleanliness (failure to wash out snouts of pots, and scald them, or failure to make fresh infusions instead of permitting old infusions to contaminate). The same is true of frying pans, which are often accumulations of charred and rancid oils and fat which destroy flavor. In good cookery cleanliness is a first law; cleanliness of person, first; cleanliness of foods, next; cleanliness of utensils next, and daintiness in serving last.

Growth of Cookery.—Before fire was known to early man, the only way of dressing meat was by exposing it to the sun; but after its discovery and method of generating it, fire was used first for drying and afterwards for cooking flesh. The chief disadvantage of this primitive method was that those parts of the meat which came in direct contact with the fuel were blackened and besmirched, and to obviate this, spits were passed through it and it was raised to a height above the fire—the process of grilling or broiling, the chief mode known to the ancient Greeks of the Homeric epoch, being thus invented.

The Greeks gave considerable attention to gastronomic pleasures, and Athenian travelers were constantly introducing new dishes, and improved methods of cooking, from other lands. Their system of dressing and cooking food was in turn copied by the Romans. The era of modern cooking dates back to the period of the Italian Renaissance. Italian methods were introduced into France by Catherine de' Medici, who brought cooks from her own country. Under Louis XIV and Louis XV cooking became an art. French methods soon found their way into England, and cookery books began to appear as early as the first half of the 16th Century.

The art of cookery, therefore, has been in evolution in Europe, China and America, catching up with the great Italian and French pioneers, and especially with the French point of view, which ranks cookery with the very highest arts. In America the low state of cookery in all but a few localities was a result of crude pioneering conditions which enforced isolation and narrow diet, and the social push upwards which slurred cookery as drudgery and menial.

The science of feeding being observed as productive of important results in raising live stock for the market, it became apparent about 1895 that the feeding of human beings rested on a far less scientific basis than the feeding of hogs. Interest, therefore, began to center upon human feeding, and 'domestic science' and food research became active—only to discover almost at once that in its ignorance and cupidity people in the United States had been making and selling for human consumption a vast amount of adulterated, impure and dangerously bad food. The beef scandals ('embalmed beef') of the Spanish-American War greatly aided in the subsequent pure food struggle.

In 1906 came Upton Sinclair's sensational book, *The Jungle,* exposing deplorable conditions in the Chicago stockyards and packing plants. This led to a Government investigation which in turn led to the passing by Congress of the Pure Food and Drug Law (q. v.).

The great territory of the United States yields an immense variety of available foodstuffs, while foreign trade brings in a great galaxy of additional foods, thus providing a wide range of cookery materials scarcely available to any other locale. In addition, regional delicacies and conditions make possible a provincial repertoire of cookery now shared with the entire country, through the employment of modern express refrigerator cars and the Birdseye freezing process. Electric and other refrigeration ensure the preservation of foods at their best all the way from point of origin to the kitchen.

Furthermore, inventive skill in the United States has added enormously to the possibilities of cooking technique. By making oil, gas and electric ranges available even to suburban and isolated country homes it has widened the scope of cookery for vast numbers of families. The invention of a multiplicity of handy and small kitchen tools, as well as electric mixers, peelers, grinders, etc., has greatly reduced the labor of cookery. Electric utensils of many kinds, such as casseroles, toasters, egg cookers, waffle irons, grills and grids, etc., have simplified the whole cooking process, while such devices as waterless cookers, etc., have improved the product of cookery both from a taste or appetizing and nutritive point of view.

Cookery embraces both an art and a science, just as there are for cookery two objectives—enjoyment and nutrition. Therefore cookery worthy of the name must employ both the science of food preparation, with its chemical and digestive aspects, and the art of food enjoyment, which is partly social and psychological, and partly sensuous. The whole necessarily includes the garnishing and serving of foods and the setting of the scene for food enjoyment—the dining table; conversation and the anticipatory savoring of the feast.

Food chemistry is a wide scientific technique of cookery, having formerly largely to do with the changes produced on foods by heat, but with the arrival of the electric refrigerator has now a great deal also to do with the application of *cold.* A considerable variety of foods are now yielded to the electric refrigerator for processing for the table, even dough for baking. The frying pan, once the 'national symbol' for American cookery, and the chief explanation for its low status, is slowly being outmoded; the broiling, baking and steaming processes meanwhile gaining in favor.

The true cookery object is to make food more digestible, more tasty and nutritious without impairing or destroying its natural flavor or dissipating its richest nourishing and appetizing values. The literature on the culinary art and gastronomic enthusiasm is immense and is spread through many languages. 'Man is a cooking animal' wrote Carlyle, and a famous German proverb declares that 'Man is what he eats' (Der Mensch ist was er isst), a neat play on words.

In connection with the subject of Cookery the reader is referred to the articles in this work on the various foods and foodstuffs. See particularly the following:

Baking powder
Butter
Bread
Canning
Cereals
Cheese
Diet and Dietetics
Digestion
Egg
Fat
Flour
Food
Foods, Preserved
Fuel
Meat
Milk
Nutrition
Sugar

Bibliography.—Henry T. Finck's *Food and Flavor* (1908); Barron's *Principles of Cookery* (1914); Dr. Mary Schwartz Rose's *Feeding the Family* (1916); Fannie Merritt Farmer's *Boston Cooking School Cook Book* (1929); Mrs. Christine Frederick's *Efficient Housekeeping* (1920); J. George Frederick's *Cooking As Men Like It* (1930); *The Edinburgh Book of Advanced Cookery Recipes* (Thomas Nelson & Sons, 1933).

(Christine Frederick.)

Cooking, Military. See Field Cooking.

Cook Inlet, an arm of the Pacific Ocean in the Sitka District, on the southern shore of Alaska, included between long. 150° and 150° w. It lies behind Kodiac Island, delimits the Kenai Peninsula on the east and, with an extreme width of 60 miles, reaches into the interior for 200 miles. The upper part of the inlet is closed by ice from November to May. The natives of this region are of various tribes and live by hunting, trapping, and fishing, and by acting as laborers or guides when occasion offers. They have schools and churches under the Russian Church. In 1900 the Biological Survey of the Department of Agriculture made biological reconnaissances of Cook Inlet, adding materially to the scanty data in regard to its flora and fauna.

Cook Islands, otherwise known as the Hervey Archipelago, lie about midway between the Society and Navigator groups, near 20° s. lat. and 158° w. long. Part are volcanic, part coraline. The principal islands are Mangaia, Atiou, and Raratonga. The natives, mainly of the brown Polynesian stock, number about 13,000. Formerly cannibals, they are now all Christians. The islands were discovered by Cook in 1773–7, annexed by Britain in 1888, and made over to New Zealand in 1901. Mail steamers plying between Sydney, Wellington and San Francisco call at Raratonga. Pop. (1926 census) 13,877 (313 whites).

Cook Mountain (Maori, *Aorangi,* 'Fleecy Cloud'), the highest mountain in New Zealand (alt. 12,349 ft.), in the centre of

CALVIN COOLIDGE
Thirtieth President of the United States

the Southern Alps in South Island. Rising from the serrated range of sandstones and slates (7,500 feet), it resembles a square tent, terminating in a curved sharp ridge, crowned with perpetual snow. The first practical ascent was made by Rev. W. S. Green in 1882; the first complete ascent by T. C. Fyfe in 1894.

Cook Strait, strait between North and South Islands, New Zealand, 90 miles wide, was discovered by Captain Cook in 1770. It is somewhat dangerous to navigation due to the high winds which prevail.

Coo'ley, LEROY CLARK (1833–1916), American physicist, was born in Point Peninsula, N. Y. He was graduated from New York State Normal College (1855) and from Union College (1858; PH.D., 1870), was professor of mathematics at Fairfield Academy (1858–9), and professor of physical science at New York State Normal College (1860–74). In 1874 he became connected with Vassar College, with which he was associated until his death, as professor of physics and chemistry (1874–94), professor of physics (1894–1907), and professor emeritus (1907–16). He is the author of a *Text Book of Physics* (1868); *A Text Book of Chemistry* (1869); *Easy Experiments in Physical Science* (1870); *Elements of Chemistry for High Schools* (1873); *New Textbook for Physics* (1880); *New Textbook for Chemistry* (1881); *Beginners' Guide to Chemistry* (1886); *Laboratory Studies in Chemistry* (1894); *Students' Manual of Physics* (1897).

Cooley, THOMAS MCINTYRE (1824–98), American jurist, was born in Attica, N. Y., and removed to Michigan in 1843, where he was admitted to the bar in 1846; became Professor of Law at the University of Michigan, 1859; was a justice of the Supreme Court of that State, 1864–85, and chief justice part of that time. He returned to the University as Professor of American History and lecturer on constitutional law, 1885–88, and was chairman of the Interstate Commerce Commission under Cleveland. He rose to great fame as a constitutional lawyer comparable with John Marshall. His works include *Constitutional Limitations which rest upon the Legislative Power of the States*, etc., frequently consulted; *Treatise on the Law of Taxation* (1876); *Principles of Law of Torts* (1878).

Coolgar'die, formerly the principal town in the eastern gold fields of West Australia, is situated about 360 miles by rail east of Perth. The rapid progress of Kalgoorlie has prevented Coolgardie from developing as rapidly as it promised. It is the centre of a large mining district. Pop. 3,000.

Coolidge, ARCHIBALD CARY (1866–1928), American educator, was born in Boston. He was graduated from Harvard University (1887) and studied in Berlin, Paris, and Freiburg. In 1890–1 he was acting secretary to the American Legation in St. Petersburg, in 1892 secretary to his uncle, T. J. Coolidge (q.v.), then ambassador to France, and in 1893 secretary to the American Legation in Vienna. He became an instructor in history at Harvard in 1893, assistant professor in 1899, and professor in 1908. In 1911 he became director of the University Library. He was Harvard lecturer at the Sorbonne, Paris (1906–07), and Harvard exchange professor at the University of Berlin (1913–14), and in 1919 was attached to the Peace Conference at Paris. He is the author of *The United States as a World Power* (1908) and *The Origins of the Triple Alliance* (1917).

Coolidge, CALVIN (baptized John Calvin) (1872–1933), thirtieth President of the United States, was born on July 4, 1872, in Plymouth, Vt. His first American ancestor was John Coolidge, who went to the Puritan Colony of Massachusetts Bay in 1630. He grew up on his father's tiny farm, attended the village school, and later Black River Academy at Ludlow, Vt. He was graduated from Amherst with high honors in 1895, and in 1896–97 studied law with the firm of Hammond and Field in Northampton, Mass., being admitted to the bar in 1897. In the fall of that year he began his political career, as a member of the Common Council of that city, and in immediately subsequent years held several minor political offices. In 1905, he married Grace A. Goodhue of Burlington, Vt. Two sons were born to them, John B., in 1906, and Calvin, Jr., in 1908 (d. July 7, 1924).

In 1907, Coolidge was elected to the Massachusetts legislature, after which he was twice chosen mayor of Northampton (1910 and 1911), and was elected a second time to the State Legislature (1912), three times Lieutenant Governor (1912–15), and twice Governor (1919–20). As a result of a strike by the police of Boston in September, 1919, he achieved a national reputation for steadiness and conservatism. With three-quarters of the police force on strike, the city was left unprotected, and a night of looting and violence followed. Next day the National Guard and U. S. Marines were called out and quickly got the situation in hand. In a telegram to the head of the American Federation of Labor, Coolidge justified his course in supporting the local authorities during the strike on the ground that 'there is no right to strike against the public safety by any body, anywhere, any time.'

At the presidential election in November, 1920, Coolidge was elected Vice-President on the ticket with Warren G. Harding as President. On President Harding's death (August 2, 1923) Coolidge succeeded to the Presidency, the oath of office being administered by his father on August 3, at 2:47 A.M. In 1924 he was nominated and elected by a tremendous popular and electoral college vote.

After taking the oath of office at Plymouth on August 3, 1923, he issued a statement: 'It will be my privilege to carry out the policies which he (President Harding) has begun for the service of the American people. . . . I have faith that God will direct the destinies of our Nation.' Harding's strongest wish was to get the country 'back to normalcy,' and Coolidge succeeded in doing just that.

At the invitation of President Harding, Coolidge had, while Vice President, attended Cabinet meetings. The knowledge he thus acquired of the procedure and plans of the Administration, combined with his long experience in public office, and his steadiness, simplicity, and honesty were highly useful to the country in the months following his accession to the Presidency. Public confidence in the integrity and competency of many high Government officials had been shaken by the uncovering by Senate committees of scandals in the administration of the Navy's oil reserves, the Veterans' Bureau, the office of the Alien Property Custodian, and the Department of Justice. Coolidge's calmness and his asserted intention of bringing wrongdoers to justice without doing injustice to the innocent, were like a granite rock of his native Vermont hills against which the rising flood of hysteria and cynicism broke and receded.

On becoming President, Coolidge retained all but two of the Cabinet selected by Harding, which, because of the high renown of three of its members, was called the Cabinet of the 'best minds.' On March 28, 1924, he dismissed Attorney-General Harry Daugherty, who had been appointed for political reasons and who in popular judgment had proved himself unfit for the office. A month earlier, February 11, the Senate had adopted a resolution asking the President to call for the resignation of Secretary of the Navy Denby, on the ground that he had been remiss in allowing the Navy's oil reserves to be transferred to the Interior Department, where they had been leased out to private interests. Coolidge replied to the Senate that he could not recognize its right to make the request. On February 18, Denby brought the tension to an end by voluntarily resigning.

Coolidge's relations with Congress, beginning with the clash over Denby, were never cordial, despite the fact that during all the years of his incumbency of the Presidency his party had a majority in both Houses of Congress. Except for a relatively few Eastern conservatives, the President could only rarely, and then only when backed by strong public opinion, count on his party in Congress to carry out his recommendations. In 1923 and again in 1925 he suggested legislation, based on the Hammond report, designed to prevent future strikes in the coal industry. He was ignored. In his first message to Congress, December 6, 1923 (delivered in person), he commended to the Senate the World Court as the only practical plan on which many nations have ever agreed, 'with the proposed reservations clearly indicating refusal to adhere to the League of Nations.' When he left the White House the country was as far as ever from joining the World Court. Other measures sponsored by him which Congress ignored were consolidation of the country's railroads and systematization of Government activities.

The disposition of Congress to go against the President's wishes extended to appointments, and the number of Coolidge appointees who were rejected by the Senate is probably greater than that of any other President. The Senate's refusal to confirm Charles Beecher Warren as Attorney-General, following the elevation of Attorney-General Harlan F. Stone to the Supreme Court, was the first occasion in over eighty years in which a President was refused a Cabinet officer he had chosen. As a corollary to this Coolidge broke all precedents in the number of times he vetoed laws passed by Congress. From the beginning of his administration he had stressed the necessity of economy in Federal expenditures and most of his vetoes were for Congressional enactments calling for expenditures which he considered unwarranted. Among the many laws he vetoed were the Bursom bill (May, 1924) calling for increased pensions to veterans of several wars, which would have cost the Treasury more than $400,000,000; the Soldiers' Bonus Bill (May, 1924), which was promptly passed over his veto; a bill for raising salaries of post-office employes (June, 1924); the McNary-Haugen farm relief bill (February 25, 1927, and May 23, 1928) containing the feature, obnoxious to the President, of the equalization fee; (by pocket veto, June 7, 1928) the Muscle Shoals Bill, calling for U. S. Government operation of the $150,000,000 power plant on the Tennessee River in Albama. In one day, May 18, 1928, he vetoed eight bills, including one giving a 10 per cent. ($6,000,000 a year) increase of pay to night postal workers.

On the constructive side, Coolidge's administration was marked by several achievements of first importance. A settlement was made providing for payments over a long period of years of the debts owed the United States by its War-time Allies, except France; the National debt was reduced by an estimated three-quarters of a billion dollars yearly and interest charges were greatly decreased through the issuance of low interest-bearing bonds in substitution for those issued during the War; Federal taxes were reduced three times; the budget system was put into effective operation as an incident to a general drive for economy and efficiency in the administration of the Federal Government.

In the field of foreign affairs, a more important achievement than the debt settlement was the concerting of a treaty (Pact of Paris) for the renunciation of war in the settlement of international disputes, which was signed at Paris, August 27, 1928, by the representatives of the United States and fourteen other nations. This treaty, if the hopes that are held for it bear fruit, will probably go down into history as the most lastingly beneficent event of the first third of the twentieth century.

Throughout all the years of Coolidge's tenure of the Presidency the country generally enjoyed a degree of prosperity unprecedented in all history. (Conspicuous exceptions were agriculture and the coal and textile industries.) A number of factors undoubtedly contributed to bring about this condition, but certainly to Coolidge belongs credit for helping to create it. It was his task to effect the shift from the disorganization and fever of the war period to the placid course of peace, and his habit of non-interference, of letting problems work out their own solutions was probably the best and wisest course that under the circumstances he could have followed. In the summer of 1927 he issued his famous statement renouncing a third term as President: 'I do not choose to run for President in 1928.' On his retirement from office he engaged in literary work and also became a director of the New York Life Insurance Company. He died suddenly at his home in Northampton, Mass., on Jan. 5, 1933 and was buried in Vermont. Consult *Autobiography* (5th ed. 1931); White, W. A., *Calvin Coolidge* (1925); Woods, R. A., *Preparation of Calvin Coolidge* (1924); Rogers, C., *Legend of Calvin Coolidge* (1924); *N. Y. Times,* Jan. 6, 1933.

Coolidge, CHARLES ALLERTON (1858–1936), American architect, was born in Boston. Among his notable buildings are Stanford University, Cal., the buildings of the Harvard Medical School, the Chicago Public Library, Chicago Art Institute, Merchants' National Bank, Boston, and buildings for the Rockefeller Institute, New York. died Apr. 1, 1936

Coolidge, SUSAN. See WOOLSEY, SARAH CHAUNCEY.

Coolidge, THOMAS JEFFERSON (1831–1920), American manufacturer and diplomat, was born in Boston, Mass. He engaged in the East India trade, and became a successful cotton manufacturer and president in turn of the Atchison, Topeka, and Santa Fé Railroad, and the Oregon Railroad and Navigation Co. He was a delegate to the Pan-American Congress (1889), U. S. minister to France (1892–3), and a member of the joint high commission appointed to adjust various disputes between United States and Canada. Among his benefactions is the Jefferson Physical Research Laboratory at Harvard University.

Coolidge, WILLIAM AUGUSTUS BREVOORT (1850–1926), writer on Alpine subjects, was born near New York. He was graduated from Oxford University (1874), and afterward resided in England, taking orders and serving as curate, 1883–95, though retaining his American citizenship. Among his chief works are *Guide to the Central Alps of the Dauphiny* (1892), *Adula Alps* (1893), *Range of the Tödi* (1894), *A Run through the Western and Central Alps* (1895), *Alpine Studies* (1912), *Johann Madutz* (1917), besides a number of Alpine guidebooks. He was editor of the *Alpine Journal* and of *Murray's Handbook of Switzerland.*

Coolidge, WILLIAM DAVID (1873–), American physicist, was born in Hudson, Mass. He was graduated from the Massa-

CALVIN COOLIDGE
Thirtieth President of the United States

chusetts Institute of Technology in 1896 and studied at the University of Leipzig. From 1901 to 1905 he was instructor and professor of physical chemistry at the Massachusetts Institute of Technology, did research in physico-chemistry at the General Electric Company's laboratories, 1905–8, and since 1908 has been assistant director of the laboratories. Among his important inventions is the Coolidge tube (see Vacuum Tubes).

Coolies (Hindu kûli,'laborer'), a term applied to Indian and Chinese laborers who emigrate to foreign lands, whether at their own or at the expense of the foreigner, to whom they bind themselves by contract to serve for a fixed term of years. Laborers who migrate from one part of India to another, as for instance from Bengal to Assam, are also called coolies. The European and American residents in the treaty ports of China give the same name to the lower class of Chinese laborers.

After the emancipation of the slaves in 1834, the negroes in the West Indies declined to work, and their places were supplied by free laborers brought from India and later from other Eastern countries. At first the movement was unregulated and was subject to great abuses, natives being practically kidnapped into slavery; but gradually regulations and restrictions were introduced.

The whole system of coolie migration from India is under strict regulation by the British government. Emigration is permitted only through Calcutta, Madras, and Bombay, and every precaution is taken against fraud, and for the health and comfort of the coolies while on board ship. The colonies to which the stream of coolie labor is directed on their part are careful to see that no abuses take place; and where migration is permitted to the colonies of foreign powers, the British consuls are expected to report any abuse of the system. In consequence of adverse reports, emigration from India to the island of Réunion and to French Guiana was forbidden—to the former in 1881, to the latter in 1876. It is permitted to the following British colonies: Mauritius, Natal, British Guiana, the West Indies, and Fiji. It is also permitted to the French colonies Guadeloupe and Martinique, under a convention made with France in 1861; to Dutch Guiana, under a convention with the Netherlands made in 1870. Jamaica suspended immigration of coolies in 1886, but resumed it again in 1891.

In British Guiana the coolies form two-fifths of the population, and in Mauritius nearly three-fifths of it. Natal has coolies in the proportion of one in fifteen of its population. In British East Africa their arrival is welcomed. In the West Indies, in Trinidad in particular, they form so considerable an element of the population (one-third) that missionaries have been forced to make themselves proficient in Hindustani to enable them to reach the people. The coolie system is also in vogue in the Federated Malay States.

The United States, Canada, and Australia all have laws restricting or forbidding the importation or immigration of Chinese labor. In this connection see Chinese Immigration.

Coomassie. See Kumassi.

Cooper, Ashley. See Shaftesbury.

Cooper, Sir Astley Paston (1768–1841), English surgeon, was born at Brooke Hall, near Norwich. He studied under Henry Cline, surgeon at St. Thomas' Hospital, London, and was appointed demonstrator in anatomy there in 1789. From 1793 to 1796 he lectured on anatomy at the College of Surgeons, was elected professor of comparative anatomy (1813), was twice president (1827 and 1836), and in 1820 received a baronetcy. He resigned his lectureship in surgery at St. Thomas' (held since 1792), and was prime mover in the establishment of the medical school at Guy's Hospital (1825), and in 1828 he was appointed surgeon to the king. His most valuable works are his splendidly illustrated *Hernia* (1804–7), and his *Dislocations and Fractures of the Joints* (1822). Consult *Life* by B. B. Cooper.

Cooper, Charles Henry (1808–66), English biographer and antiquary, was born in Great Marlow, Buckinghamshire, and from 1849 onwards was town clerk of Cambridge. He is the author of three works of first-rate importance: *The Annals of Cambridge* (5 vols. 1842–53); *Athenæ Cantabrigienses* (2 vols. 1858–61), suggested by Anthony à Wood's similar Oxford work; and *Memorials of Cambridge* (3 vols. 1858–66).

Cooper, Edith Emma. See Field, Michael.

Cooper, George Henry (1821–91), American naval officer, was born at Fort Diamond, New York Harbor. He entered the U. S. navy as a midshipman in 1837, and served in the Mexican War, taking part in the attacks on Tabasco and Tuxpan. In the Civil War, as commander (commissioned July, 1862), he commanded the monitor *Sangamon* in operations against the fortifications of Charleston, S. C., and commanded the *Sonoma* in the South Atlantic Blockading Squadron (1863–4), and the *Glaucus* in the East Gulf Blockading Squadron (1864–5). He became a captain (1869), a commodore (1874), and a rear admiral (1881), was president of the Board of Inspection (1877–80), and for some time before his retirement in 1884 was in command of the North Atlantic Squadron.

Cooper, Henry Ernest (1857–1929), American public official, was born in New Albany, Ind. He was graduated (1878) from the law school of Boston University, was admitted to the Massachusetts bar the same year, and practised his profession until his removal to Honolulu, Hawaiian Islands, in 1890. There he was chairman of the committee of safety that took the first steps to establish the Republic of Hawaii in 1893. He was, in succession, judge of the circuit court, minister of foreign affairs, acting president, minister of public instruction, and attorney-general of Hawaii until the annexation of the islands by the United States in 1898 and their organization as the Territory of Hawaii in 1899, when he was appointed first secretary of the territory. Later he retired from public life and resumed his law practice.

Cooper, Jacob (1830–1904), American Presbyterian clergyman and educator, was born in Butler County, O. He was graduated from Yale University (1852), took a course in divinity at the Edinburgh Theological Seminary, and was professor of Greek at Center College, Ky., 1855–66, meanwhile serving for two years as chaplain of a Kentucky regiment in the Civil War. From 1866 to 1883 he was professor of Greek at Rutgers College, and he held the chair of philosophy at the same college from 1839 until his death. He wrote lives of George Duffield, Theodore Woolsey, and William Preston Johnson. Among other books are *Creation, a Transference of Power* (1900) and *The Passage from Mind to Matter* (1901).

Cooper, James Fenimore (1789–1851), American novelist, was born Sept. 15, 1789, in Burlington, N. J. He was of Quaker extraction, the eleventh child in a family of twelve. In 1790 his father, William Cooper, removed with the family to Otsego Lake, N. Y., where he founded the village of Cooperstown upon a large tract of land secured a few years previously, and in 1799 erected the family mansion known as Otsego Hall. It was here that Fenimore Cooper gained the knowledge of frontier life and of Indian traits and character which are so truthfully portrayed in his *Leatherstocking Tales.* Fenimore received his education at Albany, N. Y., and at Yale, from which institution he was expelled in his junior year for a breach of discipline. He then shipped before the mast on a merchant vessel by way of preparation for entrance to the U. S. Navy, in which he was appointed a midshipman in 1808. He served for three years, chiefly on the Great Lakes, and resigned in 1811, having married into the De Lancey family of Westchester county, N. Y., where he passed most of his time for the ensuing ten years, occupied with his family and farming.

Cooper's first novel, *Precaution* (1820), was written by way of showing that he could improve upon a novel of English life which accidentally fell into his hands. This met with little success, but *The Spy* published the following year created such a furor that the author gave himself altogether to literary work. He removed to New York about this time, having published *The Pioneers* (1823), the earliest written of the Leatherstocking series. Their order in narrative is, *The Deerslayer* (1841), *The Last of the Mohicans* (1826), *The Pathfinder* (1840), *The Pioneers* (1823), and *The Prairie* (1827). Of these *The Last of the Mohicans* is by common consent Cooper's greatest work. Meanwhile *The Pilot* (1823–24), suggested by the lack of genuine sea-element in Scott's *The Pirate,* was the first book to bring Cooper enduring fame. He removed to Paris in 1826, whence he wrote for the *National* on American topics. During his stay at the French capital he wrote *The Prairie, The Red Rover* (1828), and *The Bravo* (1831).

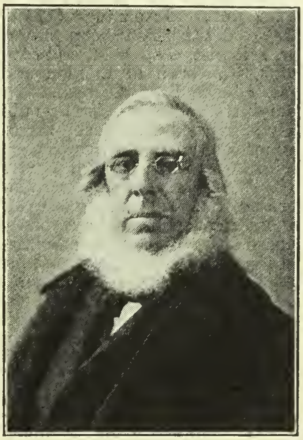
Returning to America in 1833, Cooper successively produced *The Monikins* (1835), *Mercedes of Castile* (1840), *The Two Admirals* and *Wing and Wing* (1842), *Ned Myers and Wyandotte* (1843), *Afloat and Ashore, or the Adventures of Miles Wallingford* (1844), *The Chainbearer* (1845), *The Redskins* and *Satanstoe* (1846), *The Crater of Vulcan's Peak* (1847), which introduced supernatural machinery, *Jack Tier, Captain Spike, The Oak Openings, or the Bee-Hunter* (1848), *The Sea Lions* (1849), and *The Ways of the Hour* (1850). Cooper was also the author of *Homeward Bound* and *Home as Found* (1838), containing an idealized portrait of himself, and *History of the Navy of the United States* (1839).

During his residence abroad Cooper, while sturdily maintaining republican institutions, particularly in *The Bravo,* was nevertheless frankly critical of crudities of American life. He followed this up with further not unprejudiced comments, on his return to America, and responded to attacks in the press with libel suits in which he was almost invariably successful, conducting them himself. The bitterness of these contests undoubtedly affected his later work, which does not show the inventive faculty and high picturesque gifts of his early books. He settled permanently at Cooperstown a few years after his return from Europe and there died Sept. 14, 1851.

Consult Griswold's *Prose Writers of America;* T. R. Lounsbury's *Life of Cooper;* Clymer's *J. F. Cooper;* J. Erskine's *Leading American Novelists;* H. W. Boynton's *James Fenimore Cooper* (1931); R. E. Spiller's *Fenimore Cooper* (1931).

Cooper, Lane (1875–), American educator, was born in New Brunswick, N. J. He was graduated from Rutgers College (1898) and subsequently studied at Columbia, Yale (M.A. 1898), and the universities of Berlin and Leipzig (PH.D. 1901) and in Paris. In 1902 he became associated with Cornell University, where he was successively instructor in English (1902–06), assistant professor (1906–15), and professor (1915–) of English language and literature. His publications include: *The Prose Poetry of Thomas De Quincey* (1902); *Theories of Style* (1907); *Literature for Engineers* (1909); (with others) *A Manual of American Literature* (1909); *Concordance to the Poems of William Wordsworth* (1911); *The Function of the Leader in Scholarship* (1911); *Aristotle on the Art of Poetry* (1913); *Methods and Aims in the Study of Literature* (1915); *A Concordance to the Works of Horace* (1916); *Louis Agassiz as a Teacher* (1917); *The Greek Genius and Its Influence* (1917); *George Meredith, An Essay on Comedy* (1918); *Two Views of Education* (1922); *An Aristotelian Theory of Comedy* (1922); *A Concordance of the Latin, Greek, and Italian Poems of John Milton* (1923); *The Poetics of Aristotle, Its Meaning and Influence* (1923); *A Concordance of Boethius* (1928).

Cooper, Peter (1791–1883), American philanthropist, was born in New York City. He worked with his father in various manufacturing enterprises, and as an apprentice, until 1812, when he invented a machine for shearing cloth and engaged in business for himself, later establishing on Long Island a glue factory, which was the foundation of his prosperity. He also made money in the iron and allied industries. He built (1830) the first locomotive in America, a tiny experimental engine for the Baltimore and Ohio Railroad, and later assisted in laying the first transatlantic cable. He formulated the scheme for 'giving instruction in branches of knowledge by which men and women earn their daily bread,' and 'The Cooper Union for the Advancement of Science and Art,' founded in New York in 1853, is the outcome (see Cooper Union). In 1876 Cooper was Independent candidate for the presidency. Consult *Life* by Carter in *Century Magazine* (1883–4).



Peter Cooper

Cooper, Samuel (1798–1876), military officer, was born in Hackensack, N. J. He served in the Mexican War, and rose to adjutant-general. In March 1861 he resigned to become adjutant-general and inspector-general in the Confederate army. He wrote *A Concise System of Instructions and Regulations for the Militia and Volunteers of the United States.*

Cooper, Susan Fenimore (1813–94), American author and philanthropist, daughter of James Fenimore Cooper (q.v.), was born at Scarsdale, N. Y. She was her father's secretary and amanuensis during the latter portion of his life, and afterward resided at Cooperstown, engaged in literary work and in the developing of a home for orphan girls, which she established in a small way in 1873, and for which a large building was later erected. In 1883 she organized 'The Friendly Society' of ladies, each of whom made one of the girls her particular charge. Miss Cooper's books, which are pleasantly observant of rural conditions, include *Rural Hours* (1850), *Rhyme and Reason of Country Life* (1854), and *Mt. Vernon to the Children of America* (1858).

Cooper, Thomas (1759–1840), British-American agitator, scientist, economist, and educator, was born in London and was educated at Oxford. In pamphlets and otherwise he publicly supported the French Revolution, and to avoid prosecution emigrated to the United States in 1795, and settled in Northumberland, Pa. Interesting himself in American politics, he strongly opposed the Federalist administration of President John Adams, and was one of the small number of men convicted and punished under the obnoxious Sedition Act of 1798. (See Alien and Sedition Acts.) In 1811–14 he was professor of chemistry at Dickinson College, Carlisle, Pennsylvania, and in 1816–19 at the University of Pennsylvania; and from 1820–33 was president of the College of South Carolina, where he also filled the chairs of chemistry and political economy. He was a conspicuous opponent of protectionism and did much to inculcate in the minds of South Carolinians theories and ideas which found expression in the nullification movement of 1832–3. He helped to prepare an edition of the statutes of South Carolina (10 vols., 1836–41), and published *Political Essays* (1800) and *Elements of Political Economy* (1826), and other volumes.

Cooper, Thomas (1805–92), English Chartist leader and poet, was born in Leicester. He was apprenticed to a shoemaker, and afterward taught school. Settling in Leicester (1840), he became leader of the Chartists there, lecturing in the Potteries at the time of the riots of 1842; he was arrested for conspiracy and sedition, and sentenced to two years' imprisonment. During his incarceration he wrote his most famous work, *The Purgatory of Suicides*, an epic wherein he discussed the great social and religious problems of the past and his own times, the spirits of suicides being the speakers. This was published in 1845, and was followed by his *Wise Saws and Modern Instances* (1845); *The Baron's Yule Feast* and *The Condition of the People* (1846); *The Triumphs of Perseverance* (1847); and two novels. He also edited *The Plain Speaker* and *Cooper's Journal.* While in prison Cooper struggled with religious doubts, which finally developed into open unbelief, but in 1855 he became an earnest lecturer upon the evidences of Christianity. In 1871 he published *The Bridge of History Over the Gulf of Time,* and in 1875 *The Verity of Christ's Resurrection.* In 1872 Cooper wrote his own *Life* and in 1873 *The Paradise of Martyrs.* In 1877 an edition of his *Poetical Works* appeared, and in 1885 he published *Thoughts at Fourscore and Earlier.*

Cooper, Thomas Abthorpe (1776–1849), British-American actor, was born at Harrow-on-the-Hill, England, and after his father's death was educated under the supervision of William Godwin, the latter's cousin. His first appearance was made in Stephen Kemble's company at Edinburgh Theatre and later he met with great success at Covent Garden, London, particularly in Shakespearian rôles and as Pierre in *Venice Preserved.* He made his American début in 1796 as Macbeth at the Chestnut Street Theatre in Philadelphia, and was for some time lessee of the Park Theatre in New York. Cooper revisited England in 1803 and 1827, having meanwhile held a leading position on the American stage. During his later years he filled various government offices to which he was appointed through the influence of his son-in-law, the son of President Tyler.

Cooper, Thomas Sidney (1803–1902), English painter, was born in Canterbury. After a youth of privation and struggle as coach painter, scene painter, and drawing master (1819–27), he studied animal and landscape painting in Brussels, where he found employment till the revolution of 1830. He exhibited in the Academy every year for sixty-nine years from 1834, being elected A.R.A. in 1845, and R.A. in 1867. His work is done in the open air in fine finished Flemish style. There are pictures by him in the Tate Gallery, South Kensington Museum, at Warrington, and in the National Gallery. Queen Victoria employed him to paint portraits of her prize cattle. Consult his *Story of My Life* (1892).

Cooperage, the art of making wooden casks, kegs, barrels, tanks, vats, and other circular or elliptical wooden vessels bound together by means of hoops. The industry is doubtless of great antiquity, as the use of such vessels has been described by writers as early as the beginning of the Christian Era. It is a stable industry and varies but little in volume from year to year.

There are two classes of cooperage: the 'tight,' which is concerned with the making of barrels for holding liquids, and the 'slack,' which produces vessels for dry articles, notably flour, sugar, and cement. The latter class is by far the larger and more valuable, but the former requires a higher grade of wood and greater accuracy of construction.

The cooper's product consists of three parts: the staves, headings, and hoops. Sometimes the manufacture of these parts is carried on in separate factories, but often a single establishment turns out the finished product. The best wood for staves in tight barrels is oak; in slack barrels elm is the favorite, with red gum a close second. Elm, ash, hickory, and birch are used for hoops, but iron hoops have largely superseded wooden ones. These are hammered down with mallets and sometimes put on red hot so that the shrinking in cooling may bind the cask more firmly together.

The cooper uses few tools, but these he handles with great skill and dexterity. The chief tools are an axe, an adze, several spokeshaves, and a large fixed plane or jointer, used to make the edges of the staves true. Casks are wider in the middle than at the ends, forming what is called the *bilge,* so that each stave must be skilfully tapered. A skilled workman can do this so perfectly that no further fitting is needed. At the present time machinery is employed almost entirely in barrel-making.

There is an increasing demand for kegs and barrels as shipping containers, and a majority of them are used and re-used many times. Modern machinery has so cheapened their cost that they are probably the least expensive kind of durable package. The cement industry is the largest consumer, followed by the flour, sugar, and salt industries.

Consult Wagner's *Cooperage: a Treatise on Modern Shop Methods and Practice;* Newlin's *Tests of Wooden Barrels* (*U. S. Dept. of Agriculture Bulletin No. 86,* 1914); U. S. Dept. of Commerce's *Packing for Domestic Shipment* (1927).

Coop'erage, the name given to the practice, eventually suppressed, of illicitly selling drink and tobacco to the fishermen engaged in the North Sea fisheries. The term is derived from the vessels, called *copers,* which carried on the traffic.

Co-operation. Broadly speaking, co-operation is any kind of joint effort for the accomplishment of certain results. Specifically the term is applied to the combined effort of a number of persons—usually laborers, farmers, or small capitalists—to produce, purchase, or distribute goods for their joint benefit. The invention of steam-driven machinery was followed by the rise of political socialism, trade unionism, and co-operation. For a while all these movements were included under the general term, co-operation, but eventually trade unionism and political socialism developed into definite forms of their own (see SOCIALISM; TRADE UNIONS), and the co-operative movement became quite distinct from either of them.

One of its earliest advocates was Robert Owen (q.v.), an Englishman, who about 1825 undertook the establishment of communistic colonies in which the colonists were to hold the land and work the machinery of production in common. These colonies met with little success, possibly because they turned to outside agencies for financial support rather than to the colonists themselves. Dr. William King approached nearer the co-operative ideal. In 1827 he published a series of essays, wherein he set forth the idea that the working classes should themselves work out their industrial emancipation. Although his writings attracted slight notice at the time, he was, nevertheless, a real prophet of the modern co-operative movement, and its progress and development have been along the very path he indicated nearly a hundred years ago. Other economic theorists, notably Fourier (q.v.) of France, early interested themselves in co-operative enterprises, but the practical pioneers of the movement are generally held to be the Rochdale weavers.

In 1843 twenty-eight weavers in the town of Rochdale, in the north of England, with a view to bettering their condition decided to establish a co-operative store to be conducted by the workers for the workers. To that end each agreed to contribute one pound, paid in weekly installments of two pence. The now famous store was started in a back street, the members in turn acting as salesmen on the Monday and Saturday nights it was kept open. The goods, consisting of the common groceries in use, were sold at market prices, and at the end of each quarter the profits, after expenses had been paid and a substantial appropriation made to a reserve fund, were given back to the purchasing members in proportion to the amount each had purchased. Each member had one vote regardless of the number of shares owned. In ten years the original membership of 28 had grown to nearly 1,000, the yearly business had grown from $3,500 to over $100,000, and Rochdale societies were springing up all over Great Britain. In 1864 the Co-operative Wholesale Society was formed, consisting of 54 societies representing 18,000 co-operators. In July 1931 it included 1,084 societies with a membership of over 5,000,000. Sales for the year ending on that date amounted to £82,247,174.

Starting with the purchase of a few groceries, the Co-operative Wholesale Society expanded until almost every form of trade was represented. The co-operators to-day own their own factories, have their own dairy, fruit, and vegetable farms, and their own banks. The Co-operative Wholesale Society bank in 1931 had deposits and withdrawals amounting to more than £700,000,000. The value of the output of the productive plants was £23,906,580.

In 1868 the Scottish co-operative stores, seeing the success of the English Wholesale Society, established a similar organization. At the close of 1930, the Scottish Co-operative Wholesale Society, Ltd., comprised 251 societies possessing share and loan capital to the amount of £8,500,000. It employed 10,774 persons, and sales for 1930 totalled £17,700,000. Its productive enterprises included a boot and shoe factory, clothing factories, cabinet and brush factories, printing works, a tobacco factory, preserve and grocery productive departments, tweed, blanket and jute mills, flour and meal mills, soap works, and creameries.

The Irish Agricultural Wholesale Society, Ltd., located in Dublin, is the wholesale provider for the agricultural co-operative societies in Ireland. At the close of 1930 it comprised 470 affiliated societies. Its turnover for that year amounted to £582,426.

The Co-operative Union, Ltd., was established in 1869. It holds a yearly congress, and is the educational body of the British co-operative movement. It carries on a country-wide propaganda through lectures, books, and pamphlets, and maintains a parliamentary committee to guard its interests. At the close of 1930 member societies numbered 1,221, with 6,253,734 members.

During the early sixties the Rochdale system was adopted in some form in practically all countries. In Zürich, Switzerland, a bakery was established on Rochdale principles in 1851, and in 1865 a society was founded in Basel, which to-day includes practically the whole city. In France the first consumers' societies appeared in 1866, but it was not until 1900 that a wholesale co-operative society was started in Paris. Denmark founded a Rochdale store in Thisted in 1867, but agricultural co-operation is the chief form which the Danish movement has taken (see below).

In Germany, Schulze-Delitzsch (q.v.) in 1851 began a vigorous propaganda for joint effort, which resulted in the formation of credit-unions of small tradesmen to finance consumers' shops. These tradesmen's banks later organized a nation-wide co-operative union, but in 1902 the radical members of this union were expelled, and with them went the majority of the other members. In Hamburg, the Central Union of German Consumers' Societies included 974 distributive societies in 1930 with a total membership of 3,010,000, while the German Co-operative Wholesale Society served 969 affiliated societies.

Italy had enough consumers' societies in 1866 to form a national union, which in 1898 comprised 480 societies. In that year all popular societies with a radical tendency were suppressed and among them many co-operative societies, but they were soon re-established and by 1915 numbered over 2,000. The Italian Co-operative Union in 1930 comprised 3,300 societies, with about 900,000 members.

The first Russian co-operative society was established in Riga in 1865; the following year one was started in Perm, and in 1872 there was a co-operative society in Kharkov. The development of such societies was hindered in every possible way by the government and it was not until after 1905 that much progress was made. At present the co-operative movement is considered a partner of the state in serving the people, and in the spirit of the Five Year Plan an effort has been made to make the entire nation co-operative. In 1930 membership of societies was about 61 per cent of the whole population, or 69,000,000. The Centrosoyus (All-Russian Central Union of Consumers' Societies) is divided into various departments. The turnover for the retail trade of this system was, in 1931, 16,400,000 rubles, as opposed to 12,200,000 rubles in 1930, and 9,310,000 rubles in 1929.

Finland, though slow to inaugurate the movement for co-operation, now has a large number of organizations with a prosperous wholesale society.

The Consumers' movement in 1930 had a total membership of 467,480. The Norwegian Co-operative Union and Co-operative Wholesale had 445 societies in 1930, comprising 110,076 members. In Sweden about a third of the population is served by the movement. Societies are wide-spread in Australia and well-established in South Africa; distributive co-operation is not strong in Japan.

In Belgium the co-operative movement has taken on a slightly different aspect, as exemplified by the *Vooruit* of Ghent. This society was founded in the seventies by Eduarde Anseele, who persuaded the weavers of Ghent to bake their bread in common and to turn back the profits into a pool for a mutual benefit insurance fund. A small amount of the profits was returned to the purchasers in the shape of free bread, but the bulk was allowed to accumulate as a mutual benefit fund. In a short time the *Vooruit* opened *Ons Huis* ('Our House'), the first of the *maisons du peuple,* those social centres peculiar to Belgium. The membership of the *Vooruit* increased rapidly, and just before the World War there were over 200 such co-operative centres patterned after Anseele's *Vooruit.*

The outbreak of the World War had a stimulating effect upon the co-operative movement, and membership in societies increased enormously. The food supply was threatened and that in the hands of private dealers was advanced in price to the uttermost limit. The co-operative stores had no reason for any such increase; the goods on hand belonged to the members and were not on the market. The volume of business of the English Wholesale Society almost doubled during the war, and the same is true of Germany, Austria, and France. As for Russia, co-operation became the basis of practically the entire industrial system of Soviet Russia.

In 1895 was established the International Co-operative Alliance, an organization dedicated to the promotion of co-operative principles and their international practice. In 1931, 42 countries comprised it, with an individual membership of 70,000,000. Purely educational in nature itself, the Alliance has helped organize commercial central organizations of international scope, namely, the International Co-operative Wholesale Society, with headquarters at Manchester (established in 1924), the International Co-operative Banking Committee, at Paris, and the Committee on International Insurance. The Alliance holds international congresses every three years, and publishes an official monthly organ. Most of the consumers' societies of the world are affiliated with it, through their participation in national leagues or unions in direct membership.

United States.—The first attempt at co-operation in the United States was made in 1844, when a Boston tailor organized a co-operative buying club. This later became the first American co-operative society, and about it was formed a federation which in 1849 was known as the New England Protective Union. This flourished for some dozen years and as many as 700 stores were established throughout New England and even as far west as Illinois. With the advent of the Civil War the organization went to pieces. These early stores were closely associated with the prohibition movement, all members being obliged to pledge abstinence from alcoholic liquors, and were not conducted on Rochdale principles. Goods were sold as near cost as possible, a practice shown by experience to be impracticable.

In the early seventies the Patrons of Husbandry, a farmers' society, established a number of local co-operative stores and in 1874 the Sovereigns of Industry, a society open to all persons, was founded for the purpose of establishing an industrial system based on equity. After some experimenting with a system of their own they adopted the Rochdale plan. After half a dozen years of prosperity, however, the Sovereigns declined and practically disappeared.

The last decade of the nineteenth and the early years of the twentieth century showed a great lack of interest in the co-operative movement in America, but during the second decade and especially since 1916 there has been a revival. In Southern Illinois, for example, a group of co-operative societies was organized by the coal miners. They spread to the neighboring States and prospered. In Staunton, Ill., a clubhouse similar to *Ons Huis* in Ghent was opened.

Toward the end of the war period many consumers' societies were formed. A large part of these were of short duration, owing to their lack of experience, the falling prices of 1920–21, and the attendant depression. The entire period following 1920 was marked by general economic and employment conditions inimical to the success of co-operative or private business. The farmers' societies were the victims of agricultural depression; others were troubled by political dissension—communism frequently being an acute cause of discord in 1929–30. Inevitably the membership of many societies dwindled; as a whole, the movement more than held its own.

The various types of consumers' societies are exemplified by the principal ones of 1929—retail store societies, gasoline filling stations, distributive departments of marketing associations, creameries, restaurants, bakeries, boarding houses, and laundries. The largest consumers' society is the Franklin Co-operative Creamery Association, formed in Minneapolis in 1921 when the drivers of milk wagons and milk consumers united. Its membership in 1930 was more than 4,300 and its annual sales more than $3,000,000. The association owns and operates two plants in Minneapolis; it has developed an educational department and annually conducts a co-operative training school which extends over several weeks. In New York City co-operative cafeterias and a laundry have been established, and members receive patronage refunds after the expenses of operation have been met.

Co-operative credit societies and banks have increased in number. There are many fraternal life insurance associations which operate largely on a co-operative basis and make annual benefit returns, as well as co-operative fire, hail, and cyclone insurance companies. Several of the larger cities have co-operative housing associations, as well as co-operative telephone exchanges, motion picture houses, schools, and a co-operative undertaking establishment.

It was estimated that there were 1,200 consumers' associations in the United States in 1920, with a total membership of about 340,000 and total sales in excess of $120,000,000. These figures had shrunk somewhat by 1929. In that year 656 co-operative societies reporting to the U. S. Bureau of Labor Statistics had 204,368 members. Of these, 60 per cent belonged to store societies and 27 per cent to co-operative oil associations. Of the whole number of societies, 70 per cent, and of the entire membership, 60 per cent were in the north central states. The businesses included were various: 198 gasoline stations, 20 bakeries, 17 boarding houses, 13 restaurants, 8 dairies, 4 food shops, 3 laundries, 3 feed mills, 3 fuel yards, 2 coffee roasteries, 2 billiard parlors, 2 funeral parlors, a tailor shop, a dance hall, a plant for smoked meats, a tea room, a cheese factory, a public dock, an establishment for cleaning beans, a blacksmith shop and a steam bath.

The indorsement of co-operation by the American Federation of Labor in 1917 proved a great stimulus to co-operative enterprise, which is developing in close alliance with the labor movement. The first national convention of American co-operative associations was held in Springfield, Ill., in 1918, at which the National Co-operative Congress was organized, representing the commercial side of the movement. The Co-operative League of the United States represents the educational and propagandistic. Its purpose is to extend the scope and influence of consumers' co-operative societies throughout the country, and extends business services to societies and individual members such as wholesale buying, accounting and auditing, legal aid, the services of field organizers; publishes various material, sponsors lectures and resident schools to train employees. An insurance department was incorporated in 1930 as Clusa Service, Inc. The League had 140 societies and 125,000 members in 1930.

Co-operation in Agriculture.—An agricultural co-operative society consists of producers of agricultural wealth who have combined, with the object of improving their financial status by performing some or all of the functions involved in transferring their products from themselves to the consumers, or by collectively buying farm supplies or jointly providing credit for productive purposes, or conducting some other business enterprise. Among the marketing functions are standardizing, assembling, selling, transporting, storing, financing, processing, and dispersing. In few instances do the organized producers attempt to perform all these functions. Standardizing and assembling are most frequently undertaken. There is, however, a considerable tendency for groups of producers to extend their co-operative marketing activities further and further along the road leading toward the consumer. The storing and processing functions are being taken over with greater frequency, and groups of associations are federating for the purpose of collectively solving financing problems.

As a general rule, separate organizations have been formed for the different commodities. There are, for example, associations for the making and marketing of butter, for the manufacture and sale of cheese, for the marketing of fluid milk, livestock, wool, tobacco, cotton, hay, citrus fruits, apples, peaches, grapes, raisins, walnuts, almonds, pecans, and peanuts.

United States.—The origin of agricultural co-operation in the United States is sometimes traced to the establishment in 1841 of Brook Farm (q.v.), but there is a great difference between that idealistic project and the modern agricultural co-operative association whose object is the economic betterment of the members through co-operative shipping and marketing and the co-operative buying of fertilizers, feed, seeds, spraying materials, packing house supplies, farm implements, building materials, fuel, and other necessities.

Among the first farmers to combine for collective marketing were those with surplus milk. As early as 1851 the farmers in Oneida county, New York, banded together to make and market cheese. A co-operative creamery was formed in Orange county, New York, in 1856, and a farmers' creamery was started in Montgomery county in 1863, which has been functioning continuously ever since.

Attempts were made in the late sixties to organize associations for the co-operative handling of grain. One of the early farmers' elevators was established at Blairstown, Iowa, in 1867, and continued for two years.

Another early association was that formed among the fruit and vegetable growers of Hammonton, N. J., in 1867, which is reported to have operated for twenty-one years.

Farmers in the neighborhood of Goodlettsville, Tenn., organized the Goodlettsville Lamb Club in 1877. A livestock shipping association has been in continuous operation at Superior, Neb., since 1883.

The growers of citrus fruit about Riverside, Cal., began organizing for collective marketing as early as 1885. The raisin growers tributary to Fresno formed an association in 1889, and the predecessor of the present California Fruit Growers' Exchange was formed in 1893. A walnut growers' marketing association was formed at Santa Paula in 1885, and the almond growers about Davis organized in 1887.

An association for the co-operative marketing of cotton was formed in 1889, an association for the marketing of wool in 1893, one for the marketing of poultry products in 1901, and one for the marketing of tobacco in 1904. Early in 1917 the first of the producer-controlled terminal market livestock sales agencies began operating in the Nebraska capital, Omaha.

The first of the large egg-marketing associations was formed at Tulare, Cal., in 1913; the first of the State-wide associations for the marketing of grain—the Washington Wheat Growers' Association—early in 1920; the first of the big State-wide cotton associations—the Oklahoma Cotton Growers' Association—early in 1921. In 1920 the first of the regional tobacco associations was formed, and the following year the Burley Tobacco Growers' Co-operative Association was organized at Lexington, Ky.

The Dairymen's League Co-operative Association, Inc., which is a marketing agency for the milk producers in the New York City milk shed, began operating May 1, 1921. In 1929 it handled more than 2,578,000,000 pounds of milk, sold chiefly to dealer distributors in New York and Pennsylvania.

The growth of agricultural co-operation in the United States can be measured by the increase in the number of associations, by the increase in membership, and by the increase in amount of business handled. The number of associations has increased from less than a score in 1860 to twelve thousand in 1930; the membership from a few hundred in 1860 to over 3,000,000 in 1930; the amount of business handled from a few thousands of dollars in 1860 to $2,500,000,000 in 1930.

Until comparatively recently, the co-operative movement consisted largely of the activities of local associations, though groups of local associations had in a few cases been combined into federations which acted as sales agents for the members of the groups. Beginning about 1920, the 'large' association, serving the people of an entire State or a producing region which might lap over into several States, was promoted with vigor. State and regional associations for the marketing of cotton, tobacco, rice, wheat, peanuts, and potatoes were formed. At the same time, sales agencies, owned and controlled by the farmers, were set up in many of the terminal livestock markets.

During the five years from 1920 to 1925 the membership of the agricultural co-operative associations increased from less than one million to over two and one-half millions, and the amount of business handled annually from about $800,000,000 to $2,500,000,000.

A survey of co-operative associations made by the U. S. Department of Agriculture for 1928 included reports from 11,400 organizations. The total number of associations is placed at 12,000. The number of associations reporting, and the estimated membership for the several commodity groups, are as follows:

Commodity	Number of Associations	Estimated Membership
Grain	3,455	900,000
Dairy Products	2,479	600,000
Cotton	125	140,000
Tobacco	16	15,000
Livestock	2,012	450,000
Fruits and Vegetables	1,269	215,000
All Others	2,044	680,000
Total	11,400	3,000,000

A majority of the associations, with 70 per cent. of the total membership, were located in the North Central States; 700 associations in the South Central States were credited with 8 per cent. of the total membership; 1,100 associations in the Atlantic Coast States reported a combined membership of more than 400,000, and ten Western States, with over a thousand associations reporting, had 256,000 members. The following table indicates the geographic distribution of associations and membership.

Geographic Division	Number of States	Number of Associations	Membership	
			Number of Members	Per Cent
Atlantic Coast	17	1,084	408,200	13.7
North Central	12	8,586	2,087,600	69.5
South Central	8	703	248,600	8.3
Western	11	1,027	255,600	8.5
Total	48	11,400	3,000,000	100.0

In December, 1922, the National Council of Farmers' Co-operative Marketing Associations was formed at a conference of co-operative marketing associations held in Washington, D. C. A second conference was held under the auspices of the Council in February of 1924, and a third in January of 1925. In addition to the annual conferences, the Council conducts short schools in various sections of the country for the teaching of co-operative principles and furnishes its members with a continuous clearing-house service regarding co-operative activities.

The American Institute of Co-operation was organized early in 1925 by representatives of seventeen educational and marketing organizations concerned with the welfare of the farmer. At the first session of the Institute, held at the University of Pennsylvania, July 20 to Aug. 15, 1925, consideration was given to problems of economic principles and legal structure, organization and membership, operating methods and management, sales policies, and prices.

'House organs' are issued by the various agricultural co-operative associations. Some of these are published weekly, some bi-weekly, some monthly, and some irregularly. These publications vary from small four-paged circulars to large attractive magazines. Several have circulations in excess of 60,000.

In *Canada,* agricultural co-operation is confined largely to the marketing of grain, livestock, wool, poultry and poultry products, and dairy products. The wheat marketing associations in the Prairie Provinces are handling over one-half of the grain marketed.

Other Countries.—Continental Europe has made progress along the line of agricultural co-operation, but its achievements as regards the selling of farm products do not involve so many farmers as are included in the American co-operatives. In Denmark the movement has reached large proportions. Agricultural co-operation started there with a credit association in 1851. A horse-breeding association was formed on the Island of Bornholm in 1879, and the first creamery was established at Hjedding in 1882. The first co-operative bull association was organized in 1884, and the first co-operative bacon-curing plant in 1887. A butter export association formed in 1889 continued for nine years. The first pig-breeding association was formed in 1894, and the first co-operative cow-testing association in 1895. The Danish Co-operative Egg Export Association came into existence in 1895, and in 1897 the National Federation of Danish Co-operative Bacon Factories was formed. In 1898 the Jutland Co-operative Association for the purchase of feeding stuffs was organized, and eight years later the association for seed growing. The first co-operative wholesale for selling bacon in England was established in 1902. In 1907 an association was formed for furnishing marl on a co-operative basis, and in 1913 the co-operative cement factory began operating. In the same year the Danish Co-operative Coal Supply Association was organized.

In 1925 Denmark had 1,362 co-operative creameries, about 82 per cent of the whole number, serving 185,000 farmers, and receiving 3,800,000 tons of milk; butter export associations serving 550 creameries; 47 bacon factories receiving pigs from 176,000 farmers; 1 egg-marketing association with 700 local collecting groups; 18 cattle export associations with 15,500 members; a seed-purchasing association; 3 feed-purchasing associations serving 1,200 local societies; a fertilizer association purchasing for 76,000 farmers; a coal supply association; a cement factory; an association for supplying machinery; cow-testing, horse-breeding, cattle-breeding, pig-breeding associations; co-operative stores and rural banks.

Figures of December 31, 1929, show that in Denmark co-operative creameries enlisted 94.1 per cent of the farmers, with 92.2 per cent of the total production; 69.4 per cent of the whole number of farmers were associated with co-operative bacon factories producing 75.4 per cent of the total output; the co-operative 11.2 per cent exported 17.6 per cent of the fat cattle; and the co-operative 21.5 per cent exported 25.9 per cent of the eggs. England imported 99 per cent of the bacon exported, 68 per cent of the butter, and 78 per cent of the eggs exported.

In the Danish co-operative creameries each member contracts to supply all the product of his herd to the society for a fixed period, usually ten to fifteen years. The capital is obtained by raising a loan on unlimited liability. Each member has one vote, and each one is paid for the amount of butter fat furnished, at the lowest price which has prevailed during a stated period. At the end of the year the profits are divided among the members in proportion to the amount of butter fat furnished. Nearly all the creameries are members of the Danish Creameries Association. The co-operative creameries are federated into district associations, and these into provincial organizations. The provincial organizations are united in a national service federation which is a member of the central co-operative council functioning for all the co-operatives of Denmark. The managers and the butter-makers of the local creameries organized in 1887 the Danish Creamery Managers' Society. The creamery helpers also have an organization. The butter export associations and the co-operative bacon-curing plants are federated. The number of pigs killed in 1925, 3,000,000, was doubled by 1930. Eggs are marketed co-operatively through the Danish Co-operative Egg Export Association and through seven of the co-operative bacon-curing plants. The association has established branch packing houses in a dozen towns. The eggs are collected at a central station, and are graded, packed, and sold at a price fixed by the managing committee.

Agricultural co-operation in Ireland owes its inception to Sir Horace Plunkett (q.v.), through whose effort the Drumcollogher Co-operative Creamery Society was established in 1889. This was immediately successful, ending its first year with a profit of over $2,000. The number of creameries soon increased, and the expansion of the movement led, in 1894, to the organization of the Irish Agricultural Organization Society, Ltd., to continue its further development. The Government Department of Agriculture and Technical Instruction works in harmony with the Organization Society. The establishment of Plunkett House in Dublin, 1908, as a memorial to Sir Horace, opened up a wider field for the development of agricultural organization, as it serves as a headquarters for the study of rural sociology as well as a home for the Irish Agricultural Organization Society.

In 1900 a British Agricultural Organization Society similar to the Irish Society was formed in Nottingham. This society within a year united with the National Agricultural Union to form the Agricultural Organization Society. The year 1924 marked the end of this society. Its work was taken over by the National Farmers' Union, which in 1927 consisted of 160 societies, with a membership of 64,036, classified as follows: purchase of requirements, 96; dairy, 31; egg and poultry, 10; fruit and vegetables, 9; bacon factories, 4; slaughterhouses, 3; cattle auction marts, 2; wool, 3; miscellaneous, 2.

In 1905 a Scottish Agricultural Organization Society was inaugurated to stimulate interest in agricultural co-operation in that country. The member societies handle dairy and poultry products and are engaged in co-operative buying and in the improvement of livestock. Belgium and Holland have both shown marked increase in agricultural co-operation during the past thirty-five years. More than half of Switzerland's agricultural associations are co-operative dairies. In Australia the government operated compulsory wheat pools during the years 1915 to 1920. Co-operative agricultural societies in the Union of South Africa handle maize, wool, cotton, fruit, wine, honey, tobacco, dairy products, poultry products, sugar, ground nuts, timber, livestock, and meats.

The National Union of German Agricultural Co-operative Societies (Raiffeisen) was founded in February 1930. On July 1, 1930, it included 33 regional and provincial unions and 12 central co-operative bodies in direct affiliation, with a total of 36,599 agricultural co-operative societies and a membership of about 4,000,000. The National Union embraces about 90 per cent of the German agricultural co-operative societies.

In 1930 there were 11,029 agricultural co-operative societies in Czechoslovakia and 1,100,000 individual members. About half of these were engaged in furnishing credit, others in selling farm products and buying farm supplies. The modern co-operative movement was instituted in Japan by the government in 1900. Credit societies are the most numerous, followed by marketing and purchasing societies and machinery societies. Russia had, in 1928, 93,409 local agricultural co-operative societies (exclusive of those societies not belonging to any union), with a membership of 11,330,900.

For co-operative credit and banking see Rural Credits; Building Societies; People's Banks. See also Profit Sharing; Factory Management.

Bibliography.—For industrial co-operation, consult: Adams' and Sumner's *Labor Problems*; Webb's *Industrial Co-operation*; Fay's *Co-operation at Home and Abroad*; Bloomfield's *Modern Industrial Movements* (1919); Sonnichsen's *Consumers' Co-operation* (1919); Warbasse's *Co-operative Democracy* (1923); Mears and Tobriner's *Principles and Practice of Co-operative Marketing* (1926); Kayden and Antsiferov's *Co-operative Movement in Russia during the War* (1929); U. S. Bureau of Labor Statistics, Bull. 531 (1929); *The People's Year Book*; *The Co-operative League Year Book*.

For agricultural co-operation, consult: Bulletins and Circulars of the U. S. Department of Agriculture and Bulletins issued by Agricultural Experiment Stations at Ames (Iowa), St. Paul (Minn.), Madison (Wis.), and Manhattan (Kans.); The Federal Trade Commission's *Co-operation in Foreign Countries*; Pratt's *Agricultural Organization*; Sinclair's *Agricultural Co-operation in Denmark*; Powell's *Co-operation in Agriculture*; Cumberland's *Co-operative Marketing*; Hibbard's *Marketing Agricultural Products*; Steen's *Co-operative Marketing*, Jesness' *Co-operative Marketing of Farm Products*; Wolff's *Co-operation in Agriculture*; The U. S. Federal Farm Board's *Co-operation in Agriculture*, a bibliography (1931); H. Faber's *Co-operation in Danish Agriculture* (1931); *Year Book of Agricultural Co-operation*.

Cooperia, ko͞o-pē'ri-a, a genus of plants of the order Amaryllidaceæ. It includes two species: the Giant Fairy Flower (*Cooperia pedunculata*) and Evening Star (*C. drummondii*).

Coopering. See Cooperage.

Cooper River, river, South Carolina, rises in Berkeley county, and flowing south joins first with the Wando and then with the Ashley River at Charleston, forming Charleston Harbor.

Cooper's Creek, or Barcoo River, river, Queensland, Commonwealth of Australia, has two headwaters, the Thomson and the Victoria. In the rainy season the river drains southwest into Lake Eyre, South Australia, but in dry seasons it gradually dwindles away. In 1861, near the creek, the explorers Burke and Wills died of starvation on their return journey across the continent.

Coop'erstown, village, New York, county seat of Otsego county, situated on Otsego Lake at the source of the Susquehanna River, and on the Delaware and Hudson Railroad; 62 miles west of Albany and 33 miles southeast of Utica. It is a popular summer resort and residential village. Hops, butter, and cheese are the chief products.

The historical associations of the village are centered in *Cooper Grounds*. Here, in 1769, the first white settler, Col. George Croghan, built a log hut, and on this site William Cooper, the founder of the town, built his first home and afterward erected Otsego Hall, the residence of his famous son, James Fenimore Cooper (q.v.), who made Cooperstown the scene of several of his *Leatherstocking Tales*. Pop. (1910) 2,484; (1920) 2,725; (1930) 2,909.

Cooper Union for the Advancement of Science and Art, an institution founded in New York City by Peter Cooper (q.v.) in 1859, to provide free tuition in art, science and technology for the working classes. A large building was erected at the junction of Third and Fourth Avenues at a cost of $630,000. An endowment fund was created by gifts of Peter Cooper, Edward and William Cooper, and Mr. and Mrs. Abram S. Hewitt, added to by a gift from Andrew Carnegie in 1900 of $600,000. The Union offers day and evening courses in science, civil, mechanical and chemical engineering, architectural drawing, design, modeling and elocution. There is also a Woman's Art School and a library of over 60,000 volumes. The value of the property at June 30, 1931 was $5,752,755; the budget for 1932–33 amounted to $576,286. The annual enrollment is about 3,050. A gymnasium, managed by the Athletic Association, promotes sport and rifle practice. A weekly school paper, *The Pioneer,* is run by students, and a year book, *The Cable,* is issued in the spring. The engineering day school gives four-year courses; the night school, six-year courses. Applicants must be at least sixteen years old. The Museum for the Arts of Decoration exhibits models showing the ornament of the artistic trades of various countries and periods by means of fine examples arranged chronologically. During the winter months from November to April, free courses of lectures, under the auspices of the People's Institute, on varied topics are given in the Large Hall on Sunday, Tuesday and Friday evenings, at 8. Admission is free. All applicants, besides qualifying in the intelligence and placement tests, must give evidence of graduation from a recognized high school, or its equivalent.

Co-ordinates, in geometry and applied science, may be defined as the quantities which determine the relative positions of the points, lines, surfaces, abstract or material, which build up the geometrical or mechanical system under consideration. The choice of co-ordinates is to some extent arbitrary; but experience has shown that certain kinds of co-ordinates are specially useful in facilitating discussion. Thus we have the important system of co-ordinates invented by Descartes, and known as Cartesian co-ordinates. Then there are the polar co-ordinates of the astronomer, and the generalized co-ordinates of Lagrange, besides other systems useful in particular problems.

The first essential in all these systems is to choose a fundamental point of reference, from which as a starting point the whole system of measurements may be laid down. We shall call the point the origin O (Fig. 1). To determine the position of any other point P, we must know the distance OP and the direction of the straight line drawn through OP. If the distance only is given, the point P may lie anywhere on a spherical surface with centre O and radius OP. If the direction only is given, the point may lie anywhere on the infinite straight line drawn through OP. When both are given, the point is assigned to the intersection of the spherical surface and the line drawn from O in the proper direction. Here the distance OP is one of the co-ordinates. But what co-ordinates are most convenient for determining the direction of a line in space?

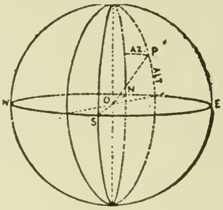


FIG. 1

It is necessary now to introduce, in addition to the origin or point of reference, certain lines or planes of reference, so as to give us a framework or scaffolding by means of which the direction of any line may be determined. The simplest and most direct way is first of all to draw through O and P a vertical plane, which will then be found to make a definite angle with the vertical plane running north and south. This angle we call the azimuth; and when it is assigned—positive if towards the west, negative if towards the east—the plane in which OP lies is determined. In order to fix the direction of OP in this plane we require to know the angle which OP makes with the horizontal line in this plane. This angle is called the altitude—positive if measured up, negative if measured down. Hence it requires two angles, the azimuth and the altitude, to determine the direction of a line in space. Thus to fix the position of P completely we need three numbers—distance, azimuth, and altitude. These are the polar co-ordinates. To determine the position of a point on the surface of the earth, the distance from the earth's centre is implicitly given; and hence only two numbers are required—*viz.* the latitude and longitude, which are fundamentally the same in principle as the azimuth and altitude.

The same point may be fixed by using other systems of co-ordinates; but whatever system be used, three independent numbers are needed. For example, the point is fixed, or strictly speaking determined as one of two points, when its distances from three non-colinear points O, O′, O″ are given. Given the two distances OP, O′P, the point P must lie on the intersection of two spherical surfaces—*i. e.*, upon a circle. When the distance O″P is then assigned, the point P will be one of the two points of intersection of this circle with the third spherical surface. These two points lie on opposite sides of the plane OO′O″, and other considerations will determine which of these is the point required.

We now come to the Cartesian system of co-ordinates, which, though more artificial than those just described, lead to a peculiarly symmetrical and systematic method of representing the relative positions of points and the geometrical properties of lines and surfaces. Here the fundamental idea is to represent the position of a point in space as being determined by the intersection of three planes drawn parallel to given planes. The given planes of reference have the origin as their common point of intersection, and each pair will intersect along a line. There will be three such lines of intersection, and the three constitute the system of co-ordinate axes, which are generally named the X, Y, Z axes (Fig. 2). They are represented in the figure by the lines OX, OY, OZ, of which OX and OY are supposed to be in the plane of the paper, while OZ is drawn upwards, making an assigned angle with the plane of the paper. Each axis is the intersection of two planes, and each plane contains two of the axes. Suppose now that the YZ plane moves outwards, keeping always parallel to itself, until it meets the point P. It will then have moved along the X axis through a distance x, which is called the x co-ordinate of the point P. Similarly, when the plane ZX has moved outwards till it meets the point P, it will have moved along the Y axis through a distance y, the y co-ordinate of the point P. In like manner we determine the z co-ordinate by translation of the plane XY. These three co-ordinates x, y, z completely assign the position of the point P, provided we make some convention as to the positive and negative directions of motion from the origin O.

In the great majority of cases the three reference planes are taken at right angles to one another, so that the co-ordinates x, y, z may then be most simply defined as the distances from the reference or co-ordinate planes YZ, ZX, XY. In this case it is easy to show by simple geometry that the square of the distance OP is equal to the sum of the squares of x, y, and z, or

$$OP^2 = x^2 + y^2 + z^2 .$$

Let us assign the condition that OP is of constant length a, then the equation

$$x^2 + y^2 + z^2 = a^a$$

represents the spherical surface with radius a and with its centre at the origin.

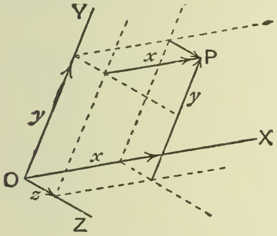


Fig. 2

If we confine our operations to one plane only, then we need concern ourselves only with two co-ordinates referred to two axes, which are generally known as the X, Y axes. With rectangular axes OX, OY, the co-ordinates x, y of any point are the distances of the point from the Y and X axes respectively. It is usual to study plane Cartesian geometry first, and then proceed to the geometry of space. The principles are, however, the same in both. The plane geometry is easier, because we are able to draw accurate figures, and so obtain a clearer picture of the meaning of the formulæ.

In all the ordinary processes of curve tracing and graphics, we use the ideas and processes of Cartesian co-ordinates; and there is certainly no more important method in the whole of geometry and dynamics. For certain types of problem, however, polar co-ordinates are found to be more convenient; and it is important to know how to pass from the Cartesian representation to the polar representation. The process lies in expressing the values of x, y, and z in terms of the distance r and the directional angles θ and ϕ, which are the usual symbols for the altitude and azimuth. Adhering to rectangular co-ordinates, we see that x is the projection on the X axis of the line r (Fig. 3). First project r on the horizontal line in the vertical plane containing O and P. This gives $r \cos \theta$. Then project this projection upon the x axis, which we take to be the horizontal line in the reference plane with respect to which we measure the azimuth. This gives $r \cos \theta \cos \phi$. Thus we find—

$$x = r \cos \theta \cos \phi,$$
$$z = r \cos \theta \sin \phi,$$
$$y = r \sin \theta.$$

In plane geometry we confine our attention to one plane, which we take to be the original XY plane. Hence the azimuth is zero, and its *cosine* unity, and we have—

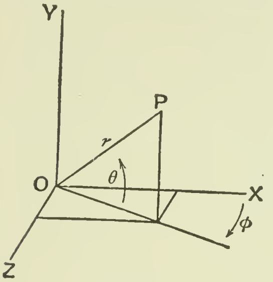


Fig. 3

$$x = r \cos \theta.$$
$$y = r \sin \theta.$$

Thus the equation of the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1,$$

when transformed to polar co-ordinates, becomes

$$r^2 = \frac{a^2 b^2}{b^2 \cos^2\theta + a^2 \sin^2\theta}$$

Every equation involving two variables x and y can be represented as a curve referred to the two co-ordinate axes X and Y. Similarly, every equation involving three variables x, y, and z may be represented as a surface in space, x, y, z being what are termed the current co-ordinates of a point on the surface. All the important properties of curves and surfaces can be discussed in terms of these equations, or equations derived from them by analytical processes. When, for example, we move along a curve from point to point, there must be some relation between the rates of change of the co-ordinates x and y. This relation is determined from the equation by application of the methods of the differential calculus (see Calculus, Infinitesimal), which methods accordingly find interesting illustrations from Cartesian geometry.

The method of Cartesian co-ordinates has great advantages in physical applications, although for certain problems, such as those connected with the motions of the planets, polar co-ordinates are found more convenient. Also where rotations enter largely into the problem, as in the spinning-top and gyros opic motion generally, it is almost self-evident that angles are the more appropriate co-ordinates. In many physical problems, however, the quantities which determine the state of a material system may be neither distances nor angles. They are none the less co-ordinates, and in almost all cases may be represented graphically as geometrical co-ordinates measured along assumed axes. Such, for example, are the pressure, volume, and temperature of any chosen substance in solid, liquid, or gaseous state. These are then the co-ordinates which determine the physical state of the mass of substance under consideration; and if we choose three mutually perpendicular axes with reference to which these quantities are measured, we obtain a surface each point on which is the symbol of that state for which the pressure, volume, and temperature have the volumes of the Cartesian co-ordinates of the point. We thus obtain James Thomson's thermodynamic surface.

In certain kinds of problems it is found more convenient to use as co-ordinate in this generalized sense not the quantity which is most directly measured or most easily measurable, but a quantity from which the real quantities are derived by a particular mathematical process. For example, in the theory of attractions, gravitational and electrical, and in fluid motion, a co-ordinate is introduced known as the potential. From this one quantity can be derived by differentiation the forces or velocities involved. Once the potential is determined as a function of the positions, velocities, pressures, volumes or other physical co-ordinates of the system, the associated physical properties of the system are known. Although originally defined in terms of a more obvious system of co-ordinates, this quantity may itself be regarded as a co-ordinate. Now in all cases a definite number of co-ordinates is necessary and sufficient to determine completely the physical state of a material system; but there is theoretically an infinite number of ways in which these co-ordinates may be chosen. As a simple illustration, take the case of the thermodynamic properties of a substance. At first we take naturally the volume, pressure and temperature as the co-ordinates, since these are quantities easily measured. But in terms of these we are able to define two other quantities—*viz.* the energy and entropy (see Thermodynamics); and a valuable method of discussing the properties of substance is based on the recognition of the energy, entropy, and temperature as the co-ordinates determining the state of the substance. Gibbs' thermodynamic surface is obtained by using these three quantities as the Cartesian co-ordinates.

Coorg, ko͞org, or Kurg, province, India, on the southwest border of Mysore; area, 1,582 square miles. It is traversed by spurs from the West Ghats and is watered by the Cauvery. Much of the surface is forest land, but rice is grown in the valleys, and coffee, cardamoms, and cinchona on the hillsides. The natives are tall, of good physique and intelligence. They speak a Dravidian language allied to Kanarese. Coorg was annexed by the British in 1834. Merkara is the capital. Pop. (1921) 163,838.

Coornhert, kōrn'hert, Dirck Volkertsen (1522–90), Dutch writer, was born in Amsterdam. He was appointed town clerk (1562) of Haarlem, but being an outspoken champion of political and religious freedom, was compelled to flee to Germany to escape the Spaniards. In 1572, after Holland had thrown off the Spanish yoke, he returned and was nominated secretary of state of the Netherlands. He is celebrated both as a theologian and as a reformer of his native tongue. He translated the *Iliad* and works of Cicero and of Boccaccio, and wrote a work on ethics—*Zedekunst, dat is Wellevens Kunst* (1586)—and *Liedboeck* (1575).

Coorong, ko͞o'rong, The, an arm of brackish and shallow water, near the mouth of the Murray River, Australia. It is nearly 100 miles long and has an average width of 2 miles. A narrow tongue of land separates it from Encounter Bay.

Coosa River, a river rising in the northwestern part of Georgia, flowing westward into Alabama, then southwest to join with the Tallapoosa, forming the Alabama. Length about 350 miles.

Coos Bay, an inlet of the Pacific on the coast of Oregon, north of Cape Arago. It is an important port for the export of coal.

Coot, or Mud-Hen (*Fulica*), a ralline marsh-bird widely distributed on inland waters throughout the northern hemisphere. A scalloped membrane on the edge of each toe takes the place of the webs seen in other species of rails. It is from thirteen to sixteen inches long, with the plumage black on the head and neck and slatey-gray elsewhere, and a white bar on the wings. The nest is an elevated structure built of flags and reeds. The American species, *F. americana*, is found throughout North and Middle America and in the West Indies. It is a noisy bird, thoroughly aquatic, and when fed entirely on wild celery, of which it is very fond, makes a delicious table bird. The European coot, *F. atra*, found in most parts of Europe, Asia, and North Africa, is similar in appearance and habits.

Coote, Sir Eyre (1726–83), British general, was born in Ash Hill, county Limerick, Ireland. He went with the first British regiment sent to India in 1754, and fought with distinction at Plassey. In 1760 he defeated the French under Count Lally at Wandewash, and in 1761 captured Pondicherry. He returned to England in 1762, was knighted (1771), and having returned to India (1779) as commander-in-chief in Bengal, routed Hyder Ali at the battle of Porto Novo (1781) and saved Madras to the English.

Coot'ie, in army slang, the name, of unknown origin, given to the body louse (*Pediculus vestimenti*). See Lice.

Copaiba, or Copaiva, kō-pā'ba, an oleo-resin obtained from the tree *Copaifera langsdorfii* (Leguminosæ) and other trees of the same species indigenous to Northern South America. It is a brownish-yellow liquid of varying consistency, with an aromatic odor and an unpleasant acrid taste. To collect it, a cavity is cut in the trunk of the tree, near the base, sloping inwards and downwards to the centre of the stem, and into this the balsam is discharged. Copaiba balsam consists of a resin and volatile oil, useful medicinally for their stimulant and disinfectant action upon the mucous membranes. The drug is used chiefly in inflammatory affections of the bladder and urethra, and sometimes in chronic bronchitis.

Copais, kō-pā'is, ancient lake, in Bœotia, Greece, formed in the winter when the Cephissus overflowed its banks. Drainage operations undertaken about 1883 revealed the fact that similar measures had been carried out in ancient times. The present drainage system has converted nearly 60,000 acres into fertile land, yielding two crops annually.

Co'pal, a resinous substance used in varnish making. It is obtained either from living trees or as a semi-fossil product, in the East Indies, South America, New Zealand, Africa, and Australia. In general it occurs in irregular, light yellow to brown, semi-transparent masses, which are hard, inodorous, and of a shell-like fracture. The best is insoluble till heated, when it undergoes chemical changes, giving off gases, and becoming soluble in ether, turpentine, and linseed oil. A solution of fused copal in boiled linseed oil is used extensively as a varnish. The African variety (Mozambique and Zanzibar) is the most highly valued. See Dammar.

Copal'chi Bark, the bark of a Mexican tree, *Croton niveus*, is much used as a substitute for cinchona in Mexico, where it goes by the name of *quina blanca*. It contains a minute proportion of a bitter alkaloid resembling quinine. The name is also given to the febrifugal bark of the South American *Strychnos pseudoquina*.

Copalm, the balsam obtained from the American Liquidambar or Sweet Gum Tree. See Liquidambar.

Copan, kō-pän', ruined city of the Mayas, Honduras, Central America, on the Copan River, 30 miles southeast of Chiquimula. The remains include monoliths, with sculptured human figures on the front, surrounded by elaborate scrollwork, and covered with hieroglyphics on the reverse; also, parts of a great temple and truncated pyramids once crowned with *teocalli*, like those of ancient Mexico.

Copar'ceners, in British common law, the heirs of the real property of an intestate. Their estate was described as tenancy in coparcenary, as it was neither a tenancy in common nor joint tenancy, but had certain characteristics of each. A release was sufficient to convey from one to another, but their interests descended to their heirs. In the United States, except in Maryland, this form of tenancy has never obtained, estates by descent being treated as tenancies in common.

Cope (Lat. *cappa*), a long, cloak-like vestment, often of rich material and embroidered. It is semicircular in shape, reaching to the heels of the wearer, and open in front. It has usually a hood and an orphrey enriched with embroidery, and is fastened by a band and sometimes an ornamental clasp called the *morse*. Its most common use is as an ecclesiastical garment worn by the officiating priest in various solemn rites, particularly at vespers. In the Roman Catholic Church it is never worn by the celebrant at mass, but the Anglican Church permits its use at communion.

Cope, Sir Arthur Stockdale (1857–), British portrait painter, was educated at Norwich and in Wiesbaden and studied art in the Royal Academy schools, exhibiting regularly after 1876. His work is chiefly portraiture and includes portraits of Edward VII., George V., the Prince of Wales, Lord Kitchener, and the Archbishop of Canterbury. He was knighted in 1917.

Cope, CHARLES WEST (1811–90), English artist, was born in Leeds. He studied at the Royal Academy, of which he became a member in 1848, and gave particular attention to the art of fresco painting. He executed many of the frescoes and waterglass frescoes in the House of Lords. He also illustrated various fine editions of the poets and was a skilful etcher.

Cope, EDWARD DRINKER (1840–97), American naturalist and comparative anatomist, was born in Philadelphia, Pa., of Quaker descent. He studied anatomy in Philadelphia, at the Smithsonian Institution, Washington, and in Europe, until 1864, when he became professor of natural science in Haverford College. Having resigned this position in 1867, on account of ill health, he spent a number of years as palæontologist for various government geological surveys in Western territories, covering the district west and south of the Missouri River. From 1891 until his death he was professor of geology and palæontology at the University of Pennsylvania. Cope is said to have discovered nearly a thousand new species of extinct and quite as many recent vertebrates, accomplishing much for the classification of North American reptiles and amphibia. He acquired the *American Naturalist* in 1878, and was chiefly occupied with its editorship during the rest of his life. He was a leading advocate of the Lamarckian view of evolution, which he upheld in *The Origin of the Fittest* (1886) and *The Primary Factors of Organic Evolution* (1896). He wrote, also, *Systematic Arrangement of the Extinct Batrachia, Reptilia, and Aves of North America* (1869–70), *Cretaceous Vertebrates of the West* (1877), *Tertiary Vertebrates* (1885), and *The Crocodilians, Lizards, and Snakes of North America* (1898).

Cope, SIR JOHN (? — 1760), British general, about whose early career little is known. He was commander-in-chief in Scotland when the rebellion broke out, in 1745, and was defeated at Prestonpans (Sept. 21) by the Highlanders. A commission of inquiry subsequently exonerated him from blame, and in 1751 he was on the staff in Ireland.

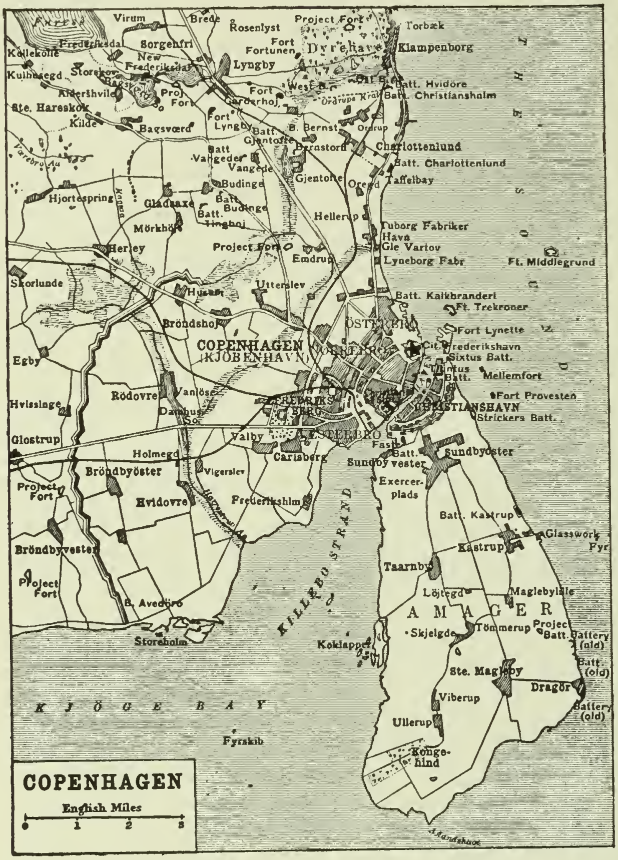
Cope, THOMAS PYM (1768–1854), American merchant, was born in Lancaster county, Pa., of Quaker descent. He entered business on his own account, in 1790, in Philadelphia, and in 1807 began building vessels for the importation of his goods. In 1821 he established the first line of packets between Philadelphia and Liverpool. He was prominent in State and municipal matters, and held office in numerous charitable organizations. He was active in bringing about the completion of the Chesapeake and Delaware Canal and in the construction of the Pennsylvania Railroad.

Sculptured Remains at Copan
(From Catherwood's *Central America*.)

Co'peck, or KOPECK, a Russian coin of which 100 make a rouble, the monetary unit. The copeck is worth about ½ cent. Copper coins of 1, 2, 3, and 5 copecks are issued.

Copenha'gen, capital and largest city of Denmark, is situated on both sides of the Kalvebod Strand, an inlet which separates the islands of Zealand and Amager and forms a fine harbor. Copenhagen proper is situated on the eastern coast of Zealand; the section on Amager is known as Christianshavn. Fortifications on both land and sea sides protect the city. West of Copenhagen are the suburbs of Osterbro, Vesterbro, Norrebro, and Fredericksberg. The Kongens Nytorv (King's New Market), the chief square, occupies the centre of the city. In it stands an equestrian statue of Christian V., and fronting it on the southeast are the Charlottenborg Palace, since 1754 the home of the Royal Art Museum, and the Royal Theatre. In the southwestern corner of the town is the

Raadhus, a picturesque modern building in Danish Renaissance style, and north of this is the Vor-Frue-Kirke (Church of Our Lady), famous for its statues by Thorwaldsen. Christianborg Palace, the residence of the king, stands on what is known as 'palace island,' in the southeastern corner of the city. It was originally built in 1733–45, was destroyed by fire in 1794, was rebuilt, again burned in 1884, and has been restored since 1907. To the northwest of Christianborg Palace is the Thorwaldsen Museum, containing a large collection of the master's work; farther south is the National Museum. Other notable features of the city are the Vor Frelsers Kirke (Church of Our Redeemer), with an exterior winding staircase; the museum of industrial art; the Glyptothek, containing a splendid collection of ancient and modern sculpture; the Botanic Gardens; Rosenborg Palace, a seventeenth-century edifice, housing a remarkable collection of robes, jewels, weapons, and uniforms; the Art Museum; the Frederiks Kirke, with a magnificent copper-sheathed dome; and Moltke Palace, containing a large collection of Dutch paintings.



The chief educational institution is the university, founded in 1478, one of the leading European institutions of learning. There are also a polytechnic institute, military and naval schools, and many scientific associations.

Copenhagen has an excellent harbor, and is the centre of more than half of the trade of the kingdom. Large quantities of agricultural products are exported. The leading industries are shipbuilding, the manufacture of porcelain, sugar, and machinery, and brewing and distilling. Pop. (1935) 666,269; with suburbs, 843,168.

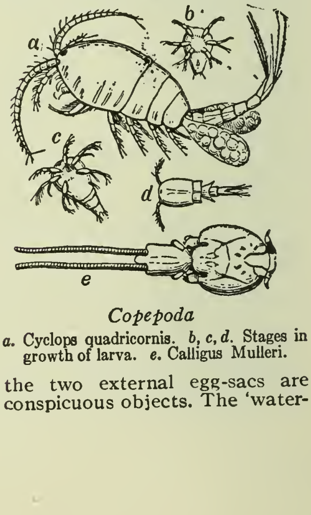
Copenhagen is first mentioned (1043) as a fishing village, under the name of Hofn ('haven'). It was made a royal residence by Christopher II. (1443). The city has sustained many sieges—notably from June 10, 1523, to Jan. 6, 1524, by Frederick I., and from July 18, 1535, to July 28, 1536, in the Counts' Feud, on both of which occasions it espoused the cause of the banished Christian II. In 1658–9 its heroic and successful defense against Charles X. of Sweden contributed largely to the saving of the monarchy. In 1801, an English fleet under Admiral Sir Hyde Parker, with Lord Nelson as second in command, attacked the Danish fleet drawn up in Copenhagen harbor. The Danes, making a brave defense, lost about 2000 killed and wounded; the British 943. A second attack on Copenhagen was made in 1807. The city came under German control when Germany invaded Denmark on April 9, 1940. See DENMARK.

Consult G. Brochner, *Danish Life in Town and Country;* Barman's *Guide to Sweden, Norway, Denmark,* etc. (1939).

Copenhagen Fields, district in the northern part of London, England, celebrated for great meetings (Oct. 26, 1796, and April 21, 1834), memorable in the history of trade unionism. The site is now occupied by the Metropolitan Cattle Market, removed from Smithfield in 1885.

Cöpenick. See KÖPENICK.

Copepoda, kō-pep'ō-d*a* ('oar-footed'), an order of Crustacea, the members of which are either free-swimming, when they are often called water-fleas, or parasitic, in which case the body is much modified in shape, and the crustacean characters may cease to be apparent. A free-swimming copepod has a large head, bearing a single median eye, and five pairs of appendages, of which the first antennæ are large, and function as swimming organs. The thorax is not sharply separated from the head, to which the first pair of appendages appears to be attached. There is no shell. The abdomen is narrow and without appendages, and the body ends in a tail-fork. In the breeding female the two external egg-sacs are conspicuous objects. The 'water-



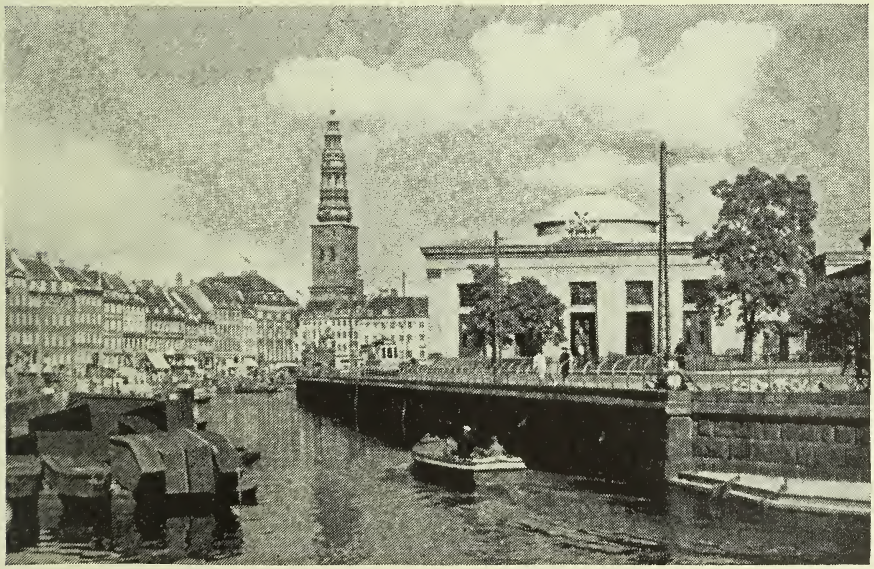
Copepoda

a. Cyclops quadricornis. *b, c, d.* Stages in growth of larva. *e.* Calligus Mulleri.

Courtesy Royal Danish Consulate, Chicago

THE ROYAL CASTLE AT COPENHAGEN

Christianborg Palace, destroyed by fire in 1794, was rebuilt, again burned in 1884, and restored in 1903.



Courtesy Royal Danish Consulate, Chicago

THORVALDSEN MUSEUM IN COPENHAGEN

This museum contains a complete collection, in originals and models, of the works of the renowned sculptor.

fleas' are often bright red in color, and always active in movement, so that in spite of their small size they are conspicuous objects both in fresh and in salt water, and furnish an important part of the food-supply of fishes. Strikingly different in appearance are the 'fish-lice,' or parasitic forms, which occur commonly on the gills of fish, the appendages being greatly reduced. As a rule, the male is less modified than the female, and is often less markedly parasitic. Examples of the free-living forms are the fresh-water Cyclops and the marine Cetochilus; Caligus is a common parasitic genus. Consult Calman's *The Life of Crustacea;* Johnstone's *Conditions of Life in the Sea.*

Coper'nicus, Nicolas (1473–1543), celebrated Polish astronomer, was born in Thorn, Poland. He was educated at the University of Cracow, and in Padua and Bologna, and in 1499 was appointed professor of mathematics in Rome. Having returned to his native land, he took holy orders, and in 1510 became canon of Frauenburg, dividing his time between his religious duties, the practice of medicine, and his astronomical studies. In 1507 he began work on his great astronomical treatise, *De Revolutionibus Orbium Cœlestium,*which was completed in 1530, though not given to the press until thirteen years later. This work, which was dedicated to Pope Paul III., consisted of six books, demonstrating the various parts of the author's theory of the celestial bodies.

The cardinal truth of the Copernican system of astronomy is that the sun is the centre around which the earth and planets revolve, a theory of which some faint foreshadowings had been given by Pythagoras. Upon the foundation laid by Copernicus, other distinguished astronomers, as Kepler and Galileo, built, until the edifice was ultimately completed by Newton. The Copernican theory was at first looked upon as heretical, and from 1616 to 1757 the Roman Catholic Church kept the *De Revolutionibus* on the Index of prohibited books, as being subversive of truth. Among Copernicus' other works are a treatise on trigonometry (1542) and a translation (1509) of the epistle of the Byzantine writer Theophylactus Simocatta. Consult Prowe's *Life and Works of Copernicus;* Clerke's *Popular History of Astronomy;* biographies by Gassendi, Von Hipler and Polkowski.

Copiapo, kō-pyä-pō, town, Chile, capital of the province of Atacama, on the Copiapo River; 50 miles southeast of Caldera. It has a fine parish church and a school of mining. In the vicinity are valuable deposits of silver, gold, lead, and copper. Pop. about 12,000.

Copiapo, river, Chile, rises in the Andes, follows a northwesterly course for 150 miles, and empties into the Pacific Ocean about 30 miles west of the town of Copiapo.

Copland, James (1791–1870), British physician, was born in the Orkney Isles. He was graduated in medicine from Edinburgh University in 1815, and after some experience in West Africa, settled in London (1820). In 1822 he became editor of the *London Medical Repository.* His publications include *Outlines of Pathology and Practical Medicine* (1822), *Elements of Physiology* (1824), and his huge compilation, the *Dictionary of Practical Medicine* (1832–58). He was president of the Pathological Society.

Coplay, borough, Pennsylvania, Lehigh county, on the Lehigh Valley and the Ironton Railroads; 7 miles northwest of Allentown. Pop. (1930) 3,279; (1940) 3,109.

Copley, John Singleton (1737–1815), American artist, was born in Boston, Mass. He studied under his stepfather, Peter Pelham, and when only fifteen years old painted a portrait of his stepbrother Charles. Making rapid progress, he soon acquired a high reputation as a portrait painter. In 1766 he exhibited his *Boy and the Flying Squirrel* at the Society of Incorporated Artists' Exhibition, London, and in that same year was elected a fellow of the Society of Artists of Great Britain; in 1783 he became a member of the Royal Academy. He removed to England in 1774, and after a two years' tour of the Continent settled in London, and began the painting of historical pictures as well as portraits. Among the best of the former are the *Death of Chatham* (1779–80), *Repulse of the Spanish Batteries at Gibraltar* (1789–90), *Charles I. demanding the Five Impeached Members,* and *Offer of the Crown to Lady Jane Grey* (1808). Copley's historical subjects are more original, spirited, and realistic than those of his friend and countryman West, with whom he is commonly classed; and they are distinguished by far richer and finer coloring. His composition is simple and effective, and his draftsmanship careful and accurate. The excellence of these and other paintings is, however, surpassed by his richly-colored and well-modelled portraits. It has been said that the possession of an ancestral portrait by Copley is an American's best title to nobility. The famous portrait of the Copley family and portraits of John Quincy Adams, John Hancock, and Samuel Adams are to be seen in the Boston Museum of Fine Arts. The New York Public Library collection also contains examples of Copley's art. Lord Lyndhurst (**q.v.**), Lord Chancellor of England, was a son of the artist. Consult biographies by Perkins and Mrs. Martha B. Amory; also E. Chesneau's *English School of Painting;* Tytler's *Modern Painters and their Paintings;* Bayley's *Life and Works of John Singleton Copley* (1915).

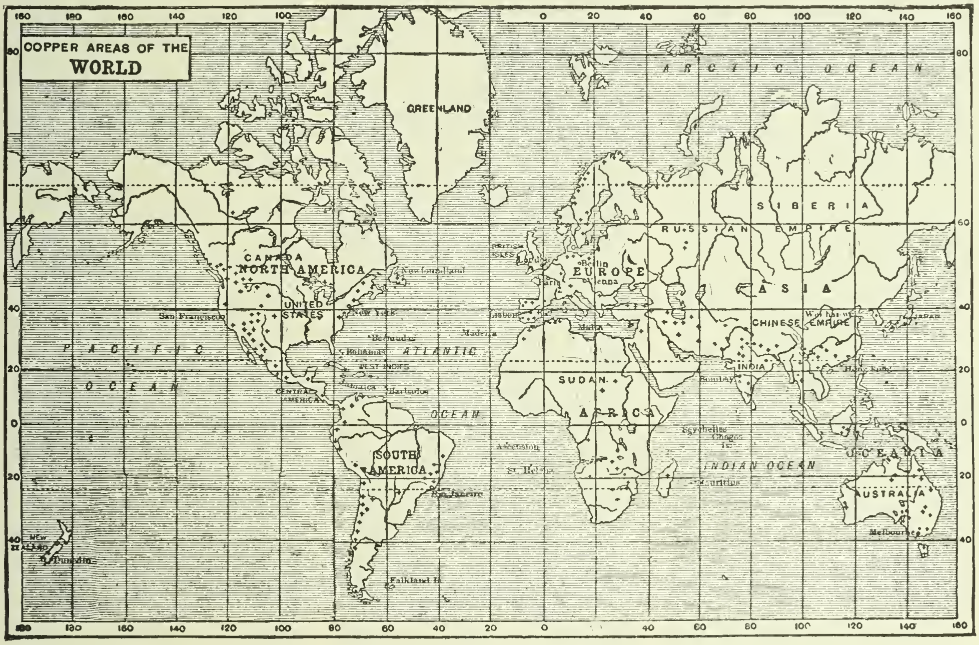
Copley, John Singleton. See Lyndhurst, Baron.

Coppée, François Edouard Joachim (1842–1908), French poet and dramatist, was born in Paris. For a short time he was a clerk in the Ministry of War, and in 1878 was made record-keeper at the Comédie Française, a post which he resigned on his election to the French Academy in 1884. He was made an officer of the Legion of Honor in 1888. As a poet, Coppée delighted in depicting the commonplace emotions and the tragedies of every-day existence, illustrating these with rare force and pathos. His plays, though often extravagant in construction and incident, strike a patriotic note that generally insures their popularity; while his tales, characterized by deft workmanship and artistic restraint, deal chiefly with the sorrows of the poor, and the hidden heroisms of otherwise uninteresting people. His chief poetical works are *Intimités* (1867); *Les humbles* (1872); *Olivier* (1875); *L'Exilée* (1876); *Récits et elégies* (1878); *Arrière saison* (1887). His plays include *Le passant* (1869), *Mme. de Maintenon* (1881), *Pour la couronne* (1895), *Le luthier de Crémone* (1876), and *Severo Torelli* (1883), and his tales *Une idylle pendant le siège* (1875), *Les vrais riches* (1892), *Le coupable* (1896), and *La bonne souffrance* (1900). Consult Druilhet's *Un poete François,* and Lescure's *François Coppée.*

Coppée, Henry (1821–95), American educator, was born in Savannah, Ga. After several years of work as a civil engineer, he entered West Point, from which he was graduated in 1845. He served as an artillery officer in the Mexican War, was assistant professor at West Point, 1850–5, and from 1855 to 1866 was professor of English literature and history at the University of Pennsylvania, accepting the presidency of Lehigh University in the latter

NOV

year. Retiring from this position in 1875, he remained at Lehigh as professor of history until his death. He published text books on logic, rhetoric, and English literature, several military manuals, a military biography of Gen. U. S. Grant, and *The History of the Conquest of Spain by the Arab-Moors* (1881).



The World's Copper-Producing Areas

Coppename, kop-e-nä'me, river, Dutch Guiana, flows northward into the Atlantic Ocean, 40 miles west of Paramaribo. It is navigable for 90 miles.

Copper (chemical symbol Cu, atomic weight 63.57), a metallic element occurring in various ores of world-wide distribution, and known from early antiquity for its valuable mechanical properties.

Copper Ores.—The chief ores are of three classes—copper sulphides, native copper, and copper carbonates and oxides. They occur frequently in association with zinc and iron, and as a rule contain also small quantities of gold, silver, and lead.

Copper sulphides form the principal source of copper. Of these the most important commercially are Chalcocite (Cu_2S), or Copper Glance (see CHALCOCITE); Chalcopyrite ($CuFeS_2$), or Copper Pyrite (see CHALCOPYRITE); Bornite (Cu_3FeS_3) and Covellite (CuS), known also as Peacock Ore.

Native or metallic copper is found nearly pure in the Lake District (region around Lakes Superior and Michigan) of the United States, in China, and in Russia. Some native copper ores are crushed, concentrated, and treated with limestone in a reverberatory furnace, while others are roasted, smelted, and partially refined in a reverberatory furnace, and further refined by electrolysis; metal so produced is known as electrolytic copper.

Copper carbonates include Malachite (q. v.), $CuCO_3Cu(OH)_2$, and the allied mineral Azurite (q. v.), $Cu_3(OH)_2(CO_3)_2$; while the principal oxides, found chiefly in connection with the carbonates, are Cuprite (Cu_2O) or the red oxide, and Tenorite (CuO) or Melaconite, the black oxide.

Other commercially valuable ores are the silicate Chrysocolla ($CuSiO_3.2H_2O$) (see CHRYSOCOLLA); the sulphates Chalcanthite ($CuSO_4.5H_2O$), known also as Blue Vitriol or Bluestone, and Brochantite ($CuSO_4.3Cu(OH)_2$); Atacamite ($Cu(OH)Cl.Cu(OH)_2$); Enargite (Cu_3AsS_4); and Tetrahedrite ($4Cu_2S.Sb_2S_3$), Fahlore, or Gray Copper (see TETRAHEDRITE).

As the various copper ores are usually disseminated in foreign rock matter known as *gangue*, the first step in the extraction of the crude copper is the concentration of the ore. In small mines this is sometimes done by hand selection, but in general, mechanical processes are employed; during recent years the flotation process of concentration has largely replaced other methods. The difficulty of handling these fine concentrates in the blast furnace has led to a correspondingly heavy substitution of reverberatory furnace smelting for blast-furnace smelting. Native copper ores are concentrated by a special process, known as stamp milling, described below.

Crude copper is extracted from its ores by two methods—dry processes or smelting in furnaces (pyrometallurgy), and wet methods or leaching (hydrometallurgy). In wet methods, if the solutions are of sufficient concentration and purity, electrolytic deposition of the metal is the usual method of recovery; otherwise chemical methods of precipitation are used, usually with scrap iron as the precipitating agent.

Copper Smelting.—The treatment of the sulphide ores of copper generally begins with roasting in heaps, stalls, kilns, or furnaces, whereby a large part of the sulphur and the volatile impurities are oxidized and pass off in the waste gases. The roasted ore, containing much oxidized iron, is then smelted in a blast or reverberatory furnace with siliceous material, which yields a *matte* of copper, iron, and sulphur, $x\mathrm{Cu_2S}.y\mathrm{FeS}$, and a fusible *slag* of oxidized iron and silica; the matte being easily separated from the molten slag because of the difference in specific gravity. This method of smelting is known as the roasting and reduction process, and also as the German or Swedish process. With certain ores this was later largely replaced by the pyritic and partial pyritic processes, which combine roasting and reduction in a single operation. In true pyritic smelting the raw pyritic ore is smelted in the blast furnace without the use of carbonaceous fuel, the rapid oxidation of sulphur and iron furnishing the necessary heat. In the partial pyritic process, which is more commonly employed, a small amount of coke is used to supplement the heat derived from oxidation.

The percentage of copper in the first matte may vary from 20 to 60 per cent, depending upon local conditions and purity of the ore, but is usually in the neighborhood of 35 to 45 per cent. Formerly this first matte was reroasted and fused one or more times for a higher grade matte, yielding at successive stages 'white metal' and 'blister copper.' This method has been largely superseded, especially in the United States, by the converting process, in which the first matte, while still molten, is placed in a converter similar to the Bessemer steel converter (except that the blast openings are at the side and not at the bottom), and 'blown' to crude metal called 'blister copper.' The passage of the air oxidizes the sulphur to sulphur dioxide, which passes off in the gases, while the iron and impurities are oxidized and combine with silica charged into the converter to form a specifically lighter slag, which is separated from the metal, leaving the latter, containing any gold and silver present in the ore, ready to be cast into anodes or other shapes for refining, which is generally done by the electrolytic process.

Rich oxide ores are treated by mixing with sulphides, then smelting for matte and subjecting to the converter process.

Native copper ores of the Lake Superior region are treated as follows: The ore, which averages about 2½ per cent of copper, is separated from the friable and lighter gangue rock by crushing in 450-ton steam stamps, and is subsequently treated by water concentration on jigs and tables. The concentrates, containing a little gangue, are melted in a reverberatory furnace; the impurities are oxidized and pass into the slag; the molten metal is then refined by 'poling' with a green wood pole until of proper purity or 'pitch,' on the attainment of which it is ladled into moulds forming ingots, wire bar, or cakes.

Wet Methods of Extraction are of limited application, being used chiefly with low-grade ores. At Rio Tinto, Spain, where the ore is a massive pyrite containing about 3 per cent of copper, the metal is extracted by allowing huge heaps of the ore to oxidize under the influence of moisture and air, and subsequently washing out the copper sulphate by running water through the heap; the copper is precipitated by metallic iron, yielding 'cement' copper, which is subsequently refined in a furnace and cast into merchant shapes. In England, the residues from burning pyrite in the manufacture of sulphuric acid (which contain small quantities of copper, with traces of silver and gold) have been roasted with common salt, and the copper and other valuable metals are converted into chlorides, which are dissolved out, the silver and gold then removed, and the copper precipitated by scrap iron, $\mathrm{CuCl_2 + Fe = Cu + FeCl_2}$. The copper thus obtained is refined in a reverberatory furnace. In the United States Spanish cupriferous pyrite has been burned for the conversion of the sulphur to sulphuric acid, and the residue added to the copper blast furnace charge for the recovery of the copper.

Refining of the crude copper obtained by smelting or leaching may be carried out in reverberatory furnaces, in which the crude metal is melted under highly oxidizing conditions and poled, as in the Lake Superior process already mentioned. In recent years, however, nearly all of the crude copper produced from sulphide ores and some of the Lake Superior product is refined electrolytically. The crude metal is cast into anode plates, which are suspended in a tank containing an electrolyte of copper sulphate acidified with sulphuric acid; thin sheets of pure copper forming the cathodes are also suspended in the tank; on the passage of the electric current the copper dissolves from the impure anodes and is deposited in a pure state on the thin sheets, the impurities mostly falling to the bottom of the tank or dissolving in the solution. (See ELECTROLYSIS). The resultant cathodes of pure copper are later refined to the proper 'pitch' in a reverberatory furnace and cast into ingots, plates, or wire bars.

Physical and Chemical Properties.—Copper is a reddish-colored metal of bright, metallic luster, highly tenacious, malleable, and ductile. It melts at 1,083° c., boils under ordinary conditions at 2,300° c., and burns with a green flame. Its specific gravity is 8.92, or weight per cubic inch .315 lbs. It is an excellent conductor of heat; has a specific heat of 0.09422 at 100° c.; and a coefficient of linear expansion of 0.000017 per deg. c. When pure it has high powers of electrical conductivity, ranking second only to silver in that respect. In dry air at ordinary temperatures copper remains unchanged, but in the presence of moisture and of carbon dioxide it acquires a green coating of basic carbonate.

Pure copper when annealed has a tensile strength of about 40,000 lbs. per sq. in., a non-determinable elastic or proportional limit, an elongation in 2 inches of 40% to 60%, and a reduction in area of 40% to 60%. In compression, copper of good quality does not fracture, but flattens out. The tensile strength can be increased to a pronounced extent by cold drawing and rolling. Rods are drawn through dies into wire, which by further drawing is given a high tensile strength, but in so doing it is made hard and difficult to bend. To reduce the hardness annealing is resorted to. Copper sheets and strip may be cold rolled to high tensiles, but they become stiff, hard, and difficult to work. To control this, between the cold rollings the sheets and strip are annealed.

There are some copper base metals as aluminum bronze and beryllium copper that can be hardened by heat-treating procedures similar to those employed for hardening tool steel. Chisels have been made of beryllium copper, that can cut soft steel and other metals. Wrenches, chisels, screw drivers, and other tools of beryllium copper and aluminum bronze, because of their non-sparking properties, have been used in oil fields and elsewhere, when a spark as produced by hitting a steel chisel with a hammer would cause an explosion.

Copper forms with oxygen two important oxides, the cuprous or protoxide, $\mathrm{Cu_2O}$, and the cupric, or monoxide, CuO. These oxides unite with acids to form two classes of copper salts, cuprous and cupric. The former are of little importance; the latter are usually hydrated and of a green or blue color, soluble in water, possess a disagreeable metallic taste, and are poisonous. The best known of the cupric salts is Blue Vitriol, hydrated cupric sulphate, $\mathrm{CuSO_4.5H_2O}$, a fine crystalline solid which becomes a

NOV

white powder when dehydrated by heat. Cupric sulphate is used in calico printing, dyeing, electrotyping, preparation of pigments, preservation of timber, and in agriculture as an insecticide. Other compounds are cupric hydrate, a blue pigment; cuprous and cupric chlorides, green and blue pigments; cupric nitrate and cupric carbonate (occurring native as the minerals malachite and azurite), used as pigment.

Uses.—Copper is widely used for wire to transmit electricity, for parts of electrical apparatus, and for many industrial purposes. Because of its good electrical conductivity it is common engineering practice to have copper wire for electric power and light transmission systems, also for windings on electric motors, generators, and electric equipment. Large amounts of copper wire are annually taken by the telephone, telegraph, and radio industries. Copper in other forms as in sheets, strip, pipe, and tubing have wide and varied uses. Roofs for buildings, statues (one of the outstanding is the Statue of Liberty in New York Harbor, the exterior of which consists of copper sheets which have been turned by the weather into a beautiful green color), tanks, and steam plant auxiliaries have been built of copper sheets. Leaders, gutters, and pipe handling rain water from roofs of houses are frequently fabricated from copper sheets or strip. For purposes as just mentioned, they last much longer than those of galvanized iron or steel. Copper pipe and tubing find use in steam and exhaust lines in power stations, also in air lines of Diesel engines, and for many purposes in automobiles, motor boats, and airplanes. Steam condensers and heat exchange equipment, because of the high heat conductivity of copper, are commonly built of copper sheets and tubing. Kitchen equipment, as kettles for boiling water are sometimes made of copper, but as a whole care must be taken to keep food products away from copper as poisonous chemical compounds may be formed. In the manufacture of munitions, copper alloyed with other metals is manufactured into cases of cartridges, jackets of rifle bullets, and fuses and rotating bands of shells.

Copper is an important base metal to which alloys are added, and also in many cases is a valuable alloy to other base metals to which it imparts improved properties. Of the alloys with a copper base may be mentioned aluminum, beryllium, lead, manganese, nickel, phosphorus, silicon, tin, and zinc, giving such metals as brass (q. v.), bronze (q. v.), coinage alloys, German or nickel silver (q. v.), gunmetal (q. v.), and aluminum bronze (q. v.). Copper is an alloy to base metals as tin which with antimony makes the well known babbitts for bearings, while a nickel base and a copper alloy gives Monel metal (see Nickel and Alloys), that is noted for its strength and resistance to corrosion. Small percentages of copper added to iron and steel for castings and forgings improves their resistance to moisture and the weather, as it does also steel that will be rolled into plates and shapes.

Copper Areas in the United States.—The principal copper areas in the United States are, in order of importance, the Bisbee district in Arizona, the Bingham district in Utah and Nevada, the Butte district in Montana, and the Lake Superior or Keweenaw district in Michigan. The mining of copper in the region of Lake Superior antedates the earliest visits of European explorers to the region, while the commercial production dates from 1845. The rocks comprise a thick series of rather basic lava flows and intercalated beds of conglomerate and sand of the pre-Cambrian age, the copper occurring in the cellular portions of the lava flows and as a cement, and to some extent as a replacement of the conglomerate pebbles. The lodes are of low grade but are of great extent and show a rather uniform distribution of metallic content, the richest lode mined at present yielding less than 1.5 per cent copper and the poorest but little above 0.5 per cent. The native copper occurs in masses ranging from those of microscopic size to bodies weighing hundreds of tons.

The lodes are worked for the most part through inclined shafts, though some of the deeper deposits are opened by vertical shafts, the workings having extended in some places to more than a mile in depth. Pillars of rock are left to keep the lodes open, while dry walls constructed from the waste sorted underground serve the same purpose in some mines.

The Butte district of Montana has been known to contain valuable copper deposits since 1864, but large-scale production here dates from 1881. The ores occur as replacement veins in a granitic rock known technically as quartz monzonite, the principal ore minerals being chalcocite, chalcopyrite, enargite, and bornite. The extensive works of the Anaconda Copper Company are located in the district.

In the Bisbee district, Arizona, the principal ore bodies to be developed have been in the Carboniferous and Devonian limestones, but in recent years valuable deposits have been discovered in the Cambrian limestone and also in connection with intrusions of granite porphyry. The primary ores consist mainly of chalcopyrite and bornite, with smaller bodies of galena and some sphalerite. Alteration by surface solutions has extended to great depth, and a large part of the ores extracted have been oxidized and enriched sulphides. In recent years, however, large bodies of primary sulphides of commercial grade have been developed.

Since 1900 the Bingham district of Utah and Nevada has taken its position among the leading copper areas of the United States. The ores are of two types of occurrence—irregular replacement deposits in limestone and disseminated deposits in altered porphyry and quartzite.

The Geological Survey, U. S. Dept. of Interior announced in 1938 the finding in northwestern Colorado of a promising deposit of copper ore with appreciable amounts of platinum and palladium. The platinum-bearing copper deposit lies on Copper Hill, between Bedrock and Boren Creeks, at an altitude of 10,250 ft., about half a mile from the old town of La Plata and 21 miles northwest of Durango. A paper on this ore has been published by the Colorado Scientific Society, Denver, Col.

Bibliography.—Consult U. S. Geological Survey's *Copper Resources of the World;* A. B. Parsons, *Porphyry Coppers* (1933); H. Carpenter and J. M. Robinson, *Metals* (1939); S. L. Archbutt and W. E. Prytherick, *Effect of Impurities in Copper* (1937); G. A. Roush, *The Mineral Industry* (annual); J. W. Mellor, *A Comprehensive Treatise on Inorganic and Theoretical Chemistry* (1923); A. Locke, *Leached Outcrops as Guides to Copper Ore* (1926); H. O. Hofman and C. R. Hayward, *Metallurgy of Copper* (1924).

Cop'peras, the old name for ferrous sulphate or green vitriol, and used for the ferrous sulphate of commerce. It is made by dissolving iron in dilute sulphuric acid, and is obtained as a by-product in several manufactures, particularly in the pickling of iron for tinning and galvanizing. It occurs in pale green crystals, having the formula $FeSo_4.7H_2O$, and readily oxidizes in the air. It is used in the preparation of ink and in dyeing.

Copper Cliff, town, Canada, in Sudbury District, Ontario, on the Canadian Pacific Railway; 4

miles west of Sudbury. It has one of the largest nickel smelters in the world. Pop. (1931) 3,173.

Copperhead or HIGHLAND MOCCASIN (*Ancistrodon contortrix*), a poisonous crotaline snake of the Eastern and Central United States, closely allied to the moccasin snake (q. v.). It is of moderate size, usually from 2 to 3 feet long, with a rather thick body, and a short tail without rattles. In the Eastern and Northern specimens the color is hazel brown above with bands of rich chestnut brown, very narrow on the back and wider on the sides; the under parts are pinkish white with a row of large dark spots on either side of the abdomen; and the head is of a uniform coppery tinge. In the Western specimens, notably in Texas, the bands are fewer in number and much broader across the back, while the tip of the tail is greenish yellow.

In the North the copperhead frequents dry and rocky places, usually in the neighborhood of thick forests, where it hibernates underground or in deep clefts of rocks; in the South it is commonly found on plantations away from the swamps and lowlands. It feeds chiefly upon young birds, frogs, and small rodents. While not aggressive, it will defend itself vigorously, and its bite, if well delivered, is extremely dangerous to life. From six to nine living young are produced at a birth.

Copperheads, a term of opprobrium, applied by Unionists during the Civil War to 'those who adhered rigidly to the Democratic organization, strenuously opposed all the distinctive and vigorous war measures of the administration and of Congress, and, deeming it impossible to conquer the South, were therefore earnest advocates of peace' (Rhodes). The name is derived from the venomous copperhead snake (see COPPERHEAD), which is said to strike at its victim without warning, and is therefore typical of a concealed foe.

The more radical of the Copperheads opposed conscription, discouraged enlistment in the army, attacked the administration through the public press, and were suspected by many of coöperating directly with the Confederates. the term was revived during the World War, being applied to certain classes who opposed the policies of the government.

Coppermine, river in Northern Canada, rises in Lake Providence and Lake Point, Mackenzie province. After a somewhat turbulent course of 300 miles it flows into Coronation Gulf, Arctic Ocean. It was discovered in 1771 by Hearne, and was explored by Franklin.

Copperplate Engraving. See ENGRAVING.

Copper, or ATNA, river, Alaska, rises in the Wrangel Mountains, and flowing in a southerly direction for about 300 miles, enters the Pacific Ocean at the Gulf of Alaska through an inlet studded with many islands—west of Controller Bay. Copper is found along the bed. Its course is impeded by rapids and glaciers but it has been navigated during July and August.

Coppersmith, the popular name for a species of barbets native to India and the Philippine Islands. The birds have brilliant plumage. They inhabit tree tops from which they make short, heavy flights. Their cry is metallic and noisy.

Coppet, ko-pā', small village, Switzerland, in Canton Vaud, on the west shore of the lake of Geneva; 9 miles by rail north of Geneva. The château here was the residence of Necker, the famous French minister (1790–1804), and of his daughter, Madame de Staël (1804–5 and 1807), who was buried (1817) in the park. Pop. 531.

Coppice. See COPSE.

Coppinger, kop'in-jer, JOHN JOSEPH (1834–1909), Irish-American soldier, was born in Queenstown (Cobh), Ireland. He served in the Papal Guards in the war with Victor Emmanuel, and emigrating to the United States in 1861, received a commission as captain in the Federal Army. He fought with distinction through the Civil War, and continued in the service after its close, being several times brevetted for gallant conduct during the war and subsequently in Indian campaigns. He was promoted brigadier general in 1895, and three years later, as major general of volunteers, was in command of the Fourth Army Corps during the Spanish-American War. He was retired in October, 1898.

Co'pra, the native and commercial name for the dried kernel of the cocoanut, important as the source of cocoanut oil. It is prepared by husking and splitting the cocoanuts, extracting the kernel, and drying it in the sun, over slow fires, or in hot air chambers or rotary driers. Properly dried, it is white in color, with a pleasant odor and a sharp, brittle fracture, and yields a clear, white, smooth oil. Large quantities of copra are exported annually from the islands of the Southern Pacific, the oil seldom being extracted in the country of origin. See COCOANUT.

Cop'rolites, the fossilized excrements of animals found in Palæozoic, Mesozoic, and Tertiary strata. They are the voidings chiefly of saurians and sauroid fishes and often contain portions of scales, bone, teeth, and shells, the indigestible parts of the food on which the animals lived, and occasionally they may be found exhibiting spiral twisting and other marks produced by conformation of the intestinal tube, such as are noticed in the excrement of some living fishes. They contain a large proportion of phosphate of lime, and when obtainable in sufficient quantity are of value in the preparation of artificial manures (compare GUANO). See PHOSPHATES.

Copse, kops, or COPPICE, a growth of small trees periodically cut, usually for other than timber purposes, and reproduced by shoots springing from the stumps and roots. The coppice system of forest management is the simplest method of reproduction for trees of good sprouting capacity, as the chestnut, oak, hickory, basswood, yellow poplar, elm, red maple, white ash, and black locust. It is not usually applicable to conifers except the redwoods of the western United States.

The trees should be cut with a sharp axe in the early spring or winter, during the period of vegetative inactivity, but not on days of heavy frost. The stump should be smooth, preferably with a sloping top to prevent the accumulation of moisture, and should be cut low, that it may be less exposed to injury and the new sprouts may strike independent roots. Cutting takes place at periods of from twelve to twenty-five years, depending upon climatic conditions, the purposes for which the wood is to be used, and other considerations. As the old stumps deteriorate with successive cuttings, seedling trees are frequently interspersed with the coppice to maintain the quality of the yield. When these seedlings or the more vigorous sprouts are allowed to stand over a longer period of rotation than the rest of the trees, the system is known as *coppice with standards*. The coppice system is used extensively in the eastern United States for fuel, posts, telegraph and telephone poles, charcoal, railway tiles, and bark for tanning.

Coptic Version. See BIBLE.

Cop'tis, a genus of plants of the family Ranunculaceæ. See GOLDTHREAD.

Copts, the Christian descendants of the ancient Egyptians, living chiefly in Upper Egypt and in the cities of Cairo and Alexandria, and now numbering about 750,000. Racially iden-

NOV 1 4 1940

tical with the Moslem Egyptians, they are differentiated by their religious beliefs and by certain intellectual qualities. They are essentially townsmen, and because of their accurate habits of thought and their mathematical ability provide a large proportion of the skilled labor of Egypt and of the subordinate staff of the government, being employed as clerks, accountants, bankers, surveyors, and in the finer handicrafts. An increasing number have engaged in agriculture.

The ***Coptic Church,*** which is the ancient national church of Egypt, dating back probably to apostolic times, was separated from the Greek Church in 451 A.D. by its refusal to accept the decision of the Council of Chalcedon (*q. v.*). Its tenets are those known as Monophysite (see MONOPHYSITES), their followers admitting the divine nature of Christ, but insisting that His human nature, while not separated from the divine, is united with it 'without mingling and without confusion and without alteration.' The highest dignitary is the patriarch of Alexandria, who resides at Cairo, and other orders of the clergy are bishops, archpriests, priests, deacons, and monks.

The Copts are very strict in their religious observances, and maintain the seven sacraments—baptism by threefold immersion, confirmation, penace or confession, orders, matrimony, unction, and the eucharist. They observe Wednesdays and Fridays as fast days, and have long fasts preceding the church festivals. The ritual, liturgy, and vestments are especially interesting as they preserve unchanged the ancient Christian forms.

The ***Coptic Language,*** of which there are several dialects, is the descendant of the ancient Egyptian, though the alphabet is Greek uncial. It is not grammatically taught, and is not now a spoken language, having been everywhere supplanted by Arabic except for liturgical purposes. The literature is wholly religious.

See EGYPT. Consult Fowler's *Christian Egypt Past and Present.*

Cop'ulative, in English grammar, a term applied to a conjunction by which two coördinate clauses or members of a clause are united, as *and, also, not only . . . but also.*

Copyhold, a peculiar form of land holding in England derived from the villein tenure of the Middle Ages, and a lesser estate than freehold (see TENURE). The term signifies that the lands are held by copy of the court roll of the manor, this being evidence of the right to possess (see MANOR). Originally the tenant in villeinage held his land solely at the pleasure of the lord of the manor, but in course of time customs grew up which were recognized and enforced by the royal courts. These customs allowed the tenant an ever-increasing security of possession, but regulated the conditions of alienation, line of descent, etc. Hence the custom of the manor took the place of the lord's will.

The disadvantages of this antiquated form of land holding have led the British Parliament to pass a number of acts for the 'enfranchisement' of copyholds—that is, the conversion of them into freeholds (q. v.). Now the lord and tenant may voluntarily agree to an enfranchisement, or either may effect it compulsorily. The consideration payable to the lord may either be in the form of a lump sum, or of a rent charge redeemable by the tenant. The Board of Agriculture must sanction all enfranchisements, voluntary or compulsory.

No land is held by this species of tenure in the United States.

Copyright. A copyright is an incorporeal right granting exclusive privilege for publication of literary or artistic productions. The power to grant copyright is vested in Congress by the Constitution. The Copyright Act of 1909 expressly provides that nothing therein shall be interpreted to annul or limit the right of the author or proprietor of an unpublished work to prevent the copying, publication, or use of such unpublished work without his consent, and to obtain damages therefor. The primary purpose of the copyright statute is to secure to the inventor or author the right to multiply copies of his work.

Under the common law the author has the exclusive right to his composition until, by publication, it becomes the property of the general public.

United States.—In the United States no authority exists for obtaining a copyright beyond the extent to which Congress has authorized it. That authorization appears in the Act of 1909, which has been amended by subsequent Acts of August 24, 1912, March 2, 1913, March 28, 1914, July 3, 1926, and May 23, 1928. That Act gives to an author the sole right to print, reprint, publish, copy, sell, translate, and dramatize his productions, as well as to deliver, perform, exhibit, and produce them in public. The works for which copyright can be secured 'shall include all the writings of an author.' By 'writings' is meant literary productions of those authors. The term 'books' used in the copyright statute includes any species of publication by which the author communicates his literary production. By 'author' is understood the originator or maker; thus a mere copyist or transcriber is not an author. A translator or compiler may be. A reporter who takes notes is an author of his reports; one who reports a speech verbatim is not. Gradually copyright has been extended to literature of commerce, *i.e.,* catalogues, mathematical tables, directories, etc.

In order that a work may be copyrighted, it must be original, and must not have been previously published or copyrighted. Similar or identical works may both be copyrighted if each is the result of independent labor and work. A compilation of non-original matter may be copyrighted as a new work to the extent that selection, arrangement, classification, etc. is new. But no copyright is extended to the original matter used. The copyright of a book, if not pirated from other works, is valid without regard to the novelty or want of novelty of its subject matter. The index is copyrightable. No copyright, however, can be had where the work is immoral in nature or deceptive as to authorship.

Though all writings of an author are generally copyrightable, government publications and trade-marks ordinarily are not; nor are ideas, methods, musical or dramatic interpretations. Matter may be copyrightable though used for advertising purposes. One may copyright drawings or plastic works of a scientific or technical character, labels and prints for manufactured articles, maps and charts, photographs and chromolithographs, musical compositions including both words and music, periodicals including newspapers, prints and pictorial illustrations, new editions to the extent that they contain new and original matter, translations, unpublished works, and motion pictures.

A copyright may not be had for market quotations and news items transmitted by ticker telegraph, mechanical devices, musical rolls and records, and title of work, unless it is original, and then it is protectible as part of the copyrighted production of which it is the title.

The author or proprietor of any copyrightable work, or his executor, administrator, or assigns are entitled to the copyright in such work. Where there is more than one author or assignee of a work, all of either class, as the case may be, may have the copyright. An employer hiring one to write is deemed an author.

If the author assigns to the publishers the absolute right to publish, the absolute right to the copyright follows. One may, prior to publication, reserve the copyright in oneself. Should an author, having agreed to furnish manuscript and reserve copyright in the publishers, take it out in his own name, the copyright will inure to the benefit of the publisher. Under the Act of 1909, the copyright extends to works of authors or proprietors who are citizens or subjects of a foreign state or nation only when such alien author or proprietor is domiciled in the United States at the time of the first publication of his work; or when the foreign state of which he is a citizen grants, either by treaty, convention, or agreement, reciprocal rights to citizens of the United States. Copyright can be secured and preserved only by substantial compliance with terms and conditions prescribed by statute. It may be secured for a work by publication thereof in the United States or abroad with proper notice of copyright. Copies must be deposited in the copyright office, and prints and labels must be registered. Affidavit of manufacture must accompany the application for copyright registration. The prescribed notice must appear in the proper place in each volume or publication. The Act provides against the loss of copyright through 'the omission by accident or mistake of the prescribed notice from the particular copy or copies,' and makes the infringer liable if he had actual notice of the copyright before he began his infringing work. Damages, however, may not be recovered against an innocent person who has been misled into an infringement by the omission of a notice. Such person is to be reimbursed for any reasonable outlay he may have suffered. The object of the statute, requiring the placing on each copy in visible shape of the name of the author, existence of the claim of exclusive right, and the date on which this right was obtained, is to give due notice of the copyright to the public. Any form of notice is not sufficient. In determining whether the notice is misleading, the court is not bound to go beyond the notice and to inquire whether under the circumstances an intelligent person could reasonably have been misled.

A copyright is granted only for a definite term—twenty-eight years. Copyrights under the Act of 1909 may be renewed and extended for a further term of twenty-eight years. On expiration of the copyright, the work becomes public property and may be freely and unrestrictedly used by all persons. Copyright may be lost or abandoned, but whether it is abandoned depends upon the facts. Copyright is owned by the person in whose name it is taken out, but it may be held in trust for the true owner. It may be assigned wholly or partially, or it may be licensed.

Infringement of copyright involves a copying in whole or in part, verbatim, or by colorable variations. A copy has been defined as 'that which comes so near to the original as to give every person seeing it the idea created by the original.' While a subsequent writer may not copy from an earlier work, he may utilize the latter as a guide for the purpose of gathering information provided he makes an original investigation. The surest means of detecting infringement is the presence in the infringing work of common errors and similar language. Abridgments do not constitute piracy provided the content of the larger work is conveyed in different language, since the new work required labor and the exercise of discretion, knowledge, and judgment. The abridgment, however, must be made in good faith; it cannot be an attempted evasion of the copyright statutes. The fact that the publication of a fair abridgment may injure the sale of the original volume is immaterial. Indices to copyrighted matter may be published, even though they must of necessity contain words and phrases found in the copyrighted text; such work facilitates the use of the original work.

The art or system expounded by a copyrighted work is not protected by the copyright, nor does it cover theories, ideas, or opinions, but only the association, arrangement, and combination of ideas and thoughts making up a particular literary composition. To constitute an infringement, a substantial part must have been copied. No intention to pirate is necessary to the offense of infringement nor is exact reproduction essential. Infringement, however, can only be by acts done in territorial limits of the sovereignty enacting the particular copyright law.

Anyone who does, or who causes to be done, an act amounting to an infringement is liable. This includes printer, publisher, and seller of the infringing work. Corporate officers are not liable unless they personally participated therein. One who induces another to infringe is liable as a contributory infringer. The owner of the copyright, including the equitable owner or the assignee, may sue. His remedy is an injunction to prohibit further benefits from the infringement, damages, and a right to an accounting of profits made from the infringements. In proving profits, the owner of the copyright is required to prove sales only, and the infringer is required to prove every element of cost which he claims. Where only portions of an entire copyrighted work are infringed, if such portions are so intermingled with the rest of the piratical work that they cannot be readily distinguished therefrom, the entire profits realized by the infringers will be given to the copyright owner. In determining the amount of profits to be accounted for by the infringer, all that may be deducted from the selling price is the actual and legitimate manufacturing cost. No credit will be allowed for amounts paid to editors for making the infringing work, or for the salaries of those who carried on the business. The fact that there is a custom to copy is no defense to an action for infringement. Where, however, the owner of the copyright is himself guilty of 'unclean' hands, he will be barred from recovery with respect only to the particular right asserted in the suit. A former adjudication is a bar to any further action. Willfully and for a profit infringing any copyright, or knowingly and willfully aiding such infringement, is a misdemeanor.

Suits or proceedings arising under the copyright law are matters of Federal jurisdiction. The Act of 1909 provides that the Supreme Court of the United States shall prescribe rules and regulations for the practice and procedure in copyright infringement cases. Each separate copying of a copyrighted work is technically a separate offense and may be the proper subject of a proceeding within the court's discretion (*i.e.*, restricting unnecessary multiplicity of actions). The Supreme Court rules provide that a copy of the alleged infringement and of the work allegedly infringed accompany the petition of the copyright holder, or its absence be explained, excepting the public performance of dramas, delivery of lectures, etc. The petition should also be accompanied by a declaration of originality substantially in the language of the statute. The register of copyrights issues a certificate of registration to an applicant paying a fee therefor, which certificate is *prima facie* evidence of

NOV 1 5 1940

facts contained therein (*i.e.*, name and address of the claimant, holder of the copyright, title of the work, etc.).

Great Britain.—The present British copyright law was enacted in 1911, and extends throughout the British possessions except the self-governing dominions which have their own copyright acts. It applies to every original literary, musical, artistic, and architectural work, and the rights protected by it include lectures, translations, performing rights, the conversion of dramas into novels and of novels into dramas, and mechanical reproduction by records and cinematograph films. The duration of this monopoly, in the case of works published in the lifetime of the author, is for the term of the author's life, and, with certain restrictions, fifty years beyond.

International.—International copyright may be had by procuring independent copyrights in countries where the protection is sought, or by virtue of international conventions or treaties providing for mutual recognition and protection. Under the Berne, Switzerland, convention of 1886 various international copyright acts were adopted. One of the most important provisions had the effect of making the enjoyment of the rights granted thereby subject to the conditions and formalities prescribed by the law of the country of origin of the work. This rule has been interpreted to refer only to those conditions and formalities, and not to those required by the law of the country in which the right is being enforced. This convention was revised in 1896 and again in 1908, 1914, and 1928.

Remedies in cases arising under international copyright acts are regulated under the law of the country in which the infringement takes place.

Consult S. P. Ladas, *The International Protection of Literary and Artistic Property* (1938); T. Solberg, *Copyright Miscellany* (1939).

BENJAMIN WERNE, S.J.D.

Coquelin, kōk-laṅ', BENOÎT CONSTANT (1841–1909), known as COQUELIN AÎNÉ, distinguished French actor, was born in Boulogne-sur-Mer. His father allowed him to enter the Paris Conservatoire (1859), though physical disadvantages threatened to debar him. On Dec. 7, 1860, he made his début as Gros-René in *Dépit amoureux* but his first success was as Figaro in *Le mariage de Figaro*. It was as Scapino and in other characters in Molière, however, that he was to make his mark. In other parts, also, his directness, simplicity and versatility soon won him a unique place on the Paris stage. In the modern drama, his Gringoire and his Cyrano de Bergerac stood out as brilliant performances—the first quaintly and humorously touching, the second flamboyantly picturesque.

In 1886 Coquelin was elected a member of the Comédie Française. In the following year he toured on the Continent, and in 1888 he visited the United States. In January, 1891, he appeared as La Bussière in Sardou's *Thermidor,* which was interdicted by the French government. In November, 1892, he produced a French version of the *Taming of the Shrew,* entitled *La mégère apprivoisée,* assuming the rôle of Petruchio. In both of these plays he acted in London in 1892, as well as in *L'Aiglon* in 1902. He appeared again in the United States in 1893–94, and in 1900–1, during which he played Flambeau, in *L'Aiglon,* to the Duc de Reichstadt of Sarah Bernhardt.

Coquelin was also known as a lecturer and author, his works including *L'art et le comédien* (Eng. trans. *The Actor and His Art*); *Les comédiens par un comédien; L'Arnolphe de Molière.*

Coquelin, ERNEST ALEXANDRE HONORÉ (1848–1909), commonly known as COQUELIN CADET, French actor, brother of Constant Coquelin, was born in Boulogne-sur-Mer. He was admitted to the Conservatoire in 1864, and made his début at the Odéon in 1867 in the chief rôle in *L'anglais, ou Le fou raisonnable.* In 1876 he joined the Comédie Française. He created important parts in *Le sphinx, L'ami Fritz, Les corbeaux, Denise,* and *L'héritière.*

Coquerel, kōk-rel', ATHANASE JOSUÉ (1820–75), French Protestant divine, son of A. L. Coquerel (q. v.), was born in Antwerp. He was pastor in Paris from 1850, and with his father was one of the leaders of the liberal school of French Protestantism. In 1864 he was deprived of his office, but he continued to preach. Among his works are *Jean Calas et sa famille* (1857); *Des Beaux-Arts en Italie au point de vue religieux* (1857; Eng. trans.); *Des premières transformations historiques du Christianisme* (1866; Eng. trans.); as well as several books on the history of French Protestantism.

Coquerel, ATHANASE LAURENT CHARLES (1795–1868), French Protestant divine, was born in Paris. He left several volumes of *Sermons,* a book on preaching, *Observations pratiques sur la prédication* (1860), *Réponse au livre du Docteur Strauss, La vie de Jésus* (1841; Eng. trans.) *Christianisme expérimental* (1847); *Christologie* (1858).

Coques, kok, or COCX, GONZALES (?1618–84), Flemish painter, was born in Antwerp. He was a pupil of Pieter Breughel and Ryckaert, and was called 'the little Van Dyck,' because his portraits, though extremely small, have the freedom and breadth of Van Dyck's work, together with great delicacy and refinement. Out of a total of about forty-six, England has twenty, including his masterpieces—*e. g., The Family Verhelst* (Buckingham Palace), *The Picnic,* and *Rural Quietude* (Wallace Collection). He is also represented in the galleries of Paris, Berlin, Dresden, Antwerp, and Vienna, and in private collections.

Coquil'la Nut, the fruit of a Brazilian palm (*Attalea funifera*), an ally of the cocoanut palm. It is used in turnery owing to its beautiful mottling, and is sometimes called vegetable ivory.

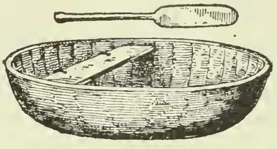
Coquimbo, kō-kēm'bō, seaport, Chile, in the province of Coquimbo, 10 miles south of La Serena, the capital. It has a modern cathedral, seminary, lyceum, and hospital. At Guayacan, 2 miles to the south are large copper works. The exports are chiefly copper, manganese, cattle and hides. Pop. 15,000.

Coquina, kō-kē'na, a rock made up almost wholly of broken fragments of shells. Such a shell limestone is accumulating off the coast of Florida, and it is to this particular type that the name is applied. In Florida and the Bermudas it is used for building.

Coquito, kō-kē'tō (*Jubæa spectabilis*), a Chilean palm, of which the sap is boiled down as syrup.

Coracias. See ROLLER.

Cor'acle, or CURRACH, a light primitive boat, made of wicker or laths covered with leather or canvas. The form used by the early Britons was made of a willow frame over which skins were stretched. The coracle now used on Welsh rivers and on the Dee for purposes of fishing is like a square basket, having a thwart across the center, on which the fisherman sits, manœuvring the rod with one hand and the paddle with the other. A single paddle about four feet long is held in the hand midway, with the shaft braced against the outer side of the upper arm. The stroke follows the shape of the figure 8, and sends the boat sideways. A coracle cannot be driven against the stream. A boat of bison skin, essentially the same as the British coracle, was used by the Mandans of the Upper Missouri.



Wicker Coracle

Cor'acoid Process (Greek *korax,* 'beak'), a beak-like projection from the upper part of the scapula (q.v.) or shoulder blade. It lies a little under the outer end of the collar bone, where it can be felt. It gives attachment to various muscles.

Cor'al, generally the calcareous skeleton of various members of the class known as Anthozoa. A considerable number of the Cœlenterata (q.v.) have the power of taking up lime from sea water, and building this into a skeleton. Where these limy skeletons reach a considerable bulk, the product is commonly called Coral; but a coral reef contains, in addition to such coral, calcareous seaweeds (nullipores), the calcareous tubes of worms, calcareous sponges, and so on, so that the term Coral is sometimes loosely applied to the hard parts of several organisms, whose skeletons form more or less compact rock. In no case, however, is there such an animal as a coral 'insect'; for insects, with rare exceptions, do not live in the sea. The popular conception of coral as built cell by cell by the 'busy coral insect,' after the fashion of honeycomb, is therefore erroneous, in spite of the hold which it has taken upon the public mind.

In northern seas cœlenterates having the power of forming coral are rare, and never produce any considerable amount of lime. In the West Indian and other warm seas, however, forms nearly related to sea firs, but having a limy instead of a horny skeleton, are often found. These are the Millepores (q.v.), the simplest kind of coral-making organisms.

By far the majority of reef corals, however, belong to the Madreporaria, a division of the Anthozoa or Sea Anemones (q.v.), which include forms having their tentacles in a multiple of six. To the genus Madrepora itself belong the Stag's-horn Corals, so often seen in museums or shops in the dry state; they are of great importance in reef-building. A dried madrepore coral looks like a piece of porous limestone, and is dotted over with distinct holes. From each of these, in life, a small sea anemone protrudes, and the porous nature of the coral is due to the fact that these sea anemones communicate with one another by numerous canals, ramifying through the substance of the colony. The coral is indeed made up of the skeletons of a number of sea anemones, united together by a system of canals. There is a great variety of such colonial corals, often in life brilliantly colored, and often with the growing points of the colony differently colored from the older parts. Such colors as green or greenish brown, red, blue, pink, and yellow, all occur, and combine to give the reefs their beautiful tints.

In addition to the branching madrepores, mention should be made of the Meandrina or Brain Coral (q.v.), forming huge rounded masses, with the surface curiously grooved like the convolutions of the human brain. Then there are also the solitary corals, such as Fungia, due to the activity of non-colonial sea anemones, often reaching enormous size, and possessed of great stinging power.

Very different from these corals is the Red Coral (Corallium) of commerce, which is found in the Mediterranean, and belongs to the form with tentacles in multiples of eight (Octocoralla), instead of to the sea anemones. Allies of the red corals are such forms as Dead Men's-Fingers (Alcyonium), or Sea Pen (Pennatula). In alcyonium we have a fleshy substance called the cœnosarc, which has numerous polyps with eight feathered tentacles placed in little cups on its outer surface. Ramifying through the substance of the cœnosarc are a number of nutrient canals, by means of which the polyps communicate with one another. The red coral is constructed on the same plan, but there is a central axis of lime of a bright red color, which is very hard and capable of taking on a high polish, and which forms the coral familiar in commerce.

Red coral, obtained in large though greatly diminishing quantities in the Mediterranean, by dredging, has considerable commercial value. The cœnosarc is red, like its contained axis of coral, and the polyps are snowy white. Related to the red coral are the Organ-Pipe Coral (Tubipora), with green polyps, and the curious Blue Coral (Heliopora).

In most corals the sexes are separate, and even the colonies may be entirely male or female; in Corallium, hermaphrodites may occur or branches may be of either sex.

Coral Islands and Reefs.—While the reef of the zoologist is the area where the living corals with the host of commensals or associated organisms are found, the reef of the geographer may be a compact mass of limestone. Indeed, whether we take the limestone peninsula of Florida or the keys which lie off it, the Bahamas or the Bermudas in the Atlantic, the Fiji Islands, or those of Low or Paumotu group in the Pacific, the same phenomenon is encountered—a thin crust of recent deposits covering a thicker mass of older limestone; and only in few cases, such as the Ellice Islands, is the recent coralliferous limestone alone visible. The living reef-building coral is found in sea water as deep as from 250 to 300 feet, but the regions where it grows best do not extend below half this depth.

The rate of growth is not accurately known, and differs with the species. Two years after the Krakatoa eruption (1883) coral was found four inches thick; madrepores on Tortugas are said to have increased three inches per annum; and the Bum Bum reef, off the northeast coast of Borneo, is supposed to have grown over nineteen feet in thirty-two years, or eight inches per annum. The rate differs also according to the relation of the polyp to the ocean currents and to the general food supply. The supply of plankton (q.v.) is much smaller on the lee than on the windward side of an island, also it is less in the East than in the West Pacific. The corals, however, are found associated commensally with green algæ, which require light. Probably this association and the fact that much of the food drifts on the surface of the sea explain the relatively shallow depths in which reef-building corals are found.

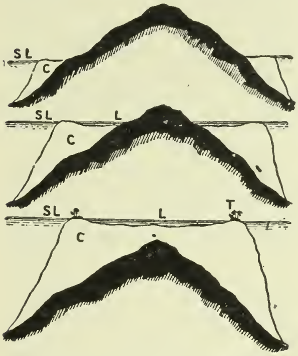
Coral reefs and islands are low masses of limestone, sand, and conglomerate. They may be plastered on to an island, which may or may not be of quite different composition (fringing reefs); or they may form a low breakwater within which a lagoon, rarely of great depth, comes between the reef and the island (barrier reefs); or they may form a more or less enclosed ring or oval-shaped belt, within which is a lagoon (atoll). The depth of these lagoons varies from a few feet to several hundred. On the outside, the coral reef or island may sink for some distance almost perpendicularly (Bougainville reef to over 300 feet, Funafuti 800 feet), and slope very steeply thereafter, or the steep slope may begin from the surface. Slopes of 50° are not uncommon—*e.g.,* in the reefs cited in the Macclesfield Bank, east of Luzon, Philippine Islands, and others.

While this is the case with the individual island, it is usually found that a group of coral islands rises from a well marked submarine bank. The most intensive developments of corals probably occur in the West Pacific, in the relatively shallow seas off New Guinea and Australia; but even in the Great Barrier reef of Australia the crust of recent coral is relatively thin, and older limestone constitutes the main mass.

The horizontal distribution of recent reef coral is well defined. Roughly, it is found only between the tropics, and even there not in the eastern parts of the oceans. The contemporary coral reefs nearest the pole are the Bermudas, 32° N., in the Atlantic; Lord Howe Island, 31° S.; on the coast of Natal, 30° S.; and round the Sinai Peninsula, in the Red Sea, nearly 30° N. In the South Atlantic none occur south of the Abrolhos Bank (near the coast of Brazil), 18° S., and in the North Pacific none are found north of Laysan, 25° N. This corresponds fairly with the limits of the surface isotherm of 68° F. The absence of coral reefs on the east of the oceans, except in small patches—*e.g.* Houtmann Rocks, West Australia—is said to be due to the colder currents which flow there at the surface.

Various contradictory theories have been brought forward to explain coral islands, and afford materials for a fascinating chapter in the history of geomorphology. Reinhold Forster (1772–5) and earlier observers were more concerned with description than explanation, but the poet Chamisso (1814–18) pictured the coral reefs as being built up on submarine mountains to the surface, where growth took place on the outside, and the ring surrounding the lagoon was formed. Darwin, during the voyage of the *Beagle* (1831–6), considered that few atolls could be explained in this way, and propounded the theory that coral atolls were built up in a sinking area, where first fringing reefs, then barrier reefs, and lastly atolls were the successive phases. In many regions evidence for elevation in the shape of raised cliffs abounds, and Darwin's explanation cannot hold for the majority of coral islands, considered as recent phenomena. Dana and others supported his theory, which was thought to be one of the best substantiated in geology. It was long unassailed, except for special regions by Semper, and then by Agassiz and others, who studied Atlantic reefs.

But in 1800 (Sir) John Murray, who during the *Challenger* voyage studied coral reefs and islands, formulated a theory based on the opposite assumption to that of Darwin, and considered the atoll as a young instead of an advanced phase of insular evolution. Guppy and others brought confirmatory evidence, and the only new argument in favor of Darwin's hypothesis is the bore at Funafuti in the Ellice group, which was sunk 1,114 feet through limestone, with occasional layers of loose calcareous sand. Later studies of Alexander Agassiz in all parts of the ocean lead to the conclusions stated at the beginning, that the modern coral deposit is normally thin, and based on older limestone of the Tertiary age. The numerous coral terraces found in almost all parts of the coral seas—in Barbados, for instance, as high as 1,150 feet—show that the sea-level has sunk relatively to the land in recent times. This does not preclude the hypothesis that the great Tertiary limestones may have been laid down in a sinking area. It may be that some of the islands with steep submarine slopes have been formed in a sinking area. The first Barrier Reef of Australia does not appear to be part of a rising or sinking sea-floor. The Maldives supply conclusive evidence that atolls may rise from a submarine plateau of sufficient elevation.



Coral Formation of Atoll

The probabilities are that differential movements and volcanic eruptions have taken place in the ocean bed, and each group of coral reefs must be studied separately. Most scientists agree that coral islands present one of the most complicated problems for the naturalist, who has not yet sufficient data to estimate the importance of nearly all the factors.

Consult Dana's *Corals and Coral Islands;* Darwin's *Structure and Distribution of Coral Reefs;* Guppy, *Proceedings of the Royal Society, Edinburgh,* xiii. (1885–6); Murray, *Nature,* xxxix. (1888–89); *Proceedings of the Royal Society of Edinburgh* (1878–80); *Transactions of the Royal Society of Edinburgh,* xxxvii. (1896); W. J. Sollas, 'Report to the Committee of the Royal Society Appointed to Investigate the Structure of a Coral Reef by Boring' (*Proceedings of the Royal Society,* lx.); Kent's *Great Barrier Reef of Australia.*

Coral Fishes, a name applied to the members of two families of fishes, both particularly abundant in the neighborhood of coral reefs. One of these is the Chætodontidæ, and the other the Pomacentridæ. Although not closely related, they exhibit a marked resemblance in color and markings, which are doubtless in both cases an adaptation to life among the gayly colored denizens of the reef. The habits of the members of the two families are closely similar.

Corallian, ko-ral'i-*a*n, a subdivision of the Jurassic system in England, comprising those rocks which rest upon the Oxfordian, and are covered in turn by the Kimmeridge clay. They are principally coral limestones and calcareous grits, and are in places so crowded with corals as to constitute veritable fossil coral reefs.

Coralline, kor'*a*l-in, a name formerly used somewhat loosely for any hydroid polyp. It is now applied to any species or plant of the genus Corallina, especially to *Corallina officinalis,* a red seaweed, coated with a deposit of lime, which may be removed by soaking the plant in dilute acid. Corallines spring from a crust-like thallus in rock pools between tide-marks. The living plants are purple, but lose their color when dead; the branches are pinnate, and at the tips the fruit is borne. Reproduction is effected by means of swarm-spores.

Coralline Crag, a white or pale-colored, friable, calcareous clay, full of shells and fragments of sea urchins, belonging to the Pliocene of England. At its base is a layer containing remains of mammalia—the 'Suffolk bone bed'—formerly extensively worked for phosphatic nodules. The Coralline Crag is from 40 to 60 feet thick, and is exposed at various localities in Suffolk.

Coral Sea, that portion of the Pacific Ocean strewn with coral reefs, between Australia on the west and the New Hebrides Archipelago on the east.

Coral Snakes, small, highly poisonous reptiles, belonging to the Colubridæ, the family which also includes the deadly cobra. The type species is *Elaps corallinus,* found in the forests of South America. Its coloring is vivid and characteristic, consisting of black and yellow circling bands on a red ground. One small species inhabits Florida, and its bite may be extremely painful if the venom enters the blood.

Coral Tree. See ERYTHRINA.

Co'ram, THOMAS (1668–1751), English philanthropist, was born in Lyme Regis, Dorsetshire. He went to the United States and from 1694 to 1703 lived in Taunton, Massachusetts, and in Boston. Returning to England, he devoted himself to charitable works, founded a colony for unemployed English artisans in Nova Scotia, and was the originator of the Foundling Hospital. In 1732 he was appointed one of the trustees for Georgia, and was a promoter of the English settlement there.

Coran. See KORAN.

Cor Anglais, kôr äṅ-glā', a musical instrument, known more familiarly as the English horn. It is really a tenor oboe, though its tone is less piercing and more suited for the expression of melancholy than the tone of the oboe. It is often met with in Bach's scores under the name of *oboe di caccia*, but it had long been in disuse when Rossini revived it in his *Guillaume Tell*. Modern composers such as Wagner, Meyerbeer, Halévy, and Ambroise Thomas have employed it freely.

Corato, kō-rä'tō, town, Italy, in the province of Bari; 25 miles west of the town Bari. On a hill close by is the former hunting château of the Emperor Frederick II., Castle del Monte. Tartar, wine, and oil are produced. Pop. 45,000.

Cor'ban (Heb. *gorban*), an oblation or gift (to God) specially in fulfilment of a vow. The New Testament usage (Mark vii: 11, *cf.* Matt. xv: 4–6) is explained by the fact that if a Jew had made a rash vow—*e.g.* not to support his parents—the Pharisees decreed that the vow was more binding than the original obligation. A natural responsibility could thus be evaded by a pretended religious dedication.

Cor'bel, in architecture, a range of stones which supports, or seems to support, the more elevated projections of a cornice, parapet, or battlement. It is sometimes a single stone, hewn to resemble the head of an animal or of a man, crowned with a bead or single moulding. It is sometimes a slab conventionally carved with foliage or trefoil. The word is also used to denote a projection from the wall resembling a bracket, and serving the purpose of one. A range of stones in the interior wall of a vault supporting the floor of the building above is called a *corbel table*.

Cor'bet, RICHARD (1582–1635), English bishop and poet, the son of a Surrey gardener, was born in Surrey. He was educated at Oxford and after holding several lesser clerical positions, in 1620 he became dean of Christ Church. In 1624 he was made bishop of Oxford, and in 1632 bishop of Norwich. He was famed for his convivial habits and his opposition to Puritanism. His poems (the longest of which, *Iter Boreale*, is an account of a holiday tour of four Oxford friends) were collected and published in 1647–1672, and 1807.

Corbie Step, or CROW STEP, a characteristic feature of the Scottish Middle Pointed or Decorated period of architecture. It consisted of a steplike trimming on the steep gables of dwellings and other secular buildings, which prevailed toward the end of the period. A similar form of gable ornament is found in France, Holland, and Germany, and in some of the early Dutch houses of New York.

Corbin, HENRY CLARK (1842–1909), American soldier, was born in Clermont Co., O. He was educated in public and private schools and studied law, but in July, 1862, entered the Federal volunteer service as second lieutenant. He served in the Army of the Cumberland during the Civil War, rising to the rank of lieutenant colonel (March, 1864) and being breveted major in the regular service for gallant conduct at Decatur, Ala., lieutenant colonel for his services in the battle of Nashville, and brigadier general of volunteers for meritorious services throughout the war. After the war he entered the regular service, and successively became brigadier general, and adjutant general (1898), and major general and adjutant general (1900). He was stationed for ten years in the West, served in the Spanish-American War, and in 1904 was placed in command of the Division of the Philippines. He was made lieutenant general in 1906, and was retired by the operation of the age limit law in 1906.

Corbulo, kôr'bū-lō, GNAEUS DOMITIUS (?—*c.* 67) Roman general under Claudius and Nero. In 47 A.D. he fought with success in Germany, but the jealous Claudius recalled him. In Nero's reign, from 54 onwards, he waged successful war against the Parthians. In 67 A.D. Nero, jealous of his success, summoned him to Greece, and, when he arrived, gave orders for his execution. On hearing this, Corbulo slew himself.

Corchorus, kôr'kō-rus, a genus of plants belonging to the order *Tiliaceæ*. The two most important species are the cultivated, tropical, annual shrubs, *C. olitorius*, popularly known as Jews' mallow, and *C. capsularis*, from the stalks of which jute is obtained. The young shoots are also used as flavoring herbs on which account the plant is largely cultivated in Syria, India, and other parts of the East.

Cor'coran, WILLIAM WILSON (1798–1888), American financier and philanthropist was born in Georgetown, D. C. He studied for a short time at Georgetown College and was occupied until 1837 in the dry goods business of his brothers and in charge of certain real estate properties in the District of Columbia. In that year he began business as a banker and broker, and was so successful that his firm at one time financed nearly all the bond issues of the U. S. government. In a period of stringency during the Mexican War he visited England and secured the interest of English bankers. He retired in 1854, and afterward devoted himself to public benefactions, founding the Corcoran Art Gallery at Washington and minor institutions, his donations mounting into millions of dollars.

Corcyra. See CORFU.

Cord or CORDAGE. See ROPES.

Corday d'Armans, kor-dā' där-mäṅ', MARIE ALINE ANNE CHARLOTTE (1768–93), French revolutionist, was born in Normandy, a descendant of Pierre Corneille. Though of noble birth, she adopted with enthusiasm the principles of the Revolution; but its bloody excesses so filled her with horror that she determined to save her country from the Terrorists in power. Selecting Marat as her victim, she set out for Paris on July 9, 1793, and on the 13th went to Marat's house. Then, pretending to denounce some fugitive Girondists at Caen, after communicating her information, she stabbed Marat to the heart as he lay in his bath. Arrested at once, she was guillotined on July 17, four days after the assassination. She has been celebrated in verse and prose by André Chenier, Lamartine, Michelet, and Ponsard; in painting by Scheffer and Baudry; and in sculpture by Clésinger.

Cordele, city, Georgia, county seat of Crisp County, on the Seaboard Air Line, the Southern, the Atlanta, Birmingham and Coast, and the Georgia, Southwestern and Gulf Railroads; 80 miles southeast of Columbus. It is a thriving trade centre, and has wagon and cotton-seed oil works and machine shops. Pop. (1910) 5,883; (1920) 6,538.

Cordelier Club, kor-d'-lyā', the name of an association founded in Paris at the beginning of the Revolution, which played a prominent part in moulding public opinion in Paris. Its leaders were Camille Desmoulins, Marat, Hébert, and Danton. It was from among them that the Parisian members of the National Assembly were chosen. After the execution of its chiefs by Robespierre (1794) it lost its influence and practically ceased to exist. It was distinguished from the Jacobin Club (of which it was originally a branch) by having no affiliations in the country districts. The name of the club is derived from the religious order of the same name whose building it occupied.

Cordials, weak alcoholic solutions flavored with essential oils, fruit essences, or plant extracts, frequently colored with burnt sugar or caramel, and sweetened with syrups.

Cordier, kor-dyā′, or Corderius, Mathurin (*c.* 1478–1564), French scholar, was born in Normandy or in Le Perche. A man of great learning and a celebrated Latin scholar, he was professor of belles-lettres successively at Paris, Bordeaux, Lausanne, and Geneva, where he settled to be near his former pupil Calvin, who dedicated to him his *Commentary on the First Epistle to the Thessalonians.* Cordier devoted the latter part of his life to the education of children, writing for them a *Latin Grammar* and his well known *Colloquiorum Scholasticorum Libri Quatuor,* a series of dialogues for teaching Latin to the young. He also wrote *De Corrupti Sermonis Emendatione,* a protest against the dog-Latin then in use among scholars.

Cordierite, kôr′di-er-īt, also known as Iolite, Dichroite, a mineral consisting of aluminium and magnesium silicate. In good specimens it is clear blue in color but the color of transmitted light depends on the direction in which it passes through the crystal; polished cubes of this mineral change color as they are turned in different directions. Hence it is also known as dichroite. (See Dichroism.) It is a product of the thermal action of masses of granite or diorite which invade argillaceous rocks. It occurs also in certain gneisses.

Cordill′era, the most complex type of the group relations of mountains consisting of several mountain chains in the same continental region. The chains of the Rocky Mountains, Sierra Nevada, Coast Range, and their extensions make up the Western Cordillera of North America. In South America the term is often used for the whole or a part of the Andean system, particularly in Colombia. See Andes.

Cord′ite, the name given to the smokeless explosive used in the British army and navy in the cartridges of cannon and small arms. It is so-called from the cord-like form into which it is manufactured. Cordite was originally a composition of 58 per cent. of nitroglycerin, 37 per cent. of gun-cotton, and 7 per cent. mineral jelly (vaseline), but a later type known as *Cordite M.D.* consists of about 30 per cent. nitroglycerin, 65 per cent. guncotton (nitrocellulose), and 5 per cent. mineral jelly. It is of a constant specific gravity of 1.56, does not deteriorate under severe climate conditions, and is not affected by damp. Cordite explodes when detonated by some fulminant, but when simply ignited burns away without explosion. See Explosives; Gun Powder.

Cordoba, kôr′do-va, province, Argentine Republic, ranking after Buenos Ayres in population and importance. It is centrally situated, northwest of Buenos Ayres; area, 66,912 square miles. Three chains of mountains (the Sierra de Cordoba) traverse the province, and culminate in the Cerro Champaque (9,350 feet). Thick woods are scattered over the northern portion, while the southern is a bare level pampas with a fertile vegetable loam. Cattle, sheep, and horses are reared, and a comparatively small area is devoted to agriculture. Mineral deposits include lime, salt, marble, gold, copper, lead and silver. The central Argentine and North West Argentine Railroads cross the province. Pop. (1926) 947,216.

Cordoba, city, Argentine Republic, capital of Cordoba province, is pleasantly situated in the foothills; 430 miles northwest of Buenos Ayres. It is a progressive, though somewhat mediæval appearing city, with a university, established in 1613, the National Observatory (lat. 31° 25′ 15″ s., long. 64° 11′ 16″ w.), an Academy of Sciences, hospital, public library, a cathedral and several fine churches. Pop. (1918) 156,000.

Cordova (*Sp.* Córdoba), province, Spain, in Andalusia, on the southern slopes of the Sierra Morena and in the valley of the Guadalquivir; area, 5,299 square miles. The plains produce abundance of fruit, wine, olives, and grain, and the upper slopes pasture many cattle, as well as half-breed Arab horses much esteemed in Spain. Pop. (1920) 557,366.

Cordova, city, Spain, capital of the province of Cordova; 82 miles northeast of Seville. The city is situated on a fine plain at the foot of the Sierra Morena on the Guadalquivir, crossed by a noble Moorish bridge (8th century), 888 feet long. It bears evidence of its Moorish ancestry and its chief glory is the great mosque, now a Christian cathedral, still one of the most lovely buildings in the world. It was begun by the Caliph Abdur-Rahman in 770 and has suffered more or less by changes made in converting it to a Christian cathedral. Other features of interest are the Alcazar, the Art Museum and several churches. The town is famous for its silversmiths' work, and also has manufactures of paper and textiles.

Cordova is said to have been founded by the Carthaginians, and was an important place at the time of the Punic wars. Here the Romans founded a patrician colony (*Corduba*) in 152 b.c. It was the city of the Arab caliphs of the west, and the centre of luxury, learning, and civilization, when Europe was overrun by the barbarians, being at the height of its glory in the 10th century. The two Senecas, Lucan, Averroës, and other great men were born here. Pop. (1920) 73,710.

Cordova, town, Mexico, in the province of Vera Cruz; 66 miles southwest of Vera Cruz. It has cotton and woollen manufactures and a trade in tobacco, sugar and coffee. Pop. 7,000.

Cor′duroy, a thick corded cotton fabric. It has a ribbed surface and a cut pile like velvet and it is strong and enduring.

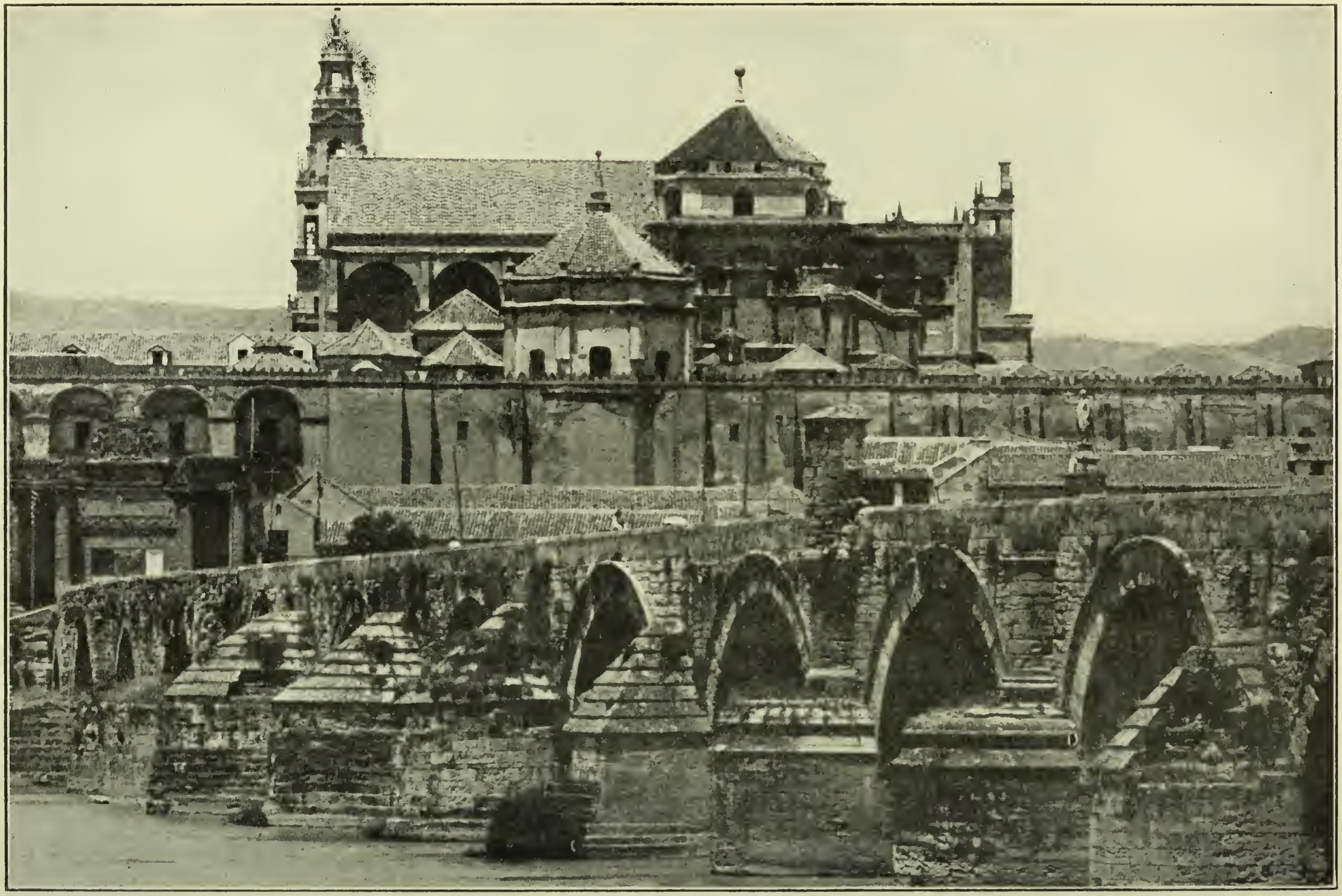
Corduroy Road, a road constructed of trunks of trees split into halves and laid close together, with the rounded surface uppermost, transversely to the direction of the road. Such roads are generally made over swampy or marshy ground.

Cordwainer, originally a worker or dealer in cordwain or cordovan (from Cordova, in Spain) leather—hence a shoemaker. The term now only survives as the name of an English trade guild, or of a trade union embracing every branch of the trade. It is occasionally found in old New England records and documents.

Corea. See Korea.

Coreg′onus, a genus of salmonoid fish, which includes a large number of lacustrine species found both in Europe and America. The American species, which are found in the Great Lakes and are a popular food-fish, are called whitefish; the European species have such special names as pollan, vendace, gwyniad.

Corel′li, Arcangelo (1653–1713), violinist and composer whose name marks an epoch in the history of violin playing, was born at Fusignano, near Imola. He settled in Rome (1681), where he lived in the



© Ewing Galloway, N. Y.

THE CATHEDRAL, CORDOVA, SPAIN

palace of his friend and patron, Cardinal Ottoboni. Corelli's distinctive powers as a composer and executant gave a new impetus to his art, and many of his numerous compositions are still included in the repertoire of modern violinists.

Corelli, MARIE (1864–1924), English novelist, was born in Italy. She was adopted by Charles Mackay, the poet, and was educated in a French convent. With her first volume, *A Romance of Two Worlds* (1886), she attracted the notice of the reading world, and achieved a popular reputation which, in spite of adverse press criticism, has since 1886 been more or less fully maintained. In 1900 she produced *Boy* and *The Master Christian;* and in 1902 the novel *Temporal Power*. Her other works comprise *Vendetta* (1886), *Thelma* (1887), *Ardath* (1889), *The Soul of Lilith* (1892), *Barabbas* (1893), *The Sorrows of Satan* (1895), *Ziska* (1897), *God's Good Man* (1904), *Free Opinions Truly Expressed* (1905), *The Treasure of Heaven* (1906); *The Life Everlasting* (1911); *The Love of Long Ago* (1920); *The Secret Power* (1921).

Corentyne, kō-ren-tīne', CORENTYN, or CORENTIJN, river, South America, forming the boundary between British and Dutch Guiana. It rises in the Acarai Mountains and is about 450 miles long. From its mouth it is navigable for 40 miles by vessels drawing nine or ten feet of water, and by large canoes for 150 miles.

Coreop'sis, or TICKSEED, a genus of showy American composite plants, many of which are popular members of the garden flora. They are all easy to cultivate, and the annuals are readily raised from seed, some either out of doors in April and May or in heat in March. Of the perennial species, the best are *C. grandiflora*, a beautiful type with large pale yellow flowers in autumn; *C. verticillata*, with feathery foliage and golden flowers in summer; and *C. lanceolata*. Among the annuals are *C. tinctoria*, yellow and brown; *C. Drummondii*, *C. coronata*, and *C. augustifolia*. *C. rosea* is a delicate, narrow-leaved plant, with small yellow flowers found in swamps along the coast.

Corfu, formerly known as CORCYRA, an island in the Ionian Sea (see IONIAN ISLES), area, 278 square miles. The northern part is bare and rocky, dominated by Monte San Salvatore (3,000 feet), but the southern narrow portion is fertile, producing fruit, oil and honey. The climate is generally delightful but the summers are very warm. The capital is Corfu, a fine and prosperous town.

The Greeks identified Corfu with the Phaeacian island, Scheria, mentioned in Homer's *Odyssey*. It was colonized by Corinth about 700 B.C. The most ancient naval battle on record was fought between Corinth and Corfu about 650 B.C. In 433 B.C. its alliance with Athens led to the Peloponnesian War. After 400 B.C. it declined, though its position on the ancient sea-route between Greece and Italy and Sicily always made it commercially important. It came into the possession of the Romans in 229 B.C. In A.D. 1205 the Venetians secured it from the Byzantine emperors, and, except from 1267 to 1386, when it was occupied by the kings of Naples, held it until 1797. In 1815–1863 it was under the protection of Great Britain, since when it has formed part of the kingdom of Greece. Pop. (1920) 138,470.

Coreopsis

Corian'der, the dried ripe fruit of an umbelliferous annual plant, *Coriandrum sativum*, which is a native of Europe. It is the gad of the Hebrews and the corion of the Greeks. In Europe it is quite extensively used as a flavoring in confectionery, and in the preparation of liqueurs; and also as an aromatic carminative in pharmacy.

Corigliano Calabro, ko-re-lyä'no ka-lä'brō, town, Italy, in the province of Cosenza, 61 miles northwest of Cotrone. Pop. 16,000.

Corin'na (fl. *c.* 490 B.C.), Greek poetess of Tanagra in Bœotia, and a contemporary of Pindar, whom she is said to have taught and to have defeated in a public competition at Thebes. Her poems were chiefly lyrical; the few fragments can be found in T. Bergkh's *Poetæ Lyrici Græci*.

Corinth, city, Mississippi, county seat of Alcorn County, on the Southern and the Mobile and Ohio Railroads; 90 miles southeast of Memphis, Tenn. It was occupied by the Confederates (about 50,000 effectives) under General Beauregard after the battle of Shiloh (April 6–7, 1862). The Federals (about 100,000) under Halleck (under whom were Grant, Buell, and Pope) slowly followed, and opened siege operations, preparatory to an assault, but before the assault was made Beauregard, who had had no intention of trying to hold the place permanently, evacuated on May 29–30 (1862). On Oct. 3–4, 1862, the Federals (about 20,000) under Rosecrans repelled an attack upon the place by about 28,000 Confederates under Generals Price and Van Dorn; the Federal loss in killed, wounded and prisoners being about 2,500, that of the Confederates about 4,800. Pop. (1910) 5,020; (1920) 5,498.

Corinth, village, New York, in Saratoga County, on the Delaware and Hudson Railroad; 55 miles north of Albany. Power for large paper mills is derived from the Palmer Falls, which are 90 feet high. There is a bridge here across the Hudson. Pop. (1910) 2,166; (1920) 2,576.

Corinth, kor'inth, ancient city, Greece, situated on the southern coast of the Gulf of Corinth, southwest of the isthmus of Corinth. It has railway communication with Patras, Athens (50 miles to the east), and Argos (for Peloponnesus); Greek coasting steamers call irregularly. The ancient and mediæval importance of Corinth depended on its position on the isthmus and on its natural fortress, Acrocorinthos, a spur of the hills of the Peloponnesus about 6 miles south of the narrowest point. The ancient city lay about 4 miles inland, close below Acrocorinthos; scattered ruins remain, and recent excavations (since 1896) are revealing the general agreement of its topography with the description of Pausanias. The earliest settlement was on the Acrocorinthos. About 1000 B.C. it was occupied, like the rest of the Peloponnesus, by the invading Dorians. For about three centuries it was politically subordinate to Argos. The oligarchy of the Bacchiadæ was overthrown about 650 B.C. by Cypselus, who established a tyranny, which was continued by his son Periander and grandson Psammetichus down to 582 B.C.

Under these rulers Corinth attained the height of its prosperity, though even earlier it had exhibited activity and enterprise in founding colonies, particularly Syracuse, Corcyra, and Potidæa. After the expulsion of the despots, the Corinthians were for two and a half centuries closely allied with Sparta, and sided with them in the Peloponnesian War against Athens, which was, after the fall of Ægina, their chief commercial rival. In the 4th century B.C. their power declined; and from 335 to 197 B.C., with only twenty-one years' interval (243 to 222), the presence of a Macedonian garrison in the citadel secured the dependence of the city on Macedonia. When Rome declared Greece free in 196 B.C., Corinth became once more independent, and took a leading part in the activity of the Achæan league; the result of this was its destruction by Mummius in 146 B.C., due to the commercial jealousy of Rome. A hundred years later Julius Cæsar founded a new city, which became the capital of the province of Achaia, the city which St. Paul knew.

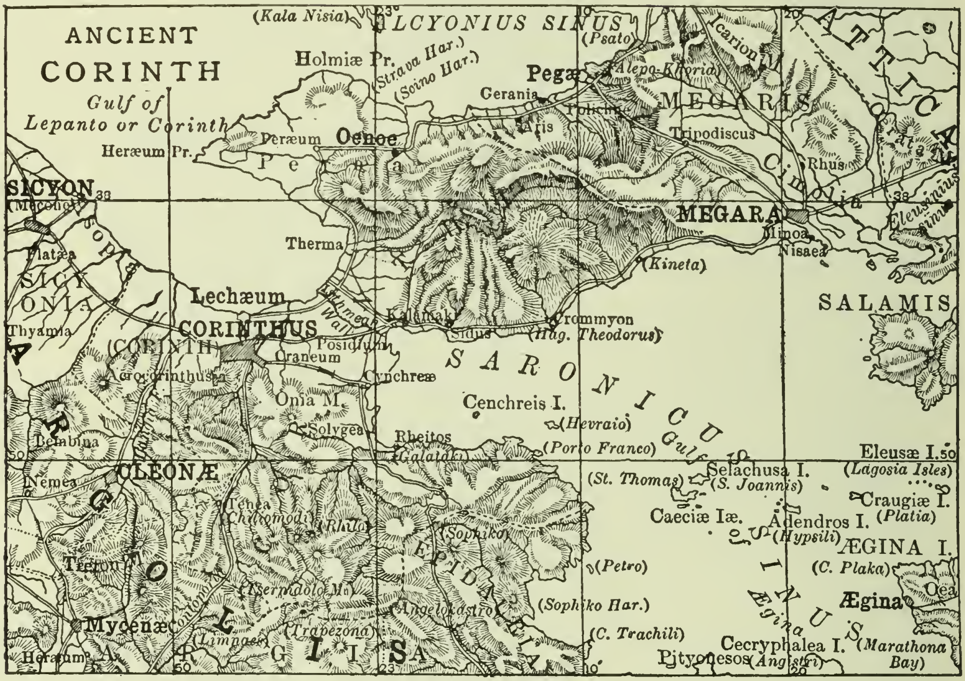
Until the Latin capture of Constantinople (1204) Corinth remained a considerable town; but in the Middle Ages it was of little importance. In 1459 it was captured by the Turkish sultan Mohammed II.; Venice held it from 1698 to 1715; in the Greek War of Independence (1821–7) it was completely destroyed, and was wrecked again by earthquake in 1858. The modern town and railway junction lie on the west shore of the isthmus, about 3 miles south of the entrance to the canal, and about 4 miles north from Acrocorinthus. Pop. 5,000.

Corinth, or LEPANTO, GULF OF, an arm of the Mediterranean extending through Greece, separating the mainland on the north from the Peloponnesus on the south, and communicating on the west side by the Strait of Lepanto with the Gulf of Patras. Its length is 78 miles, and average breadth 15 miles. The shores are very fertile, but liable to earthquakes.

Corinth, ISTHMUS OF, a neck of land connecting the mainland of Greece with the Peloponnesus, and lying between the Gulf of Corinth and the Gulf of Ægina. Its length is about 20 miles, while its breadth varies from 4 to 8 miles. Ruins of great antiquity are found on it, the most celebrated being the Isthmian Wall and the temple of Poseidon or Neptune. A ship canal, nearly 4 miles long, 75 feet broad and 26 feet deep, begun in March, 1882, and opened in August, 1893, connects the two gulfs. At the southeast end stands the town of Isthmia, and at the northwest Posidonia. The isthmus is crossed by the Athens and Corinth Railroad.

Corinthian Architecture. See ARCHITECTURE.

Corinthians, FIRST EPISTLE TO THE, one of Paul's four 'great epistles,' believed to have been sent from Ephesus by the hands of Timothy about the year 57 A.D. The apostle had visited Corinth in the course of his first European journey (Acts xviii.), but after his departure certain Judaizing teachers had split up the young community into factions, and this, together with the scandals that seem to have sprung up about the same time, gave him an opportunity of pastoral intervention. Thus, in ch. i.–iv. we find him dealing with partisanship and insubordination; next, a glaring case of immorality (v.–vii.); meats offered to idols, and public worship generally (viii.–xi.); spiritual gifts and their regulation (xii.–xiv.); the resurrection (xv.); he closes with a few personal details and the



NOV 19 1940

usual salutation (16). Through all these matters of controversy he sets forth the first principles of Christianity, and the Epistle well deserves the title, 'an inexhaustible mine of Christian thought and life.' Its genuineness is well attested, both externally and internally, and is admitted by all responsible critics, save a few extremists of the modern Dutch school.

SECOND EPISTLE TO THE CORINTHIANS, likewise one of the 'great epistles' of Paul, written in Macedonia (*c.* 57 A.D.), and conveyed thence to Corinth by Titus. Its contents are much more personal than those of the First Epistle, consisting largely of the Apostle's self-vindication against attacks, and his defense of his apostolic standing (see specially ch. i.–iv., x.–xiii.); but it has a notable section on Christian liberality, the occasion for which was the collection for the poor members of the congregation at Jerusalem (viii. *f.*). The authenticity of the Epistle is almost beyond challenge; and, despite its somewhat abrupt transitions, the evidence for its integrity is very strong. It is now generally accepted that the Apostle wrote at least one other letter to the Corinthians (see 2 Cor. ii. 4), either entirely lost, or partly preserved in 2 Cor. x.–xiii. 10.

Of numerous Commentaries may be mentioned those of Schmiedel, Beet, Lias, Ellicott, Godet, Dods, Findlay, Bernard, and Robertson and Plummer. Consult also Shaw, *The Pauline Epistles;* Scott, *Pauline Epistles* (1909); Rendall, *The Epistles of St. Paul to the Corinthians* (1909).

Corinth Ship Canal. See CORINTH, ISTHMUS OF; CANAL, NAVIGATION.

Corinto, kō-rēn'tō, seaport, Chinandega department, Nicaragua; 35 miles by rail from Leon, and 58 miles by rail from Lake Nicaragua. It has a good harbor, and is the chief port of Nicaragua on the Pacific Coast. Pop. about 3,000.

Coriolanus, kō-ri-ō-lā'nus, GAIUS, or GNÆUS MARCIUS, is the hero of an early Roman legend. He distinguished himself at the capture of Corioli, and so won his surname. He was strongly opposed to the plebeians, who refused to elect him for the consulship. After this, during a time of famine, he argued in the senate against a gratuitous distribution of the corn which had arrived from Sicily, unless the plebeians should give up their tribunes, for which he was impeached and banished (491 B.C.). He took refuge among the Volscians, whom he aided in their war with the Romans, and in 489 B.C. led their victorious army to the gates of Rome. The Romans sent deputations to plead with him, but he was deaf to every entreaty. At last the noblest matrons of Rome, headed by his mother Veturia, and his wife Volumnia, leading her two children, came to his tent, whereupon he led back the Volsci to their own territories. He died in exile, or was executed by the Volscians for his retreat. The story is now regarded as unhistorical, chiefly because of the chronological errors involved in it. Shakespeare's *Coriolanus* is a stately and impressive drama.

Corityba. See CURITYBA.

Cork (Spanish *corcho,* from Latin *cortex*) is the highly developed corky layer (see BARK) of the bark of the cork tree or cork oak (*Quercus suber* or *Q. ilex*) of the Mediterranean. The tree is not of great size, generally 20 to 60 feet high, the trunk often 3 feet in diameter, much branched, with ovate-oblong evergreen leaves, entire or serrate. The acorns are edible, resembling chestnuts in taste, and furnish excellent food for swine. The tree is usually twenty or twenty-five years old before it yields a gathering of cork, and attains an age of one hundred and fifty years. The first produced (virgin cork) is of little value; but it is removed in order that the next production may be better, for every successive formation is superior to that which preceded it; and it is not till the third gathering that cork of the highest quality is obtained. About every eight or ten years a crop is taken; but the improvement has been introduced of leaving the loosened cork layer for some months as a protective jacket upon the tree. The bark, after being cut into square pieces or sheets, is dried and seasoned, then boiled to flatten it, remove the tannic acid, and increase the volume and elasticity. It is then carefully sorted, and is ready for shipment.

Of all the uses to which corkwood is put, the manufacture of corks for stopping bottles, casks, etc., remains pre-eminent. For this purpose, on its arrival at the factory the cork bark is again boiled, and sorted into at least ten grades of differing quality and thickness. After sorting, the sheets of bark are cut into strips and squares, according to the length of the cork desired. Next the corks are carved out of the small square block, polished by a sandpapering machine, washed, sorted, disinfected, and counted by an ingenious machine.

Among other articles in the manufacture of which cork is increasingly used are insoles, life preservers, cigarette tips, instrument handles, polishing wheels, carburetor floats for automobiles, and insulating for pipes. Most of these articles are made in Europe. The enormous waste in the manufacture of cork articles —approximately from one-half to two-thirds of the total material —is utilized in the manufacture of such valuable by-products as linoleums, cork tiling, and other composition articles. *Spanish Black,* used by painters, is made by burning cork parings in closed vessels. The cork tree has been found to do well in some parts of the United States.

Spain and Portugal chiefly supply the world with cork. In Spain the provinces of Gerona, Barcelona and Seville give the finest and largest yields. The export trade in cork is of great value to both Spain and Portugal.

Cork, maritime county in the southwest of Munster, Ireland, lying between Waterford and Kerry. The coast is bold and rocky, and 250 miles long. The bays, which run 3 to 25 miles inland, include Youghal Harbor, Ballycottin Bay, Cork Harbor, and Kinsale Harbor. Among the islands off the coast may be noted Great Island, in Cork Harbor; Sherkin and Cape Clear Islands, and the Fastnet Rocks. In the east are numerous small groups and short mountain ranges; toward the west the mountainous character becomes clearly marked. The chief tracts of lowland are found north of the Blackwater, and along the Lee and around the city of Cork. The principal rivers are the Blackwater, flowing into Youghal Harbor; the Lee, into Cork Harbor; the Bandon, and the Ilen. The soil in the lowlands and valleys is generally very fertile, and large tracts in the higher parts afford pasture. About one-fourth of the county is under cultivation. Oats, barley, potatoes, and turnips are the principal green crops. Minerals include coal, iron, lead, copper, manganese; but they are little worked. The county contains numerous raths, besides cromlechs, barrows, caves, and stone circles. Area, 2,890 square miles. Pop. (1936) 355,957.

Cork, city and seaport, capital of County Cork, and a county in itself; 165 miles southwest of Dublin by rail. It is finely situated on the River Lee, about 11 miles from its mouth, and at the head of the magnificent estuary known as Cork Harbor (q. v.). Area, 2,266 acres. The central part occupies an island between two arms of the Lee.

The Protestant Cathedral, a handsome structure in the early French Gothic style, was completed in 1879. Three other churches call for special mention—the Roman Catholic Cathedral of St. Mary (1808); the Church of St. Anne Shandon, rendered famous by the lyric on its bells written by 'Father Prout' (d. 1866), who was buried in the churchyard; and the Father Mathew Memorial Church, in memory of the apostle of temperance in Ireland (d. 1856). A bronze statue of Father Mathew stands in the town. Here also are University College (founded as Queen's College in 1849, and rechartered in 1908); Schools of Science and Agriculture; and a fine Court House. West of the town is the Mardyke, a promenade between two arms of the Lee; and on the east is the beautiful Marina Parade. Southeast of the city is the Park, chiefly used as a race course; and on the northeast the military barracks and camp field.

Cork is the third commercial town of Ireland. The principal industries are tanning, distilling, brewing, iron founding, and the manufacture of woolen goods (tweeds and friezes) and chemical manures. The town has a large trade in butter, provisions, hides, live stock, poultry and eggs, whiskey and porter.

The city probably grew up around the monastery founded by St. Finbar in the seventh century. The Danes, after plundering the town in the ninth century, established themselves on the island in the Lee, where another town grew up. Perkin Warbeck (q. v.) was received (1492) with enthusiasm, and for this display of ardor in a hostile cause Cork suffered severely. During the Civil Wars it sided at first with Charles, but surrendered (1649) on the approach of Cromwell. Later it embraced the cause of James II, but was taken by the army of Marlborough (1690), and its walls were soon after destroyed. Pop. (1936) 80,765.

Cork, John Boyle, fifth Earl of, and fifth Earl of Orrery (1707–62); only son of the fourth Earl Orrery; remembered as the author of *Remarks on the Life and Writings of Jonathan Swift* (1751). Although he had been the friend of Swift, his estimate of the latter is disfigured throughout by prejudice and misjudgment. He was also the friend and patron of Pope and Johnson.

Cork, Richard Boyle, first Earl of (1566–1643), British statesman, known as the 'great earl,' was born in Canterbury. After leaving Cambridge he entered the Middle Temple to study law, but owing to poverty was compelled to abandon this intention, and went in 1588 to Ireland, where his career was at first somewhat checkered, as he was imprisoned several times on trumped-up charges, although he held various state offices. Here he settled down on a large estate, and with untiring energy developed the country, bringing in English Protestants, founding towns, making harbors, opening iron works, and building bridges and fortified castles. He was knighted in 1603, and made Earl of Cork in 1620. In 1631 he was appointed Lord High Treasurer of Ireland. There can be little doubt that Boyle was instrumental in bringing about the impeachment of his great rival, the Earl of Strafford, in 1641. When the rebellion broke out in Ireland (1641), Boyle raised an army at his own expense, and by skilful tactics succeeded in crushing it.

Cork and Orrery, Countess of, (Mary Monckton) (1746–1840), daughter of the first Viscount Galway and a celebrated hostess in 18th century London. First in her mother's house and later in her own as Lady Cork and Orrery, she entertained such literary and other celebrities as Dr. Johnson, Sheridan, Sir Joshua Reynolds, Edmund Burke, Horace Walpole, George Canning, Lord Castlereagh, Sydney Smith, Byron, Sir Walter Scott, Lord John Russell, and Sir Robert Peel. Both Dickens and Disraeli used her as original for characters in their fiction.

Cork Harbor, a magnificent land-locked harbor at the mouth of the River Lee, Ireland, capable of containing the whole British navy. Queenstown (Cobh), the ocean port of Cork, stands on Great Island. South of this the harbor, sometimes called Queenstown Harbor, stretches out west and east, containing Spike Island, formerly a convict station; Rocky Island, on which is a powder magazine; and Haulbowline, with large ordnance depot and royal naval dockyard. The harbor itself is about four miles long by two miles broad, and is entered from the sea by a channel two miles long and one mile wide.

After the creation of the Irish Free State in 1921 Spike Island remained under British control. By agreement in 1938 it was handed over to the government of Eire.

Corleone, kor-lā-ō'nā, town, Palermo province, Sicily; 42 miles by rail southwest of Palermo. In the vicinity are mineral springs. It was colonized by Lombards in 1237. Pop. 14,725.

Cor'liss, George Henry (1817–88), American inventor, was born in Easton, N. Y., and received an academic education. In 1844 he removed to Providence, R. I., and after patenting many important improvements in steam engines, he acquired land, incorporated a company (1856), and erected the great works at Providence. He built the enormous engine at the Centennial Exhibition of 1876 at Philadelphia, which drove all the machinery of the fair.

Corm. See Bulb.

Cormac, kôr'mak (836–908), king of Cashel, Ireland, was the son of Cuilennan, an Irish chief. His learning and piety led to his being appointed chief bishop of Leth Mogha, and in 900 he became king of Cashel, thus exercising both temporal and spiritual power over his people. Flann, the monarch of Ireland, with the kings of Leinster and Connaught, completely routed his forces (908); while he was retreating from the field his horse slipped, and Cormac was thrown and his neck broken. He is the reputed author of *Sanas Chormiac,* the earliest Irish dictionary extant.

Cormenin, kor-m'-naṅ', Louis Marie de la Haye, Vicomte de (1788–1868), French public official, was born in Paris. He studied law, but abandoned it for literature, writing some mediocre poems in honor of Napoleon. He received an appointment on the staff of the State Council (1810), and eventually became an authority on administrative law. During this time he published *Questions de Droit Administratif* (1822). He was elected in 1828 to the Chamber of Deputies. On the accession of Louis Philippe he made himself popular and famous by hurling a crowd of pamphlets against the new sovereign. The most important are: *Lettres sur la Liste civile* (1831); *Très Humbles Remonstrances de Timon* (his pseudonym, 1838); *Livre des Orateurs* (1836). He was a member of the Chamber of Deputies till 1836; was sent to the National Assembly after the Revolution of 1848; and became president of the commission for drafting a new constitution. At the accession of Napoleon III he was again appointed (1852) a member of the State Council.

Cor'morant (*Phalacrocorax*), the name given to certain large water birds belonging to the order Ciconiiformes, and the sub-order Steganopodes. They are familiar birds, frequenting islands in most parts of the world. They vary greatly in size, but have the following characters in common: The head is relatively small, and is naked

NOV 19 1940

behind the eyes and at the root of the beak. There is a dilatable membrane beneath the lower jaw; the bill is moderately long, straight, rounded above, and strongly hooked at the end. The neck is long, snake-like and naked on the throat. The wings are of moderate length; the tail is rather short and rounded, but with stiff feathers, which are used as aids in progression. The unfeathered lower leg is very short; all the toes are united in a web; the middle claw is serrated.

The numerous species live on the shores of islands, or sometimes inland by rivers—*e.g.*, the Danube—and lakes. They feed exclusively on fish, and are proverbial for their voracity. They do not dive when in flight, but from the surface of the water. When the prey is inconveniently seized for swallowing, it is often tossed in the air and adroitly recaught. The nests, rude but strong, are usually built of seaweed. The egg is bluish green, but the color is much obscured by thick incrustations of lime. Fishing with cormorants has been practised in China and Japan from time immemorial.

The common cormorant (*P. carbo*) is an almost cosmopolitan bird about 3 feet long, for the most part of a blackish green metallic color, with brownish feathers on the shoulder region. When in full breeding plumage it has a crest on the head, white plumes on the throat, and a white patch on the lower flanks. The bill and feet are black, the face yellow. The dwarf cormorant (*P. pygmæus*), from Southeast Europe, North Africa, South Asia, and the Florida Shag (*P. floridanus*) or Green Cormorant are other well known species.

Corn, or CLAVUS, a thickening of the skin due to friction and intermittent pressure. It may occur anywhere, but is commonest on the toes. If pressure and friction combined are continuous, a blister is formed; and unless the part is relieved of pressure, an ulcer instead of a corn will follow. Corns are *hard* when they occur on dry surfaces, but *soft* if they form in situations often more or less moist, such as between the toes. The hard corn begins as a general diffused thickening of the skin, often over the joint of the little toe, where there is pressure upon the skin between the shoe and the bone. The thickening increases the pressure; and at the point of the corn forms a cone-shaped thickening, pointing inward, and consisting of skin in cuplike layers, one within the other.

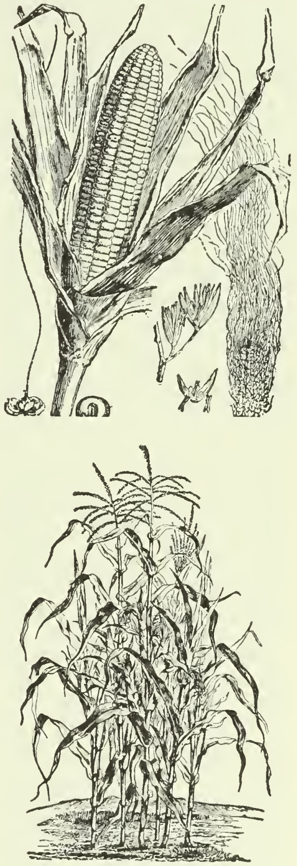
Treatment.—The corn may end in inflammation and suppuration; in that case it must be opened, and treated like any other abscess. If attended to sufficiently early, all that is necessary is to change the shoes so as to shift the pressure points. In the case of more fully developed corns, it is well to pare the hard skin carefully down, to shell out the core with a blunt-pointed instrument, and afterward to paint on a mixture of salicylic acid (30 parts), extract of cannabis indica (5 parts), and flexile collodion (240 parts) for several nights. The corn can be much more easily removed if the foot is first soaked in hot water or in a solution of bicarbonate of soda. Soft corns must be hardened by drying with a little wool between the toes, after which they may be treated as hard corns.

Corn, INDIAN CORN, or MAIZE (*Zea Mays*), specifically, a native grain of the plateau region of tropical America, which has become known throughout the world since the discovery of the Western Continent. The American colonists found it cultivated by the Indians, and called it *Indian Corn* to distinguish it from the corn of Europe, where the term is also used for wheat, rye, or barley. The natives of the West Indies called it *mahiz*, from which is derived the word *maize*, by which the grain is commonly known throughout the Old World. Columbus is believed to have introduced it into Spain on his return from America; and from Spain it was gradually carried to the other countries of Europe, and to Asia and Africa. At the present day, corn is grown on the Western Continent from Canada to the Argentine Republic, and in parts of Europe, Asia, Africa, and Australasia.

Corn is an annual, and with other common cereals belongs botanically to the order Gramineæ, or the Grasses (q.v.). In structure it is distinguished from the other common grain crops by its larger growth, by the location of its male and female flowers, and by its pithy or solid stems, stocks, or stalks. In height the plant varies from 2 to 15 feet or more, according to the type and variety. The length of the ears of corn varies from 1 to 15 inches, and an ordinary plant bears from 12 to 15 leaves. The tassel at the summit of the stalk contains the male flowers. This forms the loose, dry pollen which is scattered by the wind to other plants, and by which fertilization is effected. The female flowers are located on the side of the stalk in the axils of the leaves, and form the ear. The female flower consists of the carpel, or rudimentary kernel, and the style, or silk, which protrudes from the husk. The roots are fibrous, and extend in all directions. The larger proportion of them are from 4 to 12 inches beneath the surface of the soil. The aerial roots, or those starting from the stalk above ground and developing during late growth, are largely for the purpose of bracing the plant.

The corn kernel is made up principally of starch, the white and mealy portions consisting mainly of this substance; while the hard and flinty parts contain most of the protein, and the germ most of the oil. The starch content is about 60 to 65 per cent., the protein content approximately 9 per cent., and the oil content 4 to 5 per cent. Well-dried corn in the crib contains from 10 to 12 per cent. of water in the kernel, but in the cob the moisture content sometimes reaches 20 per cent. or more. The stalk contains a little oil, from 3 to 4 per cent. of protein, and over 50 per cent. of carbohydrates, of which two-fifths is crude fibre. The water in the dry stalks from the field amounts to almost 40 per cent.

There are six types of corn



Corn

generally cultivated for grain—namely, Pod, Pop, Flint, Dent, Soft or Flour, and Sweet or Sugar corn. *Pod corn* is considered to be the primitive form of the plant, in which each kernel is enclosed in a pod of husk. *Popcorn* is characterized by its hard, flinty kernels, which pop or burst open when heated. *Flint corn,* the type grown by the aborigines, has a kernel with an outer hard and flinty portion surrounding a mealy, starchy interior. In *dent corn,* the most important type, the starchy portion extends to the summit of the kernel, and as it dries and shrinks a depression or dent is formed in the top of the grain. Dent and flint corn are of equal value for feeding. The entire interior of the kernel in *soft corn* is mealy and white. The kernels of *sweet corn* are translucent and horny in appearance, usually wrinkled; this type is eaten in the green state, as well as dried or canned. The following are well known varieties of the above types: Dwarf Golden and Rice popcorn, King Philip and Longfellow flint corn, Reid Yellow, Leaming, and Boone County White dent corn, Cuzco soft corn, and Early Boston Market and Stowell Evergreen sweet corn.

Corn Cultivation.—In the growing of corn, the land is ploughed about 8 inches deep and harrowed to make a uniform seed bed. The crop is planted in hills or check rows, and in drills. In hill planting the rows are 3½ to 4 feet apart each way, and when the stand is perfect each hill contains 3 stalks. In drilled rows single plants are 12 to 14 inches apart, and cultivation is possible only in one direction. *Listing* corn consists in planting the seed in the bottom of open furrows which alternate with ridges over the entire field. The planting is done when the soil is sufficiently warm and moist, usually in May. The depth of planting ranges from 1 to 4 inches, according to temperature and moisture conditions. The corn planter is used for check rowing and drilling, and the lister for listing corn.

After planting the field is harrowed to prevent the growth of weeds and to keep the surface soil loose and open. As soon as the rows are clearly visible this work is continued with the cultivator, from 3 to 5 cultivations about 3 inches deep being given. Different varieties of corn require from a month or six weeks to seven months to reach their full development.

When the crop is grown for the grain, only the mature ears are harvested after the plant has dried. This is generally done in October and November. A crop intended for fodder or silage is cut when the ears begin to harden, which takes place early in the fall. Ear corn is stored in well-ventilated cribs, and corn cut for fodder is left in the shock until fed or until it is dry enough for storing under cover. The fodder is now frequently shredded, or entirely cut up with the corn shredder, before feeding or storing. In making silage the undried plant is cut into small pieces and stored in the silo (q. v.).

Among the staple crops raised, corn demands better land and farming than any of the others. It thrives best on a medium loam soil, rich in humus, and having good natural drainage. The soil may be enriched with barnyard manure or by ploughing under clover or cowpeas. Commercial fertilizers (see FERTILIZERS) are also used to good advantage. In the rotation of crops for the increased yield of the land, corn usually follows wheat or oats, but it also does well on grass or clover sod (see ROTATION OF CROPS).

The corn plant is principally used as a food and feeding stuff (see FEEDING STUFFS) in the raising of hogs, cattle, and sheep for market—one of the most important industries dependent on the cornfields. Corn is extensively employed in the making of cereal breakfast foods, which are consumed in large and increasing quantities in the United States and elsewhere. It holds high rank as a food for man, is assimilable, palatable, and wholesome. It is also used in the manufacture of starch, glucose, whiskey, paper, varnish, guncotton, and other articles. The corn cob is utilized as fuel and in the making of tobacco pipes.

Diseases.—The most common are smut (q. v.), rust (see RUST FUNGI), and ear rot. The most troublesome insects include the chinch-bug (q. v.), wireworm (q. v.), cutworm (q. v.), root worm, bollworm, corn maggot, and cornstalk borer. These, as well as the common weeds of the cornfield—foxtail, smartweed, corn cockle, and the bindweeds—are most successfully combated by careful cultivation and a proper rotation of crops. The ground squirrel, which feeds on the planted seed, is a destructive enemy.

The annual corn crop of the world ranges from 4 to 4½ billion bushels, three-fourths of which is grown in the United States, where it exceeds in value that of wheat and cotton combined. The Argentine Republic holds second place and Roumania third.

The leading corn-growing States in the United States are Iowa, Illinois, Missouri, Indiana, Minnesota, Ohio, Nebraska, Texas, Kentucky, Kansas, South Dakota and Wisconsin.

See CORN CLUBS. Consult the *Bulletins* of the U. S. Department of Agriculture, and of the State Experiment Stations, especially Illinois and Iowa.

Cornaro, kör-nä'rō, CATERINA (1454–1510), wife of the king of Cyprus, was born in Venice. She married James II, king of Cyprus, and after his death (1473) ruled the island until forced to abdicate (1489) in favor of the republic. She then formed (until 1510) a brilliant court, chiefly of savants and artists, at Castle Asolo, near Treviso, on an estate which the Venetian senate had given her. Her portrait has been painted by many famous artists, among them Paul Veronese and Titian.

Cornaro, LUIGI (1467–1566), Venetian dietitian, was born in Padua. At the age of forty, his health having been ruined by excesses, he began a strict regimen, in which he confined himself to twelve ounces of solid food and fourteen ounces of wine a day. His health rapidly improved, and he kept up his regimen until he died, almost a centenarian. He wrote a treatise, *Discorsi della vita sobria,* in praise of a temperate life, which has been translated into many European languages.

Corn Belt, the name given to that region of the United States where Indian corn is the principal crop. Corn is grown in nearly every State but most is grown in this region comprising western Ohio, Indiana, Illinois, Iowa, southern Minnesota, eastern Nebraska, southeastern South Dakota, northern Missouri, and northeastern Kansas. Deep soil, abundant rain, and hot nights characterize the Belt as favorable to corn culture.

Cornbrash, a thin series of rough, rubbly, impure fossiliferous limestones which readily break up and yield a coarse but fertile soil, adapted to the growth of corn. The geologist William Smith applied this name to a group of limestones in the Lower Oölite rocks of England.

Cornbury, EDWARD HYDE, LORD, third Earl of Clarendon (1661–1723), colonial governor, was the grandson of Charles II's lord chancellor, and thus was own cousin to Queen Anne. After serving as a member of Parliament from 1685 to 1701, he was appointed governor of the province of New York by William III. He arrived in New York in May, 1702, and the same year was also made governor of

NOV [illegible]

the province of New Jersey. Soon after his arrival he visited Albany, and, with Major Peter Schuyler's assistance, concluded a treaty with the Iroquois Confederacy, which insured the neutrality of the Five Nations until 1713. His administration was marked by personal dissipation, incapacity, bigotry, and avarice to such an extent that formal complaints were made by the colonial legislators to the lords of trade in England, and he was removed from office in 1708. His debts having accumulated, he was thrown into prison in New York; but on the death (1709) of his father, whom he succeeded as third Earl of Clarendon, he was able to pay his debts and return to England. He became a privy councillor in 1711, and envoy extraordinary to Holland in 1714.

Corn Clubs, associations for the promotion of improving methods of corn cultivation. The first corn club in the United States was established in the Middle West about the year 1900. The idea spread rapidly, and district, county, and State clubs became numerous throughout the Middle West. These clubs were usually organized under the auspices of the State colleges of agriculture, and patterned after the junior naturalist clubs organized by John Spencer of the New York State College of Agriculture. The first clubs were for boys between the ages of ten and fifteen. The national organization was formed in 1907, in Mississippi, under the direction of W. H. Smith. The corn club idea has spread over the United States, and the scope of the work has broadened to include garden, cotton, potato, poultry, canning, bread, sewing, and cooking clubs. Wholesome recreational activities also form a part of the programme.

Corn Cockle, or COCKLE (*Lychnis Githago*, *Agrostemma Githago*, or *Githago segetum*), a common and troublesome weed, belonging to the order Caryophyllaceæ. It may be distinguished by its tough, leaf-like sepals; its large, undivided petals, shorter than the sepals; its hairy stem, and its capsule opening into five teeth. It is common among grain fields, and is now found in cereal crops in almost all parts of the world. Its tall, graceful habit and large lilac-purple flowers make it one of the most beautiful of corn weeds. Its seeds are poisonous, especially to fowls and domestic animals, and thus the undesirability of its presence in crops is increased.

Corncrake, or LAND RAIL (*Crex pratensis*), a European rail (q.v.), especially familiar in Great Britain. The bird is about ten inches in length, and varies from brownish yellow to brown and buff in color. The bill is shorter than the head, and slightly bent; the tail is very short; the legs long and powerful. The harsh cry or call note of the male is generally heard incessantly at night. Unlike the nearly related water rails, the corncrake frequents dry corn and hay fields. It can, however, swim well on occasion.

Cornea, kôr'nē-*a*, the tough, transparent portion of the anterior segment of the eyeball (see EYE). The most common disease of the cornea is inflammation, known as *keratitis*. Ulceration of the cornea is also common, and is sometimes succeeded by *staphyloma*, or bulging of part of the cornea.

Corneille, kor-nā'y', PIERRE (1606–84), French dramatic poet, was born in Rouen. He was trained for the bar, and for some time tried with but slight success to obtain a practice in his birthplace. In 1629 he removed to Paris, where his first play, *Mélite*, was acted in 1629. It was followed by *Clitandre*, *La veuve*, *La galerie du palais*, *La suivante*, *La place royale*, and he became one of Richelieu's 'five poets,' who aided the Cardinal in the composition of dramas (1634). Each of the five wrote an act, which was then criticised, altered, and paid for by their employer; among the pieces thus produced being *Les tuileries*, *L'aveugle de Smyrne*, and *La grande pastorale*. Corneille, however, was too independent to retain Richelieu's favor, and his dismissal followed on his proposing to alter a plot of the Cardinal's devising.

Corneille's first tragedy, *Médée* (1635), according to Voltaire, contains the germ of the beauties of his mature dramas. The first of these was *Le Cid*, acted in the winter of 1636–7. Its success was complete, and indirectly had great importance in the future development of the French drama. The story of the play was taken from *Las Mocedades del Cid*, a Spanish work by Guillem de Castro, but Corneille's treatment of the subject was thoroughly original. The graceful and heroic figures of the lovers, Rodrigue and Chimène, the nobility of the sentiments, the power and harmony of the verse, justify the enthusiasm which the play excited. Richelieu, who was jealous of Corneille's success, set the newly founded Academy to pass judgment. The result was the *Sentiments de l'Académie sur le Cid* (1638), which condemned its irregularities with regard to the three unities and other dramatic canons, but acknowledged its beauties.

The *Cid* was followed in 1639 by *Horace*, a play founded on the story of the Horatii and Curiatii as told by Livy, and containing, in the *tirade* spoken before her death by Camilla, the most magnificent burst of invective in the French classical drama. *Cinna* appeared in 1639; *Polyeucte*, one of Corneille's noblest tragedies, in 1640; and *La mort de Pompée*, a tragedy founded on Lucan, in 1641. *Le menteur*, which was produced in 1642, entitles Corneille to be called the father of French comedy as well as of French tragedy. The character of Dorante, the liar, is drawn with admirable humor and insight, and the style, at once easy, graceful, and pointed, reaches a level of excellence which Molière did not surpass in his earlier works. *Théodore* was brought out in 1645, and *Rodogune*, perhaps the most impressive and thrilling of Corneille's tragedies, in 1646. Between 1647—when he was made an Academician—and 1653 Corneille produced *Héraclius*, *Don Sancho d'Aragon* (an imitation of Lope de Vega's *Palacio Confuso*), *Andromède*, *Nicomède*, and *Pertharite*. These writings show a decline in dramatic and poetic power. After the failure of *Pertharite*, in 1653, he occupied himself with making a verse translation of the *Imitatio Christi*, which contains passages of great beauty.

Corneille returned to the drama, however, in 1659 with *Œdipe*, which was well received. It was followed by *La toison d'or*, *Sextorius*, *Sophonisbe*, *Othon*, *Agésilas*, *Attila*, and *Tite et Bérénice* (1670). In 1671 he joined Molière and Quinault in writing the opera of *Psyché*, and the loveliest verses which he ever penned are to be found in the scene between Psyche and Cupid (act iii. scene 3). His last works were *Pulchérie* (1672) and *Suréna* (1674).

The dramas of Corneille are in a unique degree the representation of heroism, whether in sentiment or conduct. His tragedy has been well called the triumph of will over the obstacles which oppose it. His heroes are not the creatures of circumstances nor the puppets of fortune, but work out their own destiny by sheer force of character. As a result, there is wanting the direct and varied representation of nature which characterizes the romantic drama. He excels in the grandeur of his morality, in the eloquence and passion of certain scenes and speeches, in the splendid flashes of poetry with which he illumines the pale world of classic tragedy, and in the power and music of his verse.

The best editions of Corneille's works are by Marty-Laveaux and Lefèvre. *Le Cid*, *Horace*, and *Polyeucte* have been translated into English blank verse by Nokes, and the same three, with *Cinna*, into English prose by Mongan and McRae. For a bibliography consult Picot's *Bibliographie Cornélienne.* Consult also Guizot's *Corneille et son temps* (Eng. trans.); Taschereau's *Histoire de P. Corneille;* Sainte-Beuve's *Portraits littéraires;* Brunetière's *Epoques du théâtre français;* books on Corneille by Bouquet, Lemaître, Faguet, and Lanson; De Vigny's *Fragments sur Pierre et Thomas Corneille.*

Corneille, THOMAS (1625–1709), French dramatist, younger brother of Pierre Corneille (q.v.), was born in Rouen. He wrote altogether about forty dramas. Like his famous brother he began with comedies, modelled chiefly on the Spanish, his first piece being *Les engagements du hasard* (1647); but he is at his best in his tragedies, the chief of which are *Timocrate* (1656), *Bérénice* (1657), *Stilicon* (1660), *Camma* (1661), *Maximien* (1662), *Laodice* (1668), *La mort d'Anibal* (1669), *Ariane* (1672), and *Le comte d' Essex* (1678). He had not the strength and individuality of his brother, but he was acknowledged to have greater facility, and in 1685 became his successor in the Academy. Thereafter he produced a verse translation of Ovid's *Metamorphoses* (completed 1697), and a *Dictionnaire universel* (1778); and collaborated with Visé on the *Mercure galant.* Consult Reynier's *Thomas Corneille;* De Vigny's *Fragments sur Pierre et Thomas Corneille.*

Cor'nel, or CORNELIAN CHERRY (*Cornus mas*), the *Cornius* of the ancients, a shrub of the order Cornaceæ, is a native of the middle and south of Europe, and of a great part of Asia. It has oval leaves, and small yellow heads of flowers, which appear before the leaves in spring. The fruit is oblong, shining, red, or rarely yellow or white. It is late in ripening; but when perfectly mellow has an agreeable acid taste. It is made into a preserve, or gathered unripe and pickled like olives. It was formerly fermented for a beverage. In Turkey it is used in making sherbet.

The *Dwarf Cornel*, or Bunchberry (*C. canadensis*), is an American shrub; its fruit has no edible value.

Corne'lia, the mother of the Roman tribunes Tiberius and Gaius Gracchus. She was the daughter of the elder Scipio Africanus and on the death of her husband devoted her life to the care and education of her children. The Roman people erected a statue to her with the inscription: *To Cornelia, the Mother of the Gracchi.* There are two famous sculptures of her, one by Cavelier, the other by Clesinger, both exhibited at the Paris Salon in 1861. The name was also borne by the wife of P. Crassus, son of the triumvir, and afterward of Pompey the Great and by several other women prominent in Roman history.

Cornelia Gens, one of the oldest and most distinguished clans of ancient Rome. It embraced an aristocratic clan, its four principal branches being Lentulus, Maluginensis, Rufinus, and Scipio, and a plebeian clan, the most important branch of which was that of Cinna. To this last belonged Tacitus the historian, Celsus the physician, Cornelius Nepos the biographer, and others. The same clan also gave to Rome Cornelius Dolabella, Balbus, Mammula, and Sulla.

Cornelian. See CARNELIAN.

Corne'lius, according to Acts x. 1 *f.*, a centurion in the Italian cohort stationed at Cæsarea, whose Christian baptism is usually regarded as the first step in the admission of the Gentiles into the Church. But this view cannot be considered as certain, since Philip's baptism of the Ethiopian eunuch is narrated (Acts viii. 38), and may have occurred previously; and since, further, Cornelius seems to have been already a 'proselyte of the gate,' and can therefore hardly be reckoned a pagan at all. Without doubt, however, his baptism indicates a considerable relaxation of the Jewish exclusiveness that hampered for a time the early Christian Church. According to later traditions, Cornelius founded a church at Cæsarea, and became bishop of Scamandros (Scamandria?).

Cornelius, kôr-nā'lē-o͞os, PETER (1824–74), German musical composer, nephew of Peter von Cornelius (q.v.), was born in Mainz. Going to Weimar (1853), he formed friendships with Liszt and others, the founders of the New-German school, under whose influence he became an ardent disciple of Wagner. He became professor of harmony at the Munich conservatory in 1864. He composed three operas—*The Barber of Bagdad* (1859), *The Cid* (1865), and *Gunlöd*, an unfinished work; and he is well known as a composer of songs, his *Trauer und Trost* cycles, *Weihnachtslieder*, and *Trauerchöre* being worthy of note. His *Barber of Bagdad* has been produced in the United States under the direction of Anton Seidl. His *Literarische Werke* were published in 1906.

Cornelius, PETER VON (1783–1867), German painter, was born in Düsseldorf. In boyhood he showed a strong taste for literature, though he devoted himself to drawing from the antique. Commissioned when nineteen to decorate the old church at Neuss, he thereafter produced his illustrations for Faust, and going to Rome joined the brotherhood of painters under Overbeck, who were decorating the Casa Bartoldi. In 1819 he was appointed director of the academy at Düsseldorf, and at the same time was called to Munich to execute the colossal frescoes in the Glyptothek for the king of Bavaria. For him also he decorated two large halls—'The Hall of the Heroes' and 'The Hall of the Gods'—with frescoes based on heathen mythology inspired by the antique. In the Pinakothek he completed a series of designs to illustrate the history of painting, and also painted some large frescoes in the Ludwig church. In 1826 he was appointed director of the academy at Munich, and was ennobled, and in 1841 Frederick William of Prussia commissioned him to design the decorations for the royal mausoleum.

Cornelius drew his subjects from the Bible, mythology, Goethe, Dante, and the German minnesingers, his *Last Judgment* (in the Ludwig church) being perhaps the most colossal fresco ever executed. His conceptions were heroic—each fresco is a treatise; but his figures are mighty shadows, imitations of Raphael and Michelangelo. The elongation of the figures to give grandeur has an unpleasant effect; the color is crude, the chiaroscuro harsh, the drawing hard. On the other hand his cartoons were masterly in design and execution. The technicalities of painting as an art did not concern him, and he believed 'the brush has become the ruin of modern art.' His influence, potent in his lifetime, has therefore declined, except for the fact that he was the founder of the Munich school. Most of his work at Munich has been engraved by the best German engravers. Consult his *Life*, in German, by Förster, by Riegel, and by Von Wolzogen.

Cornelius Nepos. See NEPOS.

Cornell', ALONZO BARTON (1832–1904), American political leader, was born in Ithaca, N. Y., the son of Ezra Cornell (q.v.). He was educated at the Ithaca Academy, and starting as an operator, became prominent in the affairs of the Western Union Telegraph Company, of which he was director (1868–99) and acting president (1875). In State politics he was a leader of the Stalwart faction of the Republican Party. He was surveyor of customs at the port of New York (1869–72), being removed by President Hayes for alleged violation of his order that office holders should refrain from politics; member of the State

NOV

assembly (three times speaker); naval officer of the port of New York (1876–8); and governor of New York State (1880–2).

Cornell, Ezra (1807–74), American capitalist and philanthropist, was born in Westchester County, N. Y. After a brief schooling he became successively a teacher, a potter, a carpenter, and a mechanic. In 1826 he removed to Ithaca, where he had charge of a flour mill. In 1842 he became interested in the project to construct a telegraph line from Baltimore to Washington; invented devices for improving methods of wiring; and was placed in charge of the work, and some years later he became one of the founders of the Western Union Telegraph Company, and amassed a large fortune. He was a member of the first National Republican Convention (1856); president of the State Agricultural Society (1862); and member of the State assembly (1862–3) and senate (1864–7). In 1862, when the Morrill Land Grant Act assigned 990,000 acres of land to New York, Cornell persuaded the legislature to devote the proceeds to the endowment of a great educational institution at Ithaca; and he endowed the new institution with $500,000 (see Cornell University).

Cornell College, a co-educational institution in Mount Vernon, Ia., founded in 1853 as the Iowa Conference Seminary, and rechartered under the present title in 1857. It is under the patronage of the Methodist Church, but is nonsectarian. It comprises the College, with the usual four-year courses leading to the degree of A.B., and a Conservatory of Music, with four-year courses leading to the degree of Bachelor of Music and Bachelor of School Music. It has a campus of 60 acres, 17 buildings, a library of 58,000 volumes.

Cornell University, a privately endowed, non-sectarian co-educational institution of higher education, situated at Ithaca, New York. It was founded in 1865 by Ezra Cornell (q. v.) upon the Morrill Act of 1862 by which the Federal government apportioned public lands to the several States for the endowment in each State of at least one college where the leading object should be 'to teach such branches of learning as are related to agriculture and the mechanic arts.' The State of New York incorporated Cornell University and devoted its portion of the land-grant, 989,920 acres, to the university's endowment; the charter, granted on April 27, 1865, provided that, in addition to the branches of learning specified by the Morrill Act, 'such other branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the university as the trustees may deem useful and proper.'

The university comprises the graduate school; the college of arts and sciences; the law school (graduate); the medical college (graduate), founded in 1898 by Oliver H. Payne and situated in New York City; the college of engineering, comprising the school of civil engineering, the Sibley school of mechanical engineering, the school of electrical engineering and the school of chemical engineering; architecture, which offers courses leading to degrees in architecture, landscape architecture, and fine arts; and a group of four State institutions, *viz.*, the college of agriculture, the agricultural experiment station at Geneva, the veterinary college, and the college of home economics, which, although maintained by the State, are administered by the trustees as units of the University.

There are 359 acres in the campus and 1,170 acres in experimental farms; the university owns also the Arnot Forest, 1,800 acres of woodland 15 miles from Ithaca, used for research and instruction in forestry. Ezra Cornell's gifts included $500,000 and 200 acres of land, but his greatest benefaction was the product of his purchase and management of the bulk of New York's share of the Federal land-grant. He bought scrip representing 913,920 acres at the market price of 60 cents an acre under an agreement with the State binding him to sell and devote all the profits of the sale to the university, but providing that the separate fund thus created should be exempt from the restrictions of the Morrill Act. He located western lands from the sale of which the university's endowment was eventually increased by about $5,000,000.

Andrew D. White (q. v.), the first president, who had been Cornell's chief adviser and ally during a long legislative debate over the disposition of the land-grant, was the author of the university's educational scheme; he based it upon principles which seemed revolutionary to many educators at that time but which have become typical of American universities today. It called for thorough education in special departments—agriculture, the mechanic arts, civil engineering, commerce and trade, mining, medicine and surgery, law, education, and history and political and social science—and for freedom of choice of studies, even among modern languages and the sciences in the pursuit of a general education.

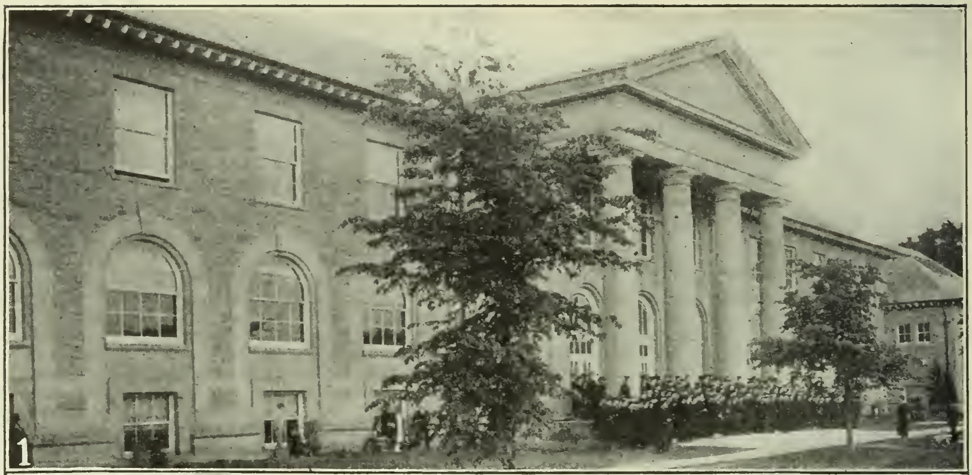
The university libraries, including the general library and college and department libraries, comprise about 1,036,000 volumes. In the general library building, given with an endowment of $300,000 by Henry W. Sage in 1891, there are many special collections, notably the Dante, Petrarch, Rhæto-Romanic, and Icelandic libraries collected and given to the university with an endowment of $500,000, by Willard Fiske, and the President White historical collection. The law library, 90,000 volumes, includes complete collections of the reports of the American Federal and State jurisdictions.

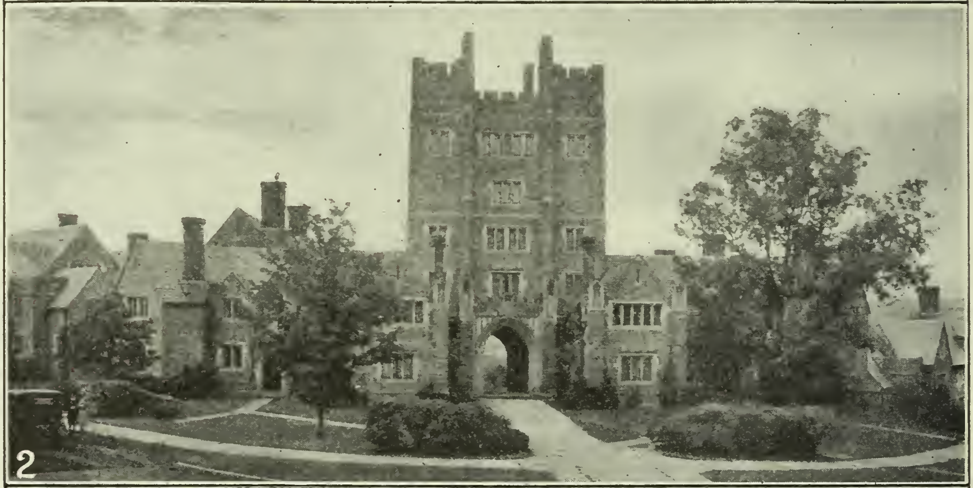
The college of arts and sciences occupies Goldwin Smith Hall, built in 1906 and named for the university's first professor of English history, who, on his death in 1910, gave the university a legacy of $683,000; in other buildings the college has extensive laboratories, including the laboratory of experimental psychology in Morrill Hall; the laboratory of physics, provided in 1906 by a gift of John D. Rockefeller, and the laboratory of chemistry (1923), for the building and equipment of which George Fisher Baker gave $1,800,000.

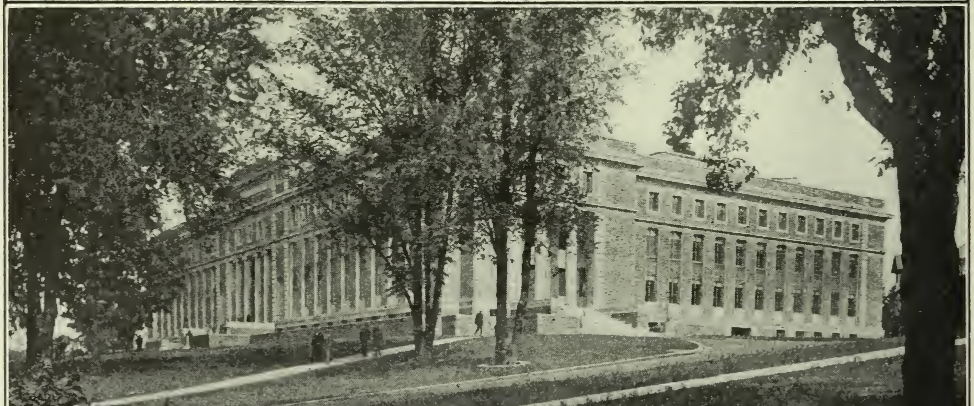
Generous gifts of Hiram Sibley and his son Hiram W. Sibley of Rochester, N. Y., established the foundations of the college of engineering, which occupies seven large buildings devoted to instruction and investigation and also the Fuertes astronomical observatory and a hydraulic laboratory. The college of architecture is housed in White and Franklin Halls. Myron Taylor Hall, built in 1931 and named for the donor, is devoted to the work of the law school.

For the group of State colleges the government of New York has provided buildings and equipment costing more than $3,000,000. They devote a large part of their resources to scientific investigation, and they maintain departments of extension through which, by means of bulletins, home-study courses, demonstrations and public meetings, they serve agricultural enterprise and rural education and other interests throughout the state.

From Colonel Payne, its founder, the medical college received an endowment of $5,000,000 and a building at First Avenue and 27th and 28th Streets, opposite Bellevue Hospital, in New York City, which the college occupied until 1932.







© *J. P. Troy*

CORNELL UNIVERSITY

1. Goldwin Smith Hall, College of Arts and Sciences. 2. Baker Tower, entrance to Dormitories.
3. George F. Baker Laboratory of Chemistry.

NOV 19 1940

In 1927 the college was permanently affiliated with New York Hospital, and the New York Hospital-Cornell Medical College Association now occupies a group of buildings completed in 1932 at 1300 York Avenue, along the East River between 68th and 71st Streets; the General Education Board contributed $7,500,000 toward this project, and large legacies to the hospital and the college for the same purpose were given by the will of Payne Whitney.

Sage Chapel was built by Henry W. Sage in 1874 and was endowed by his son Dean Sage; in 1897 Dean Sage and his brother William H. Sage gave and endowed an infirmary; Barnes Hall was built in 1888 for the Cornell University Christian Association; Willard Straight Hall was built by Mrs. Leonard Elmhirst in 1925 as a social center for students and faculty.

Fifty-five acres of the campus are devoted to playgrounds. Physical training, which for the men takes the form of military training, is required of all freshmen and sophomores; all students are expected to report to the university medical adviser for consultation or examination at least once a year. Considerable areas have been set apart for residence halls for students and a number of the halls are built or under construction.

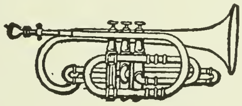
The university is governed by a board of trustees which includes fifteen persons coöpted, ten elected by the alumni, and five appointed by the governor; the president of the university and the governor and several other State officers are members *ex officio*. The university faculty elects three delegates who sit with the board but do not vote.

The presidents of the university have been Andrew Dickson White, 1866–85; Charles Kendall Adams, 1885–92; Jacob Gould Schurman, 1892–1920; Livingston Farrand, 1921–37, and Edmund Ezra Day, inaugurated in 1937.

Cor'ner, a term used in the commercial world to designate a monopoly of the supply of marketable goods or stocks, usually for future delivery, with the purpose of increasing prices unduly and benefiting the buyers. Products such as cotton and wheat may be contracted for in advance and if the supply or crop fail of realization, or if many traders follow the same course, a 'corner' is created, and is effective when sellers are forced to buy from the pool at its own prices because of a shortage of supply. Corners are 'broken' when those who have agreed to deliver the products or stocks are able to obtain them elsewhere, or when the supply is plentiful.

Where there is a definite issue of stocks or certificates, the prices may be raised to such a point that the sellers refuse to fulfil their contracts, and there ceases to be a demand—therefore no market. The practice of marginal dealing—that is, the buyer or seller depositing with a broker a certain percentage of the face value of the deal—carries with it the possibility of a corner. To 'squeeze the shorts' is another phase of a corner in which rival combinations operate in the same stocks, and the sellers are forced to pay high prices for the stock to be resold to their buyers. Sometimes a corner has practically resulted from rival combinations seeking to control the same stocks as a permanent investment, which occurred in 1901 in connection with the Northern Pacific Railroad.

Probably the most famous instance of a corner in the financial history of the United States culminated on Friday, Sept. 24, 1869, known as 'Black Friday,' in the crisis of the conspiracy of Jay Gould and James Fisk, Jr. (qq. v.), to corner the gold supply. The Secretary of the Treasury came to the rescue of the sellers of gold by releasing a supply from the U. S. treasury. Other famous corners were the wheat corner of Joseph Leiter in 1897–8, and the corner in cotton manipulated by James A. Patten of Chicago in 1909. In the latter case the U. S. Supreme Court handed down an important decision on Jan. 6, 1913. It declared that a corner in any commodity that enters into general use, or is transported in interstate commerce, amounts to a restraint of trade, and is a criminal offense under the Sherman Anti-Trust Law. See TRUSTS.



Cornet

Cornet, kôr'net *or* kor-net', a treble wind instrument made of brass, of comparatively recent origin, and formerly called a *cornopean*. It is played with a cupped mouthpiece, and possesses a quality of tone which comes between those of the trumpet and the bugle, the size of its tube being intermediate to those used for these instruments. The cornet has for open notes the harmonic sounds C (below the treble stave), and in ascending order, G, C, E, G, B♭, C. Four higher notes, D, E, F, G, also a fundamental note C (an octave below the first C given above) can be sounded, but are seldom used. The intermediate intervals are produced by means of three slides, which lengthen the tube, to give sounds from a semitone to three tones lower, the slides being used either singly or in combination. Three pistons —depressed at will by the fingers of the performer—control the mechanism which admits air to the slides, the first of which lowers the pitch a tone; the second, a semitone; and the third, three semitones. Pieces of tube of different lengths, called crooks, when placed between the mouthpiece and the instrument, produce corresponding alterations in the pitch. Formerly quite a number of pitches were in use, but now the cornet is usually played only in B♭ and A.

Cornet, the lowest rank of commissioned officer in the British cavalry until 1871, when the term was replaced by that of sub-lieutenant.

Corneto Tarquinia, town and episcopal see, Italy, in the province of Rome, 63 miles by rail northwest of Rome. It is famous for the Etruscan antiquities discovered at the adjacent *Tarquinii*, one of the chief cities of the ancient Etruscans. The town has a cathedral, several old churches and palaces, and has manufactures of matches and pottery. At Tarquinii there still remains a large Etruscan necropolis. Pop. 7,000.

Cornflower, or BLUEBOTTLE (*Centaurea cyanus*), a well-known weed in cornfields, belongs to the genus Compositæ (q. v.). In the United States it is known by many other names, of which the commonest is Bachelor's Button. It has slender, branched stems, from 1 to 2½ feet high, and is universally known and admired for the beauty of its wreath-like circle of outer barren florets, and the splendid deep azure of their hue. The cornflower is one of the most popular annuals in American gardens.

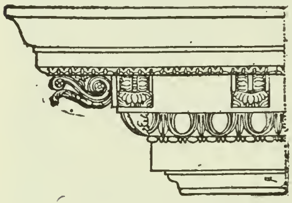
Cornhill, a thoroughfare of London, England, situated between the Poultry and Leadenhall Street. According to Stow, it was 'so called of a corn market time out of mind there holden.' It was also a place for the punishment of malefactors, having a prison, stocks, and pillories.

Cornhill is also a short but well-known street in Boston, Mass.

Cornhill Magazine, a London periodical founded in 1860, whose first editor was William M. Thackeray. In its earlier numbers, which reached a sale of

120,000 copies, appeared George Eliot's *Romola,* in company with Thackeray's *Roundabout Papers,* and a serial by Anthony Trollope. Thackeray retired in 1862, and among succeeding editors were Frederick Greenwood (associated with George Henry Lewes), Dutton Cook, Leslie Stephen, and James Payn. The list of contributors included the names of many famous writers. The *Cornhill* ceased publication with the December, 1939 issue. Lord Gorell was the last editor.

Cor'nice, in architecture, the series of mouldings crowning the upper subdivision of any structure, of any order, or of any secondary member of an order.



Corinthian Cornice

In Greek Doric the crowning portion is a single convex moulding. The supporting part also is small, being composed of narrow slabs called *mutules,* the origin of which is supposed to have been found in the primitive timber roof. These support the middle or projecting part, which, like all cornices, presents a plain face, upright, of considerable height, called the *corona.* The Ionic and Corinthian orders resemble each other in many features. In the cornice of both there are more members than in the Doric, and the decorations are richer. Several mouldings, which are carved, fortify the supporting portion. The *cyma recta,* or crowning member of the Ionic, is usually less vigorous but more refined than the *ovolo* of the Doric. It is richly carved, a feature also of the Corinthian. In Early Gothic the small arches become ornamental—taking the form of trefoils with molded edges. The decorated and perpendicular cornices are chiefly horizontal mouldings.

The term cornice is also applied to the plaster mouldings around the ceiling of rooms at its junction with the walls.

Cornif'erous Period, in geology, the name given in North America to the middle division of Devonian time. It embraces the Corniferous epoch and the Schoharie epoch and is now generally known as Onondaga (mainly limestone).

Cornigliano-Ligure, kôr-nē'lyä-nō-lē-goor'*e,* commune, Italy; 3 miles west of Genoa, of which it is a suburb. The manufactures include cotton spinning and dyeing.

Corning, city, Iowa, county seat of Adams County, on the Chicago, Burlington, and Quincy Railroad; 75 miles S.E. of Council Bluffs. Agriculture and stock raising are the leading industries. Pop. (1930) 2,026); (1940) 2,160.

Corning, city, New York, county seat of Steuben county, on the Chemung River, and the New York Central, the Erie, and the Delaware, Lackawanna and Western Railroads; 15 miles N. W. of Elmira. Its public buildings include the City Hall, Court House, Public Library, Hospital, Free Academy, and St. Mary's Orphan Asylum. Manufactures include lumber, brick, terra cotta, and glass, railway supplies, and pneumatic drills and air compressors. Pop. (1930) 15,777.

Corning, Erastus (1794–1872), American capitalist, was born in Norwich, Conn. From a clerk in a hardware store he became a great railroad magnate, an owner of extensive iron works, and a man of wide influence in the banking world. He was instrumental in forming the New York Central Railroad system, of which he was president (1853–65). He was a Member of Congress in 1857–9 and 1861–3; and although a Democrat, supported President Lincoln during the Civil War.

Corning, James Leonard (1855–1923), American neurologist, was born in Stamford, Conn., and was educated at Heidelberg and Würzburg (M.D. 1878). His discoveries include the application of spinal anæsthesia, and the prolonged effect of stimulants and sedatives upon patients resting in compressed air; and he introduced the practice of injecting liquid paraffin into the tissues. He was connected with several hospitals, and was a member of the New York Academy of Medicine and other medical societies. His published works include *Carotid Compression* (1882); *Brain Rest* (1883); *Brain Exhaustion* (1884); *Local Anæsthesia* (1886); *Hysteria and Epilepsy* (1888); *Treatise on Headache and Neuralgia* (1888); *Pain in Its Neuro-Pathological and Neuro-Therapeutic Relations* (1894); *Musical Memory and Its Derangements* (1912).

Corn Laws, an important series of enactments in Great Britain, by which the importation, and in some cases the exportation, of grain were sought to be regulated. The first English law dealing with the importation of corn, in the way of restriction, was passed in 1463, by which it was forbidden to import corn when the home price was less than 6s. 8d. a quarter. Various enactments were passed in the reigns of Henry VII, Elizabeth, and the early Stuarts; but the real beginning of the modern system of corn laws dates from the sliding scale imposed in the reign of Charles II (1670), by which a duty of 16s. a quarter was imposed when prices were below 53s. 4d., and 8s. when prices were between 53s. 4d. and 80s. This act, which was intended to prohibit the importation of food, although it had several times to be suspended owing to scarcity (1692–8, 1709–10, 1756), remained the ordinary corn law till 1773.

But England during the eighteenth century was an exporting, not an importing country. An attempt was made to remedy the ineffectiveness of this law by establishing a bounty on exportation in 1689. This was granted to the amount of 5s. a quarter when the price was below 48s. This law, with some slight modifications, remained in force till 1814; but in the latter half of the eighteenth century prices were seldom low enough to permit the bounty being paid. This bounty had, on the whole, a favorable influence on corn growing, but it tended to hinder the development of other kinds of agriculture.

Owing to popular discontent the duties levied under the Act of 1670 were modified and reduced in 1773, the duties being merely nominal when the price exceeded 48s.; and although an act was passed in 1791 consolidating the corn laws, the system remained till the end of Napoleon's Continental system in 1813 as it was enacted by the law of 1773. Prices during the great Continental wars were all that farmers and landowners could desire; but after the end of the Continental system large quantities of foreign corn were imported, and prices fell. The Act of 1815 consequently prohibited importation when prices were below 80s. a quarter. This complete prohibition was modified by the introduction of a sliding scale, by which the rate of duty was reduced as prices rose, the Act of 1828 establishing 62s. as the turning point. This sliding scale had no influence on agriculture, and served only to encourage speculation and gambling, and it also prevented foreign countries from furnishing grain habitually for the British markets. It was legislation obviously in favor of the landowners.

NOV 1

A strong opposition to the system had gradually been growing up. This had its origin in the urban manufacturing populations, which gained power as the result of the Reform Act of 1832. But the landed interests were strong enough to resist the movement for reform for many years, and it is doubtful whether the efforts of the Anti-Corn-Law League (Manchester, 1839), although assisted by the eloquence of Bright and the energy of Cobden, would have been so completely successful, had they not been assisted by the calamity of the Irish famine. Peel, who had been undergoing a gradual process of conversion, found it necessary to throw open the ports, and from this there was no receding. In 1846 the corn laws were repealed, to take effect in 1849; from which date there remained only a registration duty of 1s. a quarter, and this was removed in 1869. The repeal had no immediate effect on agriculture, for prices remained high for a quarter of a century; but with improvements in the means of transportation, foreign competition began to make itself felt, and American competition in particular provoked a reaction in Europe against Free Trade ideas. This in England took the form of an agitation for 'Fair Trade.' In 1902 the exigencies of war finance induced the Chancellor of the Exchequer to reimpose a tax of small amount on imported corn. This was explicitly declared to be a revenue tax only; but it was received by Fair Traders and Protectionists as a return to the system of the old corn laws. The tax was, however, repealed in the following year (1903), which was further signalized by the inception of Mr. Chamberlain's programme for granting a preference to colonial grain by imposing a tax on foreign grain. See Tariff.

Corno, Monte. See Sasso.

Cornouaille, the 'Cornwall' of France, is a rocky and desolate district near Quimper Corentin, in the dep. of Finistère, Lower Brittany.

Corn Snake, a harmless serpent (*Coluber guttatus*) of the Southern states, which is of moderate size, and is allied to the black snake, but is brownish red with lighter red blotches bordered with black.

Cornu, Marie Alfred (1841–1902), French physicist, became professor of physics at the Polytechnic School of Paris in 1867. He was elected officer of the Legion of Honor (1886), and Rede Lecturer at Cambridge (1899). His researches have been chiefly in optics; he repeated Fizeau's experiment to determine the velocity of light, and perfected his methods. In physics he, with Baille, recalculated the mean density of the earth on the lines of Cavendish's experiments.

Cornucopia, a metaphor denoting plenty. In ancient architecture and in sculpture it is represented as a figure bearing an overflowing horn of corn and grain.

Cornwall, Maritime county and royal duchy, forming the extreme s.w. corner of England. Its length n.e. and s.w. is about 75 miles, and its breadth a little w. of Polpero is 42 miles. The Scilly Isles, lying 34½ miles w.s.w. of Land's End, are included in the county. A great part of the interior consists of high moorland, broken by numerous rugged 'tors' or weather-worn granite hills. The coasts are usually bounded by high, steep cliffs of slate or granite, the latter chiefly between St. Ives and Land's End. The coast scenery in the w. and part of the s. is grand and wild, and picturesque in the valley of the Tamar. The principal river is the Tamar. On the s. are good harbors, but in the n.w. the inlets are difficult of access and greatly exposed. The climate is very mild in the valleys, and here many sub-tropical plants flourish; but the high moorlands are bleak and treeless. The valleys are generally fertile and well cultivated. Dairy-farming receives special attention. Tin and copper are still the principal metals, and kaolin or china-clay and china-stone are extensively worked. Large quantities of granite and igneous rocks, sandstone, and slate are quarried; other minerals are mica, ochre and umber, arsenic and arsenical pyrites, and small quantities of lead, zinc, uranium, wolfram, and gold. Fisheries constitute the third great industry of the country; pilchard, mackerel, herring, hake, cod, ling, and other fish are caught. The pilchard fishery is, however, by far the most important; immense shoals appear off the coasts at times.

Long before the dawn of British history, Cornwall probably carried on trade with the Phoenicians, and was known as Cassiterides. After the departure of the Romans it was ruled by British princes, the most notable of whom was the legendary Arthur. About 926 it was conquered by the Saxons under Athelstan, and henceforward was partly subject to Wessex. By Edward III it was erected into a duchy for the Black Prince about 1333. Since that time it has been an appanage of the princes of Wales.

The Stannaries, or tin districts, were formerly under the jurisdiction of special courts, in which all disputes relating to miners and mining were decided, especially matters affecting 'life, limb, or land,' but the functions of the Stannary Court have been transferred to the County Court judge. Cornwall abounds in barrows, tumuli, cromlechs, stone circles, earthworks, cliff and other castles, and many other interesting relics of its former inhabitants. Area 1,356 sq. m. Pop. (1931) 317,968.

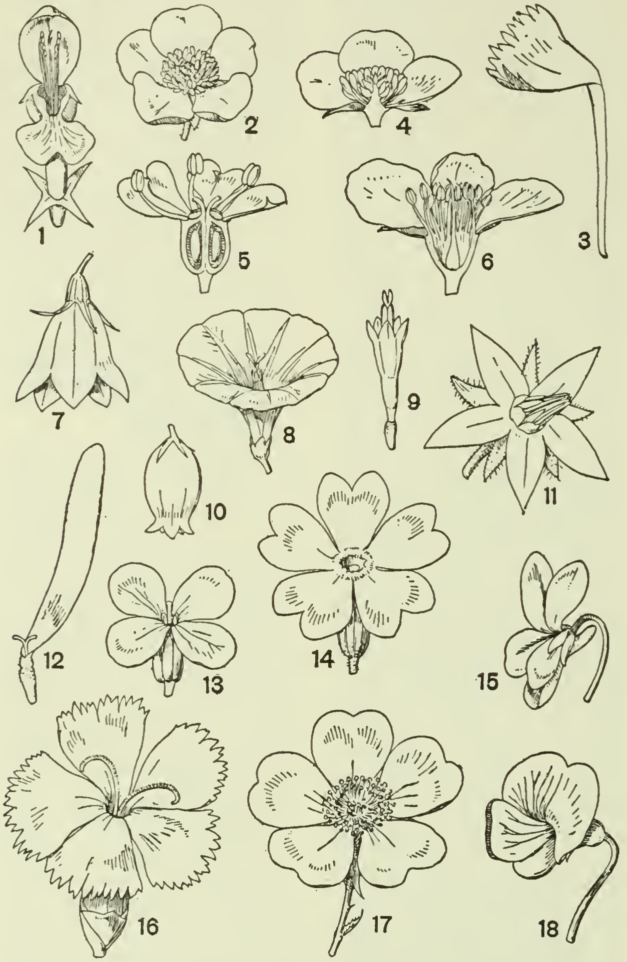
Cornwall, a port of entry, Ontario, Canada, county seat of Stormont, Dundas and Glengarry counties, 70 miles s.w. of Montreal, on the St. Lawrence River, Canadian end of Roosevelt International Bridge connecting Province of Ontario and State of New York. Is on the New York and Ottawa, the Canadian National and Canadian Pacific Railroads, and five water lines. Cotton, rayon and paper are the principal articles of manufacture. Pop. (1940) 13,650.

Cornwall, town, New York, Orange county, 5 miles below Newburgh, on the Hudson River at the base of Storm King (1,389 ft.). It has a public library, a carpet factory and paper mill. It was settled in 1684. Pop. (1930) 5,067.

Cornwall, Barry. See Procter, Bryan Waller.

Cornwallis, Caroline Frances (1786–1858), English authoress. Her first book, *Philosophical Theories and Philosophical Experience, by a Pariah* (1842), was published in a series of 'Small Books on Great Subjects,' planned and mostly written by herself.

Cornwallis, Charles, first Marquess (1738–1805), English general, son of the first Earl of Cornwallis; born in London. After entering the House of Commons for Eye, he was appointed governor of the Tower (1770). Though disapproving of the American policy of the government he served with distinction in the Revolutionary War. He was sent to America early in 1776 and took a conspicuous part under Howe in the New York campaign, including the battle of Long Island. He fought at the Brandywine (1777), and in April, 1778, became second in command, with the rank of lieutenant-general, to Sir Henry Clinton, who had succeeded Howe as commanding officer of the British forces engaged in the war. He subsequently served in the South, and defeated Gen. Gates at Camden (Aug. 16, 1780) and Gen. Greene at Guilford Court House (Mar. 15, 1781), but finally was hemmed in at Yorktown, and on Oct. 19, 1781, was forced to surrender to Gen. Washington, his surrender virtually closing the war, though the treaty of peace was not signed until 1783. (See CAMDEN; GUILFORD COURT HOUSE, and YORKTOWN.) In 1786 Cornwallis was appointed governor-general of India and commander-in-chief of the Bengal army, his administration being marked by the Mysore War; the arrangements with Oudh, Arcot, and the Nizam; the negotiations with Scindia and the Mahrattas; the settlement of the Bengal land revenue; and the treaty of Seringapatam with the defeated Tipu Sahib. Cornwallis also effected reforms in the civil service. Resigning his Indian appointments (1793), he returned to England, and was created marquess. Appointed viceroy of Ireland (1798), he successfully quelled the rebellion, and brought about the union. As he understood Catholic emancipation would follow the union, he resigned when George III refused to sanction the measure. His next work was negotiating the peace of Amiens (1802). Again appointed governor-general of India (1805), Cornwallis died at Ghazipur. See the *Cornwallis Correspondence,* edited by Charles Ross (3 vols., 1859); Owen, *Selections from the Cornwallis Despatches;* M. Wilk, *Historical Sketches of the South of India . . . History of Mysore* (1810–17); Sir J. W. Kaye, *Lives of Indian Officers* (1867); *A History of the Mahrattas,* by J. Grant Duff; and the *Marquess Cornwallis,* by W. Seton-Karr.



Typical Forms of Corolla.

1. Gamopetalous, irregular, labiate (dead-nettle). 2. Polypetalous, regular (buttercup). 3. Unguiculate notched petal (pink). 4. Hypogynous petals (buttercup). 5. Epigynous (fool's parsley). 6. Perigynous (peach). 7. Campanulate corolla (harebell). 8. Infundibuliform (bind-weed). 9. Tubular (daisy, disc floret). 10. Urceolate (heath). 11. Rotate (borage). 12. Ligulate (daisy, ray floret). 13. Cruciform (cabbage). 14. Salver-shaped (primrose). 15. Spurred (violet, lower petal). 16. Caryophyllaceous (pink). 17. Rosaceous (rose). 18. Papilionaceous (pea).

Coro, town, Venezuela, on the W. side of the Medanos isthmus, which joins the peninsula Paraguana to the mainland. Founded in 1527, Coro was till 1578 the capital of the country, and since 1890 it has been the capital of the State of Falcón. It exports coffee, tobacco, hides, from its port, La Vela, 7 m. distant, on the E. side of the isthmus. It has also coal mines. Pop. about 13,000. American and British oil companies own concessions of territory east and west of Coro along the coast, where they are developing the industry and searching for new fields. The government operates coal and salt mines nearby.

Corocoro, mining center in dep. of La Paz, Bolivia. The output is almost entirely copper ore (*barilla*), which is exported from Mollendo. Alt. 13,195 ft. Pop. 9,000.

Corolla is the second or inner layer of floral wrappings which encloses and protects the stamens and pistil of the flower. The separate parts or leaves which make up the corolla are known as petals. These are usually the most brightly colored of all the parts of a flower. Many flowers possess only a single layer of floral wrappings, but it is still called the calyx, or sometimes the perianth—a term strictly including both envelopes. When the petals are united to form a tube or funnel, the corolla is said to be gamopetalous; when, on the other hand, they are not united, it is said to be polypetalous. When, as in the buttercup, the petals of a flower are all equal, the corolla is regular; otherwise it is irregular, as in the bean and the dead-nettle. A petal with a notch or notches in its edge is said to be bifid or fimbriated, as the case may be; otherwise it is said to be entire. Petals which expand above into a lamina, as in the carnation, are called unguiculate. When the corolla is epigynous, the petals spring from the top of the ovary; when it is perigynous, they spring from the sepals; when hypogynous, they spring from beneath the ovary. Many terms are used to describe the form of the corolla—campanulate or bell-shaped; infundibuliform or funnel-shaped, as in the bindweed; tubular, as in the central flowers of a daisy; globose, urceolate, or urn-shaped, as in many of the heaths; rotate or wheel-shaped, as in the borage; ligulate, as in the outer florets of the daisy; cruciform, as in the cabbage; hypocrateriform or salver-shaped, as in the primrose; labiate, as in the dead-nettle; spurred, as in the violet; caryo-

MAY 26 1

phyllaceous, as in the pink; rosaceous, with five clawless petals; papilionaceous or butterfly-like, as in the pea. See Flower.

Corollary, in geometry, a proposition which depends so closely upon one previously proved that the truth is evident with little or no demonstration. Hence the word is used generally for an immediate inference or consequence.

Coromandel Coast, name formerly given to part of the eastern seaboard of India, approximately what is now the Madras Presidency, on the w. shore of the Bay of Bengal.

Coromandel Goldfield, the oldest in New Zealand, where gold was discovered in 1852. Its productivity has dwindled.

Coromandel Wood. See Calamander Wood.

Corona, in architecture, a member of the cornice of an order in any of its several parts, as in pier, door, pedestal, or window. It consists of a broad slab between the bed-mould and the cymatium or upper capping, channelled upward and projecting, and protects the lower members of the structure in inclement weather. See Cornice.

Corona, a solar appendage visible during total eclipses. It varies in shape with the progress of the sun-spot period. A radiated aureola at epochs of maximum, it tends, as commotion subsides, to assume a quadrilateral form, the longest streamers springing from middle latitudes; while at minima great equatorial wings spread to a length of several degrees, and the poles appear garnished with diverging tufts of light. These cyclical modifications are evidently sympathetic with the general course of the sun's disturbance. The spectrum of the corona is of threefold origin: (1) it includes an ingredient of reflected sunlight, separately recognizable both by its polarized quality and by the perceptibility in it of dark Frauenhofer lines; (2) it is very largely derived from white-hot incandescent materials; (3) gaseous radiations are added, the intensity of which grows with the plentifulness of spots. The chief of these is the green line of coronium, an unknown substance, apparently of extreme tenuity; while seven or eight others, photographically recorded, are of doubtful origin. The corona is probably in the main composed of finely divided matter shot out from the sun, and acted upon by electro-magnetic forces. Its aspect can be closely imitated by the luminous effects produced in vacuum tubes placed in strong magnetic fields. The subtility of its composition is proved by the unresisted passage of comets through the space occupied by its luminous sheaves.

Corona is also the name of the small colored ring which may be observed encircling the sun or moon when traversed by thin, filmy clouds. See Halo.

Corona, in botany, an appendage on the top of the seed (as in the dandelion or thistle); or, more commonly, on the inner side of the corolla, as in the jonquil and daffodil.

Corona Australis, a small though ancient constellation. Placed on the border of the Milky Way near Sagittarius, it typified the crown of the zodiacal Centaur. It includes a number of curious sidereal objects, especially the three closely adjacent variable stars, R, S, and T Coronæ, to the first of which a variable nebula is attached; a double nebulous star; a star-cluster (Dunlop 573); and the well-known binary γ Coronæ Australis, with a period of 153 years.

Corona Borealis, an ancient constellation east of Boötes, imitatively named, and appropriated to Ariadne. The Arabic name, Alphecca, of the chief star, also called Gemma Coronæ, commemorates the prosaic resemblance of the group to a broken platter. The associates of Alphecca comprise three binaries with computed periods—η and γ Coronæ, revolving in 41 and 95 years respectively; and σ Coronæ, nominally circulating in 846 years. On May 12, 1866, a star of the tenth magnitude rose abruptly to the second in the neighborhood of ε Coronæ, and was found by Huggins to be in a state of gaseous incandescence. T Coronæ was the first nova to which the spectroscope was applied. R Coronæ is a remarkable irregular variable; U Coronæ undergoes partial eclipses once in 3½ days.

Coronach, Gaelic, a wailing for the dead. In Irish the verb is *to keen*.

Coronado, Francisco Vasquez de (*c.* 1500?–*c.* 1549), Spanish explorer in America, was born in Salamanca, Spain. He seems to have gone to Mexico in 1535, and, gaining influence through his marriage with the daughter of a prominent official (Estrada), was made (1539) governor of New Galicia by Viceroy Mendoza. In the same year he was selected to conduct an exploring party into the country that is now Arizona and New Mexico, the primary object being the discovery of the 'Seven Cities of Cibola' (now generally identified with the Zuñi pueblos), which, according to fabulous stories then current, contained vast riches in gold, silver, and precious stones. Coronado, with a large retinue, was engaged for two years (1540–2) in his vain search, and traversed a large extent of territory never previously visited by white men. Consult H. H. Bancroft, *Arizona and New Mexico;* G. P. Winship, *Coronado Expedition* (1904).

Coronation (O. Fr. from Latin, *corona*, 'crown'), the ceremony of crowning a sovereign as symbol and consummation of investiture with rule. Roman emperors received no crown at accession owing to faint lingering of republican feeling. The barbarian States which grew up on the ruins of the Roman Empire retained, until Christianized, the Teutonic custom of elevating a new ruler on a shield, bearing him thrice round the assembled tribes, placing a spear in his hand and a fillet ('diadem') round his head. The English coronation procession and practice under French monarchy of showing the king to the people, are relics of this custom. Medieval and modern anointing and crowning are derived from the Old Testament through the Christian Church.

Service set forth (1307) in *Liber Regalis* was followed in England at the coronation of Edward II and until the Reformation, when it was translated and retained with the exception of substitution of Communion service for the Mass. It was modified in 1685 and considerably changed in 1689, since when the ceremony has been shortened. Its most important functions are taking of the oath and anointing, investiture, crowning, enthronization, and homage.

On May 12, 1937, the latest of these ceremonies, the coronation of George VI and Queen Elizabeth, took place in Westminster Abbey. The ritual was performed by the archbishops of Canterbury and of York. Heralds and pursuivants, in medieval array, marched in the royal procession when the king and queen entered, together with the lord high chancellor of England, the earl marshal and the ecclesiastics. Members of the royal family, richly attired peers and peeresses, wearing their coronets, ministers of State in court dress, judges, the *Corps Diplomatique*, foreign sovereigns and princes, representatives from the British Commonwealth of Nations—all these contributed to form a brilliant, fascinating spectacle of pageantry and pomp.

The regalia included the crown of State and St. Edward's crown, the scepter with the cross, set with the large pieces of the Cullinan diamond (q. v.), St. Edward's staff and three swords, carried by the highest military dignitaries. After the crowning of the queen the ceremony closed with the Communion service and a *Te Deum.*

Coronation Oath.—Besides other obligations which the British king assumes at his coronation, he must swear to preserve the Protestant religion established by law. That oath contained, for centuries, phrases objectionable to the sovereigns' Roman Catholic subjects. At the request of George v in 1910, these phrases were expunged from the oath, and the revised formula was used at his coronation in 1911.

Consult L. G. W. Legg, *English Coronation Records* (1901); F. G. Roe, *Coronation Cavalcade: the story of the British Crown* (1937); L. Broad, *Crowning the King* (1937); S. King-Hale, *The Crowning of the King and Queen* (1937).

Coronation Oath. See CORONATION.

Coronea, ancient town, Bœotia, Greece, west of Lake Copais. In 447 B.C. the Bœotians here conquered the Athenians; and in 394 B.C. the Spartans defeated the Thebans and their allies.

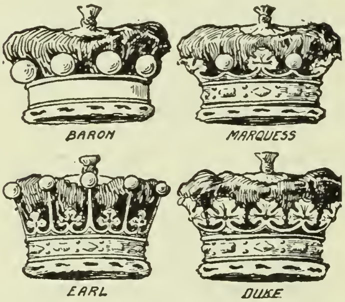
Coronel, seaport, province of Concepción, Chile, on the eastern side of Arauco Bay; 16 miles by rail from Concepción. It is the commercial center of a coal-mining district. It is a cable station and a port of entry, and has an excellent harbor and piers. Pop. 5,258.

Coroner (*i.e., custos placetorum coronæ*). This office existed at least as early as 1194 in England. Originally, the coroner was second in rank to the sheriff, and performed the duties of that office, in addition to his own, during the sheriff's absence or disability. In the United States, coroners are either appointed or elected, and the duties are generally prescribed by statute. The chief duty of a coroner to-day is to hold an inquest on the dead body of any person lying within his jurisdiction, (1) if there is reasonable ground to suspect that the deceased died a violent or unnatural death, or died suddenly from some unknown cause; (2) if the deceased died in prison, or in such place or under such circumstances as to require an inquest—*e.g.,* in a lunatic asylum, or an inebriates' retreat—unless the duty to hold such an inquest is abrogated by statute.

In some States the coroner alone hears the evidence, and makes his return to the proper authority; in other States, the coroner is required to impanel a jury of residents of the vicinity to hear the evidence, and return a verdict stating the cause of death and probable author of the crime. The jury are bound by law to view the body. Evidence upon oath is taken from such persons as voluntarily attend or are summoned by the coroner, subject to the right of any witness to refuse to answer an incriminating question.

In the United States, the finding of a coroner's inquisition may subject any one accused thereby to arrest, and the coroner may issue a warrant of arrest, but no one can be tried without the finding of a grand jury. Reports of the findings of the coroner's jury may not be used against the accused at his trial for the suspected crime. In the United States, a coroner's court is not a court of record, but is one of inferior jurisdiction. In some States (as Massachusetts), the office of coroner has been abolished and a medical examiner appointed by the governor in each county. It is the duty of this official to investigate deaths under suspicious circumstances. Such a method is now being urged in a number of other States.

Coronet, a small or inferior crown, the distinctive state headdress of the British nobility, and the symbol of their order. It consists of a chased circlet of gold, ornamented on its upper edge by conventionalized strawberry-leaves, pearls, etc. In early times the arrangement of these was arbitrary, but more modern usage has assigned a definite pattern to each grade of the peerage.



Forms of Coronet.

In heraldry, representations of these actual coronets occur as accessories, denoting the rank of the bearer; but they are seldom mentioned in blazoning. The heraldic coronet, on the other hand, is a conventional figure of an earlier type, sometimes blazoned a ducal coronet, from its supposed resemblance to that of a duke.

Corot, JEAN BAPTISTE CAMILLE (1796–1875), French painter, the most poetic and individual of landscapists, who combined the classical tradition of style with modern intensity of emotion, personal vision, and direct study of nature. Born in Paris of humble parentage, he began life behind the counter. Under Victor Bertin he learned the current rules for composing landscapes; but he soon left Paris, and lived and studied nature for several years in Italy. He exhibited in the Salon (1827), but it was long before official recognition came to him.

Returning to France, he became a prominent member of the Barbizon group of painters, and was beloved for his geniality and generosity. He was given the Cross of the Legion of Honor (1846). But the recognition that gave him the keenest pleasure was when, the year before his death, his fellow artists and friends presented 'Father Corot' with a gold medal. His life was a simple devotion to his art; his last words were, 'See how beautiful it is! I have never seen such beautiful landscapes!'

Corot is the third great link in the chain of landscape painters in France: Poussin emancipated landscape painting, and treated nature with solemnity and dignity; Claude Lorraine unveiled the sun, and poured its beams over land and water; Corot, essentially northern in sentiment and outlook, painted the ethereality of dawn and twilight, the joyous uprising of the early sun that melts the delicate mists, and reveals nature quivering in the dewy light, with shadowy trees and tremulous leaves bathed in stirring air. Like Constable's, Corot's range was limited, but he found infinite variety of poetic vision within these imposed limits, expressed in a singularly refined and restricted scheme of delicate, quiet colors. He loved best to depict the leafy environs of Paris in spring and autumn. Many of his paintings are to be seen in private collections in the United States. His *Ville d'Avray* is in the Metropolitan Museum in New York; the *Dante and Virgil* in the Boston Museum of Fine Arts; while other fine examples of his work are to be found in several private collections, in Philadelphia, in the Chicago Art Institute, and in the Corcoran Gallery at Washington. These include *The Evening Star,* and *Biblis*—the latter painted the last year of his life, and considered by some critics his masterpiece. His *Macbeth and the Witches* is in the Wallace Collection; his pastoral *Souvenir d'Italie* is in the Glasgow gallery; *The Dance of Nymphs* is in the Luxembourg

AY 2 6

at Paris; and fine examples are in the museums of Metz, Douai, Langres, and Marseilles.

The most authoritative work on Corot is A. Robaut's *L'Œuvre de Corot* (1905), containing a catalogue of his paintings. Consult also the biographies in French by Rousseau, Michel, Hamel, and Blanc; Charles Blanc's *Les artistes de mon temps;* Roger Milès' *Album classique des chefs d'œuvre* (1896); Robinson's 'Corot,' in Van Dyke's *Modern French Masters;* A. Geoffroy's *Corot and Millet;* Meyer-Graefe's *Corot et Courbet* (1905); Meynell's *Corot and His Friends* (1910).

Corozal, kō-rō-säl', town, Colombia, in the department of Bolivar; 75 miles southeast of Cartagena. Cattle are exported. Pop. 8,000.

Corozo. See IVORY; PALM.

Cor'poral, a non-commissioned officer found in nearly all the armies of the world. In the U. S. Army he is the lowest rank of non-commissioned officer. He is inferior to a sergeant, and is appointed for infantry, cavalry, and artillery regiments. His duties are to place and relieve sentinels, to keep discipline in barracks and camp, and to take command of a squad or part of a company.

Corporal, in Roman Catholic and Anglican churches, the linen cloth spread on the altar on which the vessels containing the sacred elements of the Eucharist are placed. The veil covering the chalice after the sacrament is sometimes called the corporal.

Corporal Punishment, the infliction of direct bodily pain as a penalty for or deterrent from crime or misdemeanor. Physical suffering was formerly looked upon as a law of nature, without which order could not be maintained, and such punishments as branding, mutilation, and the various forms of torture (q. v.) were universal and unquestioned. As civilization advanced, however, these cruel practices were gradually discarded, and to-day flogging or whipping is the only form in which actual corporal punishment exists—though legally, imprisonment, banishment, and capital punishment are classed under this head.

Opinions as to the value of corporal punishment differ. That in its harsher forms it cannot be effectively supervised, and that it tends to brutalize inflicters, onlookers, and victims alike, is generally accepted. On the other hand, its milder forms are held by many—including expert prison officials—to be more effective than appeals, reprimands, solitary confinement, and the forms of casual violence which have replaced it. Its chief application is in the disciplining of prison inmates.

Corporal punishment in *schools* as a method of maintaining discipline and an incentive to learning has been practised since ancient times. In recent years, however, it has been much modified on humanitarian and psychological grounds. In many schools it is entirely eliminated; while in the majority of those retaining it, it is subject to regulations that tend to reduce it to a minimum, or restrict it to 'extreme cases.' See PUNISHMENT; WHIPPING.

Corporal's Guard, in military language, is a small body of soldiers under the charge of a corporal. It is also used derisively of any small following or party.

Cor'pora Quadrigem'ina, four rounded eminences forming the dorsal part of the mid-brain, arranged in pairs above and in front of the anterior medullary velum and superior peduncle. They consist of a compact nucleus of gray substance containing large and small multipolar nerve cells, more or less completely surrounded by white fibers.

Corporation. The corporation is 'an artificial being, invisible, intangible and existing only in contemplation of law.' Any body of persons capable of acting as an entity and in a single name fixed by law and having succession is in some sense, a corporation. For most purposes a corporation is an entity distinct from its individual members of stockholders who, as natural persons, are merged in the corporate identity, and remains unchanged and unaffected in its identity by changes in its individual membership. By the very nature of a corporation, corporate property is vested in the corporation itself and not in the stockholders. Corporations may be classified generally as public or private, the distinction having reference to the powers of the particular corporation and to the purpose of its creation. Those corporations are public, which are created for public purposes only, connected with the administration of the government, and the interests and franchises are the exclusive property and domain of the government itself. Private corporations are created for private as distinguished purely from public purposes. A large class of private corporations are quasi-public on account of the special franchises conferred on them, for which they owe a duty to the public which they may be compelled to perform.

A corporation may be created and can exist only by virtue of authority from the government. It cannot be formed legally unless it is organized in compliance with the required statutory provisions. A *de jure* corporation is one which has been regularly created in compliance with all legal requirements and the right of which to exercise a corporate franchise is, therefore, invulnerable against attack except by the State in special (*quo warranto*) proceedings. When from irregularity or defective organization or constitution or from some omission to comply with the condition precedent a corporation *de jure* is not created and there has been a colorable compliance with the requirements of some law under which an association may be lawfully incorporated for the purposes and powers assumed and there was user of the rights claimed to the conferred by the law, a *de facto* corporation is said to exist.

It is essential to the existence of a *de facto* corporation that there be (1) A valid law under which a corporation with the powers assumed might be incorporated; (2) a *bona fide* attempt to organize a corporation under such law; (3) an actual exercise of corporate powers.

The distinguishing characteristics of a corporation are (1) a common seal symbolizing the unity of the corporation; (2) a distinct entity apart from that of the natural persons who constitute its stockholders; (3) transferability of ownership, as represented by shares of stock, without affecting the continuance of corporate existence; (4) perpetual succession, for though a corporation may be dissolved or may pass out of existence with the expiration of its charter, otherwise, being a legal entity, it is endowed by law with perpetual life.

A corporation has only such powers as are expressly granted in its charter or in the statutes under which it is created or such powers as are necessary for the purpose of carrying out its express powers and the objects of its incorporation. Generally it may exercise the power to acquire or purchase personal chattels, take choses in action which are transferable by assignment, and may itself become the payee of commercial paper or bonds for indebtedness owing to it unless in the pursuit of its authorized business there is no necessity for so doing. The prevailing rule in the United States is that a corporation has no power to purchase and hold the stock of another corporation unless this power is clearly granted by its charter. A corporation has no implied power to subscribe to the original stock in another but it may take stock in another corporation in payment of or as security for a debt.

A corporation has full power to alienate its property both real and personal unless restricted by its charter, statute or considerations of public policy. Its power to contract inheres in every corporation and is coextensive with its corporate powers. When such contract is not on its face necessarily beyond the scope of the power of the corporation by which it is made, it will, in the absence of proof to the contrary, be presumed to be valid. Unless there is some provision to the contrary in its charter or the general statutes, a corporation has the power to take and enforce a mortgage on real estate as security for indebtedness to it incurred in the ordinary course of its business. Unless the corporation is specially authorized to do so, the execution or endorsement of accommodation paper for the benefit of third persons is an act beyond the scope of its corporate authority (*ultra vires*). It is also *ultra vires* a corporation to enter into contracts of guaranty or suretyship not in furtherance of its business, unless given express authority to do so.

The board of directors of a corporation represents the corporate body and the directors are the executive representatives of the corporation. Since they are its agents having authority to transact the ordinary business of the corporation, unless specifically restricted in some respect, they naturally have very broad powers, and have a discretion to be exercised in good faith to control the infinite details of a business including the wages to be paid the employees, the number of working hours, the condition under which labor should be carried on and the price for which the product shall be offered to the public.

The full extent of the authority of any particular officer of a corporation is to be determined by inquiry into the authority expressly conferred upon him or incidental to such express authority. In the case of third persons who had no notice of the officers' restricted authority, his authority is that which the corporation holds the officer out as possessing or is estopped to deny. Directors and officers in charge of the management of a corporation are under obligations of trust and confidence to the corporation or its stockholders and must exercise with due care and diligence within the scope of their authority. Directors are liable for any breach of their duty with respect to the capital and assets of the corporation. When directors have not profited personally by their bad management or appropriated any of the property of the corporation to their own use, courts of equity are inclined to treat them with indulgence. Directors however cannot be excused from imprudence on the ground of their ignorance or inexperience. If they commit an error of judgment through mere recklessness or want of ordinary prudence or skill, they may be held liable for the consequences.

The liabilities of a corporation to its directors or officers are chiefly those which concern the payment of salaries or compensation for corporate services. A director or officer may become a creditor of a corporation, and as such entitled to the same remedies as other creditors. He may loan money to the corporation, and enforce its repayment. He may also take security for his claim, such as a mortgage or lien on the corporate property, even though the debt held by such officer be in excess of the limit prescribed by the charter. In most instances directors and officers are not liable to corporate creditors or third persons for corporate acts or debts. They are merely the agents of the corporation, and as such are no more to be held liable than any other agent is for the acts and debts of his principal. They may be liable for mismanagement of the business of the corporation, or waste of its assets. They do not incur personal liability for its torts unless they have participated in the wrong. A director, therefore, who is in no way a party to the preparation, printing, or publication of a prospectus concerning the affairs of the corporation cannot be held liable for fraudulent participation therein. A director or officer of a corporation is not, according to the prevailing rule, liable for an offense committed by the corporation except where he has in some way participated with the corporation in the illegal act, even though the corporation's offense consist of the violation of a statute which imposes imprisonment as a penalty. Where the crime charged involves guilty knowledge or criminal intent, to be criminally liable it is essential that the officer of the corporation actually and personally do the act which constitutes the offense or that they be done by his direction or permission. Under the common law a corporation, being an artificial creature, was incapable of committing a tort. Today it is the general rule that a corporation is liable for the torts and wrongful acts of its officers, agents, or employees acting within the scope of their authority or the course of their employment.

The relation of stockholders to the corporation, the stock of which they hold, is that of contract, and all the rights and duties of all parties grow out of the contract implied in the subscription for stock. This relation is within the protection of the federal constitution prohibiting legislation impairing the obligation of contract. The prevailing view is that a corporation is charged with the duty of trustee toward its stockholder for many purposes. The provisions of the charter and by-laws of a corporation are to be considered —not alone the recitals in certificates of stock issued by it— in the determination of the rights of the stockholders. The holders of the majority of the stock of a corporation have the power by the election of directors and by the vote of their stock to do everything that the corporation can do. A majority of stockholders, therefore, will be liable at the suit of a minority stockholder for any misappropriation by corporation action of the funds or property of the corporation for which they are responsible.

Among the rights enjoyed by the stockholders are (1) the right to inspect books and records, etc., from which they can derive any information which will enable them better to protect their interests and to perform their duties as stockholders. As an incident of this right a stockholder may make copies or extracts therefrom. (2) To bring a representative suit on behalf of the corporation after exhausting the remedies within the corporation unless there was no opportunity for redress or it would be unavailing. (3) To control corporate policies through stockholders' meetings. (4) The right of voting stock at corporate meetings and to elect directors.

In the absence of charter, constitutional or statutory provisions to the contrary, stockholders are not individually liable for the debts or obligations of the corporation. They are, however, liable to creditors of the corporation to the extent of what remains unpaid on their several shares, according to their subscription contracts, or of so much as may be necessary to supply the deficiency in the assets of the corporation to pay its debts, their liability in this respect being several.

A payment to the stockholders as a return upon their investment is in general termed a divi-

Y 26

dend. A dividend requires the concurrence of two things (1) surplus earnings, (2) a corporate resolution by the directors declaring the corporate policy of paying a portion or all of such surplus to the stockholders. In the absence of special contract or statute it rests in the sound discretion of the corporation or its authorized officers, usually the Board of Directors, to determine the circumstances under which dividends will or may be declared out of earnings or profits.

New Deal Regulation.—The post-war period was one of intense dissatisfaction with the modern corporate system. This popular displeasure was partially manifested by 'model' corporation statutes passed in different States. With the advent of the New Deal came the view that corporations which sell securities to the public or whose securities are traded in on exchanges are not merely private organizations but are public institutions. Whether or not they are engaged in a business 'affected with a public interest' they were held to be subject to special governmental supervision. To this end were enacted the Securities Act of 1933, the Securities and Exchange Act of 1934 and the Corporate Reorganization Amendment to the National Bankruptcy Act (77B) in 1934.

The most significant requirements of the Securities Act from the standpoint of internal corporate affairs are those calling for disclosure of the amount of securities held by the directors and officers, the names and addresses of all persons 'owning of record or beneficially' more than 10% of the corporation's stock, the remuneration paid to directors and officers, and of 'any management contract or contract providing for special bonuses or profit-sharing arrangements.'

The Securities and Exchange Act requires that substantially the same information be disclosed with respect to corporations whose securities are registered on a securities exchange. The new statutes extended the scope of the information heretofore required to be made public and introduced a new element of enforceability. Of particular significance is not so much the penalties written into the law as the machinery of supervision, detection and enforcement set up.

The sanctions provided by the statutes can only be invoked to compel disclosure; if the management is willing to disclose its activities there is no direct statutory check or control over it—with two exceptions. Directors, officers and principal stockholders may not 'sell short' 'equity securities' of their corporation. And they are also subject to the various rules and regulations prescribed by the Securities and Exchange Commission governing the solicitation of proxies, violation of which is declared unlawful by the statute. Another evil sought to be corrected was the unfair use of 'inside information.' Through the Securities Acts the New Deal sought to aid the investing public in evaluating securities and to prevent the undue influencing of their value, market price and sale.

The Public Utility Holding Company Act of 1935 was one of the most far-reaching measures of the New Deal in the regulation of holding companies. A holding company may be defined as a corporation formed for the express purpose of controlling other corporations by the ownership of a majority of their voting capital stock. They are divided into two classes: (1) Holding companies deriving their profits exclusively from interest and dividends on securities owned and from transactions with the public—Investment Holding Companies. (2) Holding companies deriving profits from the same sources as Investment Holding Companies and also from transactions of any character with their subsidiaries—Management Holding Companies. The advantages of the holding company as a financial device are: (1) It furnishes a readily available and effective method of controlling several corporations for a common object. (2) It may be employed to perpetuate corporate control. (3) It permits the capitalization of controlling stock interests.

The functions of the Public Utility Holding Company are: (1) To furnish centralized managerial control or assistance to the operating companies, including specialized and expert legal, engineering, accounting and public relations services. (2) To finance or aid in the financing of the operating companies. (3) To render combined purchasing service. (4) In some cases, to furnish the operating companies with equipment held under patents by the holding company, or manufactured by one of its subsidiaries.

Under the Public Utility Holding Company Act of 1935 the Federal Power Commission was given jurisdiction over operating companies. The two main objectives of the legislation are (1) to bring about coördination of power properties through interconnection of facilities and interchange of energy, and (2) to supplement and strengthen, but not to supersede the regulatory authority of the States.

To promote coördination of facilities, the Power Commission was authorized to study and encourage voluntary interconnections and, in certain limited cases, to compel interconnection of properties and interchange of energy. It may also prevent public utilities from transferring electric facilities to other companies through sale, lease or merger, and it may attach any conditions that are 'in the public interest' when transfers of property are approved. In addition, no public utility may acquire securities of another electric utility company without obtaining the consent of the Commission. In supplementing the regulatory authority of the States, the Commission is empowered to regulate the wholesale rates charged for energy moving in interstate commerce. The Commission can also regulate security issues by public utilities if the State of incorporation has no authority, and can break up interlocking relationships of officers and directors of electric utility companies in order to guard against financial manipulation. The Commission may require uniform accounting, prescribe depreciation rates, make valuations of property, conduct investigations and make its findings available to State commissions, and hold joint hearings with State commissions.

Governmental Corporations.—The Federal Government until recently made very little use of the corporation as an agency for executing the laws of Congress. Early in the course of American national development the government chartered banks and shared in their ownership, utilizing them in the fiscal operations of the treasury. Beginning with the World War the corporate form of administrative agency was utilized to avoid difficulties which would arise if the execution of the war-time activities were attempted by one of the political departments of the government.

Most of these government corporations began liquidating as soon as their war function had been completed, and only two new corporate types were authorized by Congress before the depression began (1929) to press upon and compel action by the Federal Government. Starting with the Hoover Administration and reaching a fast pace early in the Administration of F. D. Roosevelt there arose a mushroom growth of governmental corporations designed for administrative, fiscal, relief and reconstructive purposes. Many of these were specifically created by statutes of Congress; others were created by executive order of the President when it seemed appropriate to utilize such an agency to attain a purpose authorized by law.

Two major classes of corporations survive. One includes certain credit corporations which have been justified on the ground that they are fiscal agents and depositaries of public money. They were not created by Congress primarily as such depositaries; but these corporations could logically and reasonably be explained under the power of Congress to appropriate for the general welfare.

Among the corporations in the second group are many of the later federal corporations created for relief purposes of various sorts: housing—Public Works Emergency Housing Corporation; food and clothing—Federal Surplus Relief Corporation; overpopulation—Federal Subsistence Homesteads Corporation; cheap electrical energy—Electric Home and Farm Authority. These corporations, in so far as they are spending money or supervising its expenditure, could probably be justified under the power to tax and appropriate for the general welfare. There are other government corporations, like the Tennessee Valley Authority, whose extensive spending activities can best be explained in the same way—though they may also be warranted in part by their relation to the national defense, the commerce powers and others.

B. Werne, S.J.D.

Corporation Tax, any form of taxation levied on the basis of characteristics peculiar to corporations, as taxation of corporate charters, franchises, capitalization, and dividends; or any form of taxation levied upon corporations only, as distinguished from individuals and partnerships, as a corporate income tax.

In the earliest period corporations were not thought of as having a separate personality or status for purposes of taxation. Taxes were levied upon property, earnings, and transactions, regardless of whether these things were associated with individuals or corporations. Probably the two chief factors in forcing the recognition of corporate taxation as a special field were: (*a*) the difficulties encountered in attempting to tax shares of stock and bonds merely as personal property in the hands of owners; (*b*) the growth of the railways and other public service corporations with property extending through different States, which made assessment and taxation by local tax authorities practically impossible. Efforts to apply effective taxation to these corporations followed two broad trends: (1) Centralized administration of taxes levied upon corporations, in the hands of State tax commissions or other central boards; (2) the development of special forms of taxation applicable to corporations.

An Act of Congress in 1936 introduced a new principle into corporation income tax, namely, a surtax on undistributed profits. This was to induce corporations to distribute as dividends a greater proportion of their profits than heretofore. It was also to eliminate the inequalities in the taxation of American business profits as between incorporated and unincorporated business, and prevent the revival of an important source of tax avoidance inherent in the present system. Another object was to prevent the concentration and overgrowth of capital, to which the cause of depressions has been attributed. This surtax applied to all corporations except those exempt from income tax altogether.

In response to the general condemnation of the surtax on undistributed profits, the Revenue Act of 1938 drastically revised the taxes on corporate income. The new law retained the principle of the Administration-sponsored undistributed profits tax, but greatly reduced and only for 1938 and 1939. Moreover, this surtax applied only to corporations with income of over $25,000—the amount of tax basis according to the proportion and amount of earnings paid out in dividends; but the maximum rate was reduced to 2½ per cent, from 27 per cent in the 1936 law.

The new law added three complicated alternative methods of computing the tax. The general rule is to compute the tax at 19% of the 'adopted' net income, that is, on the net income minus certain 'credits.' From this tax is deducted the sum of 16% of the credit for dividends received and 2½% of the 'dividends paid credit.' For corporations with income of $25,000 or less, that is for those not subject to the undistributed profits tax under the new Act, the tax is as follows:

1—On income not in excess of $5,000—12½%.

2—On income of $5,000—$625.

3—On income in excess of $5,000 and not in excess of $20,000—$625 plus 14% of such excess.

4—On income of $20,000—$2,725.

5—On income in excess of $20,000—$2,725 plus 16% of such excess.

For certain classes of corporations, special methods of taxation are imposed; for example, the income of banks, corporations organized under the China Trade Act and those others are taxed at 16½% regardless of the amount of income, and incomes of foreign corporations are taxed at 19%. These rates are generally higher than in the previous law.

The surtax on Personal Holding Companies remained as in the previous law, but some relief provisions were granted; personal finances are exempt from the imposition of the tax. On the other hand, the definition of a personal holding company is extended to include the smaller transportation companies.

Consult P. Mertens, *Federal Income Tax;* Robert H. Montgomery, *Federal Income Tax Handbook* (1938).

Corpo′real Hereditament. See Hereditament.

Corps, Army. See Army Corps.

Corps Diplomatique. See Diplomatic Corps.

Corpse, the dead body of a human being. In law a corpse is not looked upon as a person, that which constitutes a person being separated from the body by death. Neither is it property in the usual sense of the term, the person with whom its disposition rests having no rights of ownership, but only the right of possession and control for the purpose of decent burial. Unless other provision is made by will, the disposition of a dead body devolves upon the surviving husband or wife, the next of kin, or, in the absence of these, upon the person in whose house death occurred. Failure to provide proper burial, mutilation or indecent exposure of the corpse, and illegal interference with it after burial are subject to criminal punishment. For the care and disposition of the dead, see Burial; Cremation; Embalming. See also Body Snatching.

Corps of Engineers. See Engineer Corps, U. S. Army; also Army of the United States.

Corpus Christi, kôr′pus kris′ti, one of the chief festivals of the Roman Catholic Church, was instituted in 1264, in honor of the Consecrated Host, by Pope Urban IV, who appointed for its celebration the Thursday after the festival of the Trinity, and promised to all the penitents who took part in it indulgence for a period of from forty to one hundred days. In Roman Catholic countries the festival is distinguished by magnificent processions and in France it is known as the *Fête Dieu.* In the United States and some other countries it is celebrated on the Sunday following Trinity Sunday. At the time of the Reformation it was removed from the Anglican calendar.

Corpus Christi, city and port of entry, Texas, county seat of Nueces county, on Corpus Christi Bay, and on the Missouri Pacific, Southern Pacific, and Texas Mexican Railroads and on the Braniff Airways; 150 miles south of San Antonio, and 150 miles from the Mexican border. It has a good deep-water harbor. There is a considerable trade, and fishing and manufacturing are important industries. The city is also well known as both a winter and summer resort. Commission government was adopted in 1909. Pop. (1930) 27,741; (1938 est.) 60,000.

Corpus Christi College. See Cambridge University; Oxford University.

Corpus Delicti, kôr'pus dē-lik'tī, a legal term denoting the essence or substance of the crime or offense charged, which must be proved before a conviction can be obtained. For instance, when homicide is the crime charged, the death must be proved affirmatively. In most jurisdictions, by statute, the body must have been found and identified; a confession alone is not enough. This rule applies to prosecutions for all crimes.

Corpus Juris Canonici. See Canon.

Corpus Juris Civilis, the title given to the whole body of the Roman law included in the *Institutes,* the *Digest* or *Pandects,* the *Code,* and the *Novellæ,* all of which were published in the sixth century under the auspices of the Emperor Justinian. It was the basis of the law of mediæval Europe, and of the civil law prevailing on the Continent today.

Corra Linn. See Clyde.

Correggio, kor-red'jō, town, Italy, in the province of Reggio nell' Emilia, 11 miles northeast of Reggio. Antonio Allegri, the artist, surnamed Correggio (q. v.), was born and died here. Pop. (1936) 19,046.

Correggio, Antonio Allegri (*c.* 1494–1534), one of the greatest of the Italian Renaissance painters, was born in Correggio, the son of a merchant named Pellegrini Allegri. There are various traditional accounts of his life, but few authentic details are available. He is believed to have learned the rudiments of painting from his uncle, Lorenzo Allegri, an artist of mediocre ability. In 1511 he went to Mantua, where he spent several years, probably studying the works of Mantegna. He returned to Correggio in 1514, and in 1518 went to Parma, where he had been commissioned to decorate with frescoes the convent of San Paolo. There he remained for ten years or more, executing the frescoes for the cupola of San Giovanni (1520–24) and for the cathedral (1526–30). He returned to Correggio in 1530, and there spent the rest of his life. Correggio was married in 1520 to Girolama Merlini, who seems to have been the model for some of his Madonnas.

Correggio's work is characterized by marked individuality and superb technique. He shows an extraordinary knowledge of perspective and of anatomy, due, some authorities state, to his careful study of Mantegna and to instruction in the school of Bianchi-Ferrari. His painting of flesh tints is unrivalled, and he excels in the treatment of light and shadow. Boldness and simplicity mark all his compositions, and it has been said of his work that much of it is sensuous, though never sensual. Like other artists of the Renaissance, he secularizes Christianity; his altar pieces and other religious works have no true religious sentiment, but are rather the expression of his own ideals. His frescoes are perhaps his masterpieces. The convent of San Paolo, adorned with childish figures and mythological scenes, reveals Correggio as a master of composition, while his *Ascension of Christ,* in the cupola of St. Giovanni at Parma, the first work of the kind to be attempted, and his still more ambitious *Assumption of the Virgin,* in the Parma cathedral, show extraordinary boldness of design, mastery of foreshortening, beauty of coloring, and excellence of composition.

Other works are the *St. Francis Madonna* in Dresden, his earliest authenticated work; *The Marriage of St. Catharine,* and *Jupiter and Antiopi,* in the Louvre; *The Madonna della Scodella,* in Parma; *La Notte,* in Dresden; *Leda,* in Berlin; *Jupiter and Io,* in Vienna; the *Holy Family in Egypt,* and *Madonna adoring the Child Jesus,* in the Uffizi, Florence. Examples of his work are also found in the National Gallery, London, and in Hampton Court, and some of his drawings are in the British and South Kensington Museums.

Consult C. Ricci, *Life and Times of Correggio* (1896); T. S. Moore, *Correggio* (1906); J. Meyer, *Antonio Allegri da Correggio;* Brinton's *Correggio* in 'Masters of Painting and Sculpture' Series.

Corregidor, ko-rej'i-dōr, formerly the chief officer of justice, now the chief magistrate, of a town in Spain or Portugal; in Spanish America, either the chief officer of a *corregimiento* or district, or a magistrate having the right of enforcing the law in special cases.

Corregidor Island, a small fortified island at the entrance to Manila Bay, Philippine Islands. It has an area of 2 square miles and has 5 small dependent islands covering an additional 2 square miles. It consists of a rocky mass rising sheer from the water, is an army and hydroplane station, and the first post of the inner defenses of Luzon. Pop. about 500.

Correlation of Parts, an interesting problem of biology first expressed by Cuvier, who pointed out that certain organs are so correlated that a change in one, brought about through changes in use, involves a change in another. For example, the cleft hoof is always associated with certain forms of teeth and with the stomach of a ruminant. Sharp claws of flesh-eating animals are associated with sharp teeth and an alimentary tube adapted for a diet of flesh. Darwin emphasized the fact that there is often an analogous correlation in variation; thus, the development of the tusks in the boar varies with the development of the bristles, and male white cats with blue eyes are always deaf; further examples will be found in A. R. Wallace's *Darwinism* and Darwin's *Origin of Species.*

Correnti, kor-ren'tē, Cesare (1815–88), Italian statesman, was born in Milan, and did good service to his country by his numerous pamphlets inciting his fellow-countrymen to free themselves from the Austrian yoke. In 1848 he was secretary-general of the provisional government until the fall of Milan, when he fled to Piedmont. After the victory of Magenta he returned to Milan, and was made councillor of state in the first Italian Parliament (1860). He afterwards held various offices, and was created senator (1886).

Correspondence Courses, Schools; terms used for guided absentee study, conducted by mail. Its germ was 'university extension,' first developed in England (1868), as a means of taking special university courses at home. Cambridge University (1872) pushed this feature, and gave impetus to the broad popularization of 'adult education' which has now evolved into a gigantic movement in various types of study, inclusive of correspondence courses. In America the Society to Encourage Studies at Home (Boston 1873) was first to furnish correspondence instruction. The Chautauqua, N. Y. summer open-air educational institution then (1878) developed the Chautauqua Literary and Scientific Circle, with guided courses of reading and year-round study for absentees; reaching by 1938 an enrolment of 700,000 students. In Ithaca (1883) a 'Correspondence University' was begun; and (1884) Dr. Wm. Rainey Harper (q. v.) gave Hebrew courses by mail from the Baptist Union Theological Seminary, which he continued at Yale University (1888), and at the University of Chicago (1892) on a range of subjects, when he became its president. In 1903 Columbia also developed extension courses by mail, which have grown to large scope and size. Home study, university extension courses, are offered in about 85 institutions of higher education in 41 American States.

Secondary schools in a few backward sections have added instruction by mail (on high school grade subjects) in order that poorer and inaccessible populations may be served. (Examples, Porto Rico and in Western Canada).

Soon there developed specialized correspondence schools—the outstanding one being John Foster's International Correspondence Schools for trades, beginning (1891) in Shenandoah, Pa., as a school for miners, to prepare them for the examinations of the Mine Examining Board, then quickly spreading to a large school at Scranton, Pa. Within a decade it had correspondence classes on over 200 subjects, mainly trades and mechanical occupations, until recent years, when many new occupations have been taught. Twenty-five years after starting, the 'ICS,' as it is known, had taught 1,500,000 persons in every civilized country. It was housed in a huge administration building with hundreds of employes. Through the Smith-Sears Act (1919) war veterans were granted free instruction from the ICS. It is still the leading correspondence school in the world.

In 1939 the ICS had a total of approximately 500 standard courses, encompassing a total of about 2000 subjects or instruction units; 100 to 150 courses are revised every year. An average ICS lesson consists of 57 printed pages and requires 17.3 hours of study and written recitation; lessons varying from 20 to 160 pages, and study hours from 8 to 24. National headquarters for ICS are maintained in 24 countries. An apprenticeship or journeyman program, for systematic development, within a corporation, of a new supply of trained men, was first developed by the ICS in collaboration with a large railway system in 1898. Many firms use this related instruction plan of correspondence courses, to meet the universally acknowledged apprenticeship problem of industry. The ICS in its 45 or more years of history has had a total of about 4,400,000 students.

The quality of correspondence school courses has steadily risen as the field has been policed against abuses. Executives and moderately successful business folk have now less sensitivity about taking courses since adult education has become common, and since greater complexity of business, plus increasingly rapid technological changes have taken place, calling for re-education in skills. One of the important solutions of technological unemployment is known to be rapid re-education; while the American philosophy of constant forward progress instead of being content to be one kind of skilled worker for life has also stimulated use of the correspondence school method.

A second outstanding special school, about the turn of the century, was the Sheldon School of Salesmanship which in its career enrolled a total of about 250,000 students for mail instruction in selling. The La Salle Extension University, Chicago (1898) also developed business courses of study by mail; also the Page-Davis School of Advertising, Chicago, and the Alexander Hamilton Institute, New York. A large number of special correspondence schools followed specializing in teaching by mail home economics, law, engineering, nursing, accounting, commercial art, music, civil service, journalism, writing, taxidermy, languages, chiropractics, beautician, public speaking, song-writing, English, business management, Bible study, etc. Many questionable and fantastic courses also were offered, and the postal authorities have eliminated a considerable number. A 'gray zone' of doubtful correspondence schools still exists, using advertising in lower grade magazines and newspapers.

A secondary type of correspondence instruction is that afforded by some publishers of books who offer a combination of book-and-correspondence-instruction; the purchase of the book including some special lesson papers with review of examinations and consultation with the buyer. The lesson character of such instruction is minimized, to a point of mere review or question answering. The general development (1938) of adult education by the Government's 'CCC' projects for young people, and WPA adult education classes, as well as the low-price adult evening educational projects undertaken by local boards of education, are giving rise to a further limited application of the correspondence course. It is conceded by educators that the depression has developed a great tide of adult education of a more or less permanent character, in which correspondence school methods will be increasingly used by public authorities, universities, and even by private firms, a number of which now operate correspondence courses for salesmen and other employes. The radio has also developed an application of the correspondence course, by universities or by sustaining programs by broadcasting stations (example, University of Iowa; 12 lectures of 15 minutes, using a syllabus sent by mail to students working on assignments, who return papers for correction).

Only in really good correspondence schools is there genuine individual attention from, and personal relationship between, student and instructor. In the inferior schools the instruction is all standardized and the merest routine individual attention given. Clerks give routine, pre-arranged 'stock' answers to student questions. The better schools hire instructors who set up more genuinely personal instruction and examination; but of necessity a correspondence school student cannot expect much personal attention. He is usually asked to answer sets of review questions, or write five reports: (1) the lesson's aim, (2) his evaluation comment, (3) summary, (4) application of lesson, (5) answers to questions.

The correspondence course is a product of modern times, a time-saving device, since it is recognized by educators today that upper schools and colleges use more time than millions of people have to give to education, especially fast-learning people, who can discipline themselves to study, without a 'schoolmaster.' Prof. John Dewey, educational authority, has said that higher education consists in the main of *guided reading;* thus correspondence schools are educational

2 6 19

labor, time and money savers for persons who do not need, or cannot obtain, classroom petty discipline.

A significant feature of American and English correspondence schools is their reach over the world. The greater spread of English-speaking throughout the world, and the rise of ambition among the youths of many countries, unable to attend colleges, have resulted in the utilization of correspondence courses.

The coming of new techniques also stimulates correspondence instruction, as for example automobile, radio, Diesel engines, electric welding, television, airplanes.

Consult *Bulletins* 10 and 56 of the U. S. Bureau of Education; National Home Study Council, *Home Study Blue Book* (1928); W. S. Bittner, *University Teaching by Mail* (1933).

J. George Frederick.

Corrèze, ko-rez′, department in south central France, on the slope of the central plateau, to the west of the mountains of Auvergne; area 2,272 square miles. An elevated ridge extending in a southwesterly direction from the Millevache plateau in the north separates the valleys of the Vezère and Corrèze; the highest points are Mt. Besson (3,230 feet) and Puy de Monedière (3,000 feet). The Dordogne forms part of the eastern boundary of the department. The soil is chiefly granitic and the climate cold, but the lower valleys are fertile and picturesque. The chief crops are rye-grass, chestnuts, walnuts, wheat, oats, and maize; and grazing is important. Arms are manufactured at Tulle, the capital. Pop. (1936) 262,770.

Corrib, Lough, loκ kor′ib, large islet-studded lake, Ireland, in county Galway. Next to Lough Neagh it is the largest sheet of water in the country, having a length of 26 miles, a breadth of 1 to 6 miles, and an area of nearly 70 square miles. It receives through remarkable underground passages, such as the 'Pigeon Hole,' the surplus waters of Loughs Carra and Mask toward the north. Through Galway River it drains into Galway Bay.

Cor′ridor, a gallery in the internal distribution of a building round which the various apartments are grouped. It is sometimes open on one side, but is more often enclosed by roof and walls.

Cor′rie, a name applied in the Scottish highlands to an amphitheatre-shaped niche in a mountain side, with steep walls on three sides, and with the floor not continuous with the main valley below. The term is used by some writers as equivalent to cirque (q. v.), but is best restricted to the form described above. A similar formation is known as *cros* in Dauphiné, *kahr* or *kar* in the Tyrol, and *botn* in Norway.

Corrientes, kor-i-en′tās, province, Argentine Republic, lying between the rivers Paraná and Uruguay, adjacent to Paraguay and Brazil; area 34,325 square miles. It is a level country, and abounds in swamps and lakes. The chief river is the Corrientes (120 miles long). The forests yield valuable timber, and cattle raising is the chief occupation, though the climate and soil are suitable for agriculture. Pop. (1937) 347,055.

Corrientes, town, Argentine Republic, capital of the province of Corrientes, on the east bank of the river Paraná, 832 miles north of Buenos Aires. It is an interesting old town with attractive shaded streets and villas, a library, museum, and national college. It is of some commercial importance and has a trade in fruit, timber, cereals, sugar and tobacco. Pop. (1932) 51,872.

Corrientes, Cape, promontory on the eastern coast of the Argentine Republic, in the province of Buenos Aires.

Corrigan, Douglas Gorce (1907–), American aviator, was born in Galveston, Texas, the son of a civil engineer. While nursing ambitions to be a railway engineer, a big-league pitcher or a banker, he sold newspapers, worked in a lumber-yard, a building firm and a bottling works. However, a $2.50 ride in an airplane turned his thoughts to flying. He studied the art and made his first solo flight in 1926. Starting work on the flying field at San Diego, Calif., he made the acquaintance of Lindbergh in 1927 and assisted in the assembling of the Ryan monoplane which later became famous as the *Spirit of St. Louis.* Nearly ten years were passed in ground work as mechanic and practising flying. On July 17, 1938, he set out from Floyd Bennett Airport, New York, ostensibly with the intention of flying back to California, whence he had come by air a few days before, in a 9-year-old plane (the 'crate') which he had patched together himself. Instead of turning westward, he crossed the Atlantic and landed at Baldonnel Field, Dublin, Ireland, in 28 hours, 13 minutes. He raised a laugh 'that was heard around the world' when he mildly explained that his compass had gone wrong and he thought he was flying west. This gave him the sobriquet of 'Wrong-Way Corrigan.'

Corrigan, Michael Augustine (1839–1902), American Roman Catholic archbishop, was born in Newark, N. J., and was graduated (1859) from Mount St. Mary's College, Md., receiving his theological education as one of the original students in the American college in Rome. He was ordained a priest at Rome in 1863, and was professor (1864–8) at, and later president (1868–73) of, Seton Hall College, South Orange, N. J. In 1873 he was appointed bishop of Newark, which diocese he administered with the ability which marked all his episcopal services. In 1880 he was made coadjutor to Cardinal Archbishop McCloskey of New York, on whose death (1885) he became archbishop of New York, receiving the pallium in 1886.

Corroboree, ko-rob′ō-rē, a generic name given by the Australian aborigines to a nocturnal convention, accompanied by wild dancing round the camp-fire and other rites. Corroborees are held on all great occasions. Consult Spencer and Gillen's *The Native Tribes of Central Australia.*

Corro′sive Sub′limate, Mercuric Chloride, or Perchloride of Mercury ($HgCl_2$), is made by subliming a mixture of mercuric sulphate and common salt. It forms white crystals which are moderately soluble in water and alcohol, and is a powerful corrosive poison. Its antidote is white of egg, with which it forms an insoluble compound. It is one of the most powerful antiseptics known, a solution, 1 in 1,000, being used to render aseptic the instruments, dressings, etc., used in surgery. It is easily reduced, in the first place, to mercurous chloride (calomel), and further to metallic mercury.

Cor′rugated Metal, a term applied to sheets of iron or other ductile metal which have been pressed or rolled into a series of equal waves. By this means the resistance of the metal to pressures tending to bend or buckle it is greatly increased, the 'effective depth' of the corrugated sheet being that from crest to hollow of its waves. Corrugation is effected by passing thin plates of iron or other metals through pairs of rigid rollers, which impress the form of their outline on the metal. For out-of-door use corrugated iron is usually galvanized with zinc to increase its durability. Its most extensive commercial use is for roofs of buildings where lightness, portability, and cheapness are first considerations. The mechanical applications are numerous.

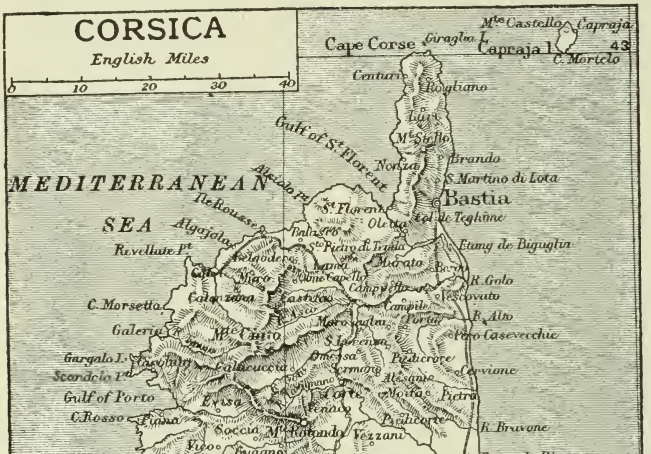
Corruption of Blood. See Attainder.

Corrupt Practices Acts. See Elections.

Cor'ry, city, Pennsylvania, Erie county, on the Pennsylvania and Erie Railroads; 37 miles southeast of Erie. The city has dairying interests, manufactures steel, lumber, leather, flour, furniture, and engines, and ships petroleum, discovered here in 1860. A State fish hatchery is located here. Pop. (1920) 7,228; (1930) 7,152.

Cor'sair (*Sebastichthys rosaceus*), a small, edible fish common in Southern California. It is one of the rockfish species, bright red and golden in color.

Corsairs, the cruisers of the Barbary States, to whose attacks the ships and coasts of the Christian countries of the Mediterranean were continually subjected. In English the word has often been considered as identical with pirate, but inaccurately, since the activities of the Saracen and Turkish corsairs were recognized by their governments as part of their settled policy towards Christendom. The principal strongholds of the Corsairs were Algiers, Tunis, and Morocco; the most famous of them were the Anatolian Turks, Khair ed-Din, known as Barbarossa, and Uruch, his brother, who flourished in the beginning of the 16th century, and Dragut, also a native of Asia Minor, who succeeded Barbarossa. The term is now loosely used of any pirate or freebooter, or of their vessels. See Barbary Pirates. Consult Stanley Lane-Poole's *The Barbary Corsairs.*



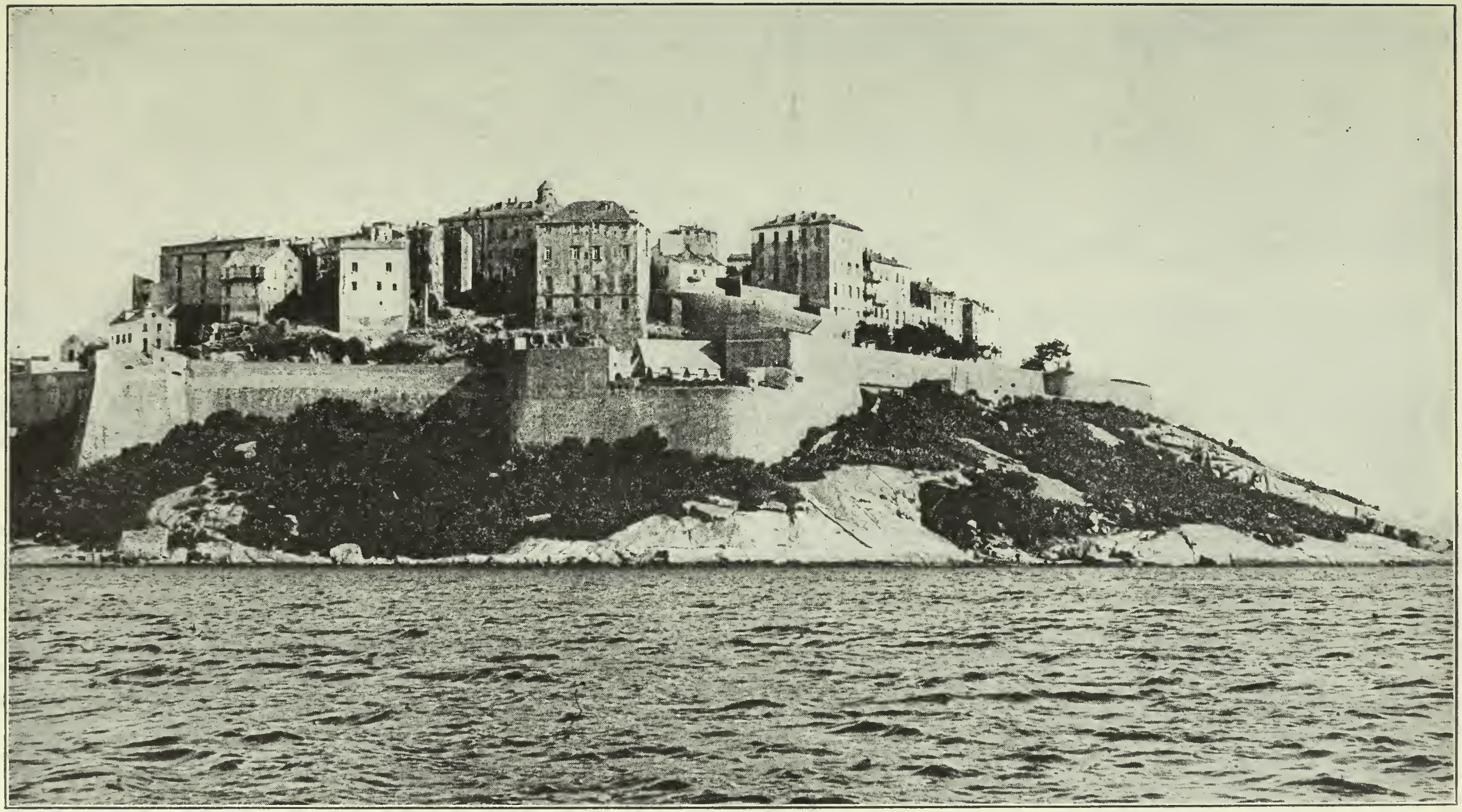
John Bartholomew & Co

Corse. See Corsica.

Cor'set, an article of dress worn generally by women as a means of support to the figure. Corsets were invented in Germany and introduced into France about the time of the Revolution. Modern corsets are generally made of jean, coutil, batiste, silk, or elastic webbing, reinforced by narrow pieces of whalebone or steel, or by bands of stitched material. Formerly they were usually in two pieces, fastened in the back by means of a lacing cord, but the modern tendency is more and more towards the one-piece corset, adjustable by means of elastic webbing, and conforming to the natural lines of the figure. Corrective corsets find a wide therapeutic application in spinal and other deformities.

Corsica, kôr-si-k*a* (Fr. *Corse*), island in the Mediterranean Sea, 8 miles north of Sardinia, 51 miles west of the coast of Italy, and 110 miles south of the French coast. It belongs to France, of which it forms a department. It is about 114 miles long and 50 miles wide, with an area of 3,367 square miles. Except for a zone of low and malarial ground along the east coast, the entire surface is mountainous. Two main ranges are distinguished, separated by the river Tavignano—one beginning at Cape Corse, the most northerly point of the island, and running inland, bisected by the Golo, which flows east; the other stretching from the N.W. shore, near Calvi, in a southerly and southwesterly direction through the greater part of the central and southern districts. The highest point in the island is Monte Cinto (8,890 feet) in the latter range; the best-known peak is Monte Rotondo (8,775 feet). In striking contrast to the east coast, the precipitous west coast is remarkably picturesque. The slopes are luxuriantly wooded, with palms at the shore line, fine larches above, and maquis, or scrub, on the heights. The Gulf of Porto, with its brilliant blue waters, is one of the beauty spots of the island. The climate is similar to that of Italy; the coasts are likely to be malarial in the summer months, but the mountain regions are healthful.

Corsica has little mineral wealth aside from a number of mineral springs. Chestnut and olive trees grow in abundance, and orange and other citrus fruits, vines, cereals, and mulberries are produced. The chief exports are olive oil, wine, gallic acid, wood, tanning bark, chestnuts, and fruit. Fishing for sponges, pilchard, and tunny is



© *Burton Holmes, from Ewing Galloway, N. Y.*

CORSICA: THE TOWN OF CALVI ON THE NORTHWEST COAST, WITH ITS SEA WALL

Vol. III.—Page 391

a leading industry, as is the extraction of gallic acid from chestnut bark. The inhabitants are a mixed race, hospitable and brave but indolent and vindictive, and their insatiable thirst for revenge (*vendetta*) has never been eradicated. They speak a corrupt form of Italian. The principal towns are Ajaccio, the capital, birthplace of Napoleon I; Bastia, Corte, and Sartène.

The early inhabitants appear to have been akin to the Iberians and Ligurians; later settlements were formed by Etruscans, Carthaginians, and Greeks. From the Carthaginians the island passed (265 B.C.) into the hands of the Romans. After the fall of Rome it was successively under the Vandals, Ostrogoths, Byzantines, Franks, and Saracens, from whom the Pisans wrested it in the 11th century. In the middle of the 14th century it passed to the Genoese, who in 1768 sold it to France. It was English from 1793 to 1796, since which time it has been French. Pop. (1926) 289,890.

Corsica'na, city, Texas, county seat of Navarro county, on the Southern Pacific, the St. Louis Southwestern, the Trinity and Brazos Valley, and the Texas Electric Railroads; 50 miles southeast of Dallas. It is the seat of the State Orphans' Home and an Odd Fellows Orphans' Home. The surrounding district yields farm products, cotton, livestock, and petroleum, for which the city serves as a central market. The first continuing oil production in Texas is said to have been located within the city limits in 1894, and the first oil refinery in the State was established here. Other leading industries include cottonseed crushing, coffee roasting, and the manufacture of textiles, bricks, and oil-drilling machinery. Pop. (1930) 15,202.

Cor'site, also known as Napoleonite, a variety of diorite, obtained near Ajaccio, Corsica, which shows a very perfect orbicular structure. When cut through and polished it makes a beautiful ornamental stone, showing on its surface groups of rounded spots an inch or more in diameter which, on minute examination, are seen to consist of crystals radiating from a center. Alternate bands are white (composed of feldspar) and dark green, almost black (consisting of hornblende). The same structure is found occasionally in granites—the so-called 'orbicular granites.'

Cor'slet, a breastplate, light cuirass, or sleeveless coat of mail or leather, worn by foot-soldiers in the 16th and 17th centuries.

Cor'so, the Italian 'race' or 'race-course,' applied sometimes to the main street of a town. The most famous is the Corso at Rome, the ancient *Via Flaminia,* nearly a mile in length, along which, during carnival, processions of maskers and gaily decorated carriages pass, waging mimic warfare with flowers and confetti. Formerly the carnival concluded daily with a race by riderless horses, which tore along the Corso, often doing much damage in their mad stampede. Similar races were held at Siena.

Cor'son, Hiram (1828–1911). American educator, was born in Philadelphia, Pa. His best-known books are *An Introduction to the Study of Robert Browning's Poetry* (1886) and *An Introduction to the Study of Shakespeare* (1889). He published numerous annotated texts of English classics.

Corssen, kôr'sen, Wilhelm Paul (1820–75), German classical scholar, was a lecturer at the famous 'Princes' school' near Naumburg. By his work, *Ueber Aussprache, Vokalismus, und Betonung der lateinischen Sprache* (1858–9), he gained the prize offered by the Royal Prussian Academy of Sciences for the best treatise on Latin pronunciation and accent.

Cort, kort, Cornelis (*c.* 1533–78), Dutch engraver, was born in Hoorn. He removed to Antwerp and studied under Hieronymus Cock, went in 1566 to Venice, and there secured the patronage of Titian, many of whose pictures he engraved. In 1571 he settled in Rome and established a school for engraving, at which Carracci was a pupil. His work includes engravings of paintings by Raphael, Michelangelo, Clovio, and other famous artists.

Cortes, kôr'tās, the name given to the legislative authority in Spain. It consists of a single chamber. See Spain; Portugal.

Cortes, kôr-tās', Hernando (1485–1547), Spanish soldier and conqueror of Mexico, was born in Estremadura, Spain. In 1504 he sailed for Hispaniola, where his kinsman Ovando was governor, and distinguished himself under Velasquez in the conquest of Cuba (1511). Having been commissioned by Velasquez to undertake the conquest of Mexico, newly discovered by Juan de Grijalva, he set sail from St. Jago (Santiago) de Cuba (February 1519), with 16 horsemen and about 300 infantry. He had barely touched at Trinidad when Velasquez sent orders to supersede him. Disregarding these, Cortes landed at Tabasco, March 25, and after a sharp encounter with the natives, in which he came off victorious, sailed along the coast until he reached what is now Vera Cruz, where he founded a colony, gaining over a number of caciques impatient of the Aztec yoke. Attacked by the Tlascalans, an independent tribe on the Mexican plateau, who had, for a time, successfully withstood the Aztecs, he defeated them with great slaughter, several thousand of them afterwards joining the standard of the conqueror. Against Cortes and his army the Cholulans, allies of Montezuma, chief of the Aztecs, after receiving them, formed a plot; but Cortes circumvented their treachery, destroying large numbers of them without losing a soldier. Marching now to Tenochtitlan, the Aztec capital, Cortes and his men were received there (Nov. 8, 1519) as divinities. News having come of an attack upon Vera Cruz, and the head of a Spanish soldier having been brought in triumph to Montezuma, Cortes conceived the bold scheme of seizing the 'priest-commander' as a hostage. Montezuma protested his innocence, and delivered up the chief aggressor, who, with a number of others, was burnt alive.

Shortly after this, Cortes heard that an expedition sent by Velasquez was marching against him. He therefore quitted the capital, leaving Pedro de Alvarado in command, and with 250 men marched against the Spanish force of 800. Surprising them by night, he took Narvaez, the leader, prisoner, and the defeated soldiers joined the victor. Back he hurried to the Aztec capital, where Alvarado by an unprovoked massacre had brought on an attack by the natives. Desperate conflicts ensued; Montezuma (whose brother, released by Cortes, had been chosen as priest-commander in his stead) perished in an attempt to pacify his subjects; and the infuriated Aztecs compelled Cortes to retreat from the city by night (June 30, 1520). However, he won a great battle against the Aztecs at Otumba on July 7, and with the aid of the Tlascalans succeeded in attaching 10,000 more natives to his service. Marching against the capital, after seventy-five days of fierce fighting he took it on Aug. 13, 1521; but the victory was marred by terrible atrocities.

After the conquest, Cortes developed the mining and agricultural interests of the country, rewarding his men with grants of land, and pursuing generally a sagacious plan of colonization. Appointed governor and captain-general of New Spain in 1522, he dispatched expeditions which conquered Guatemala and Honduras. Superseded in the governorship by Estrada, Cortes went to Spain to answer his accusers, and the king created him Marquis del Valle de Oaxaca (1528) and continued him as captain-general but not as civil governor of Mexico. Returning to Mexico (1530), he discovered Lower California (1536), and for ten years continued to send out exploring expeditions, but in 1540 returned to Spain. He was buried at Seville, but his remains were afterwards conveyed to Tezcuco, in Mexico.

Consult W. H. Prescott, *History of the Conquest of Mexico;* Sir A. Helps, *Life of Cortes;* H. D. Sedgwick, *Cortes the Conqueror* (1927).

Cortes, Sea of. See California, Gulf of.

died oct. 17 1948

Cortissoz, Royal, American journalist and art critic, was born in New York City. Art editor of the New York *Herald-Tribune,* contributor to magazines, and lecturer on art; member of the National Institute of Arts and Letters. His works include *Augustus St. Gaudens* (1907); *John La Farge* (1911); *Art and Common Sense* (1913); *Life of Whitelaw Reid* (1921); *American Artists* (1923); *Personalities in Art* (1925); *The Painter's Craft* (1930). He also edited *Don Quixote, The Autobiography of Benvenuto Cellini* and *Whitelaw Reid's American and English Studies.*

Cortland, city, New York, county seat of Cortland county, on the Tioughnioga River and on the Delaware, Lackawanna and Western and the Lehigh Valley Railroads; 35 miles south of Syracuse. It is the seat of a State Normal School and a county hospital. Its manufactures include stoves, drop forgings, wire, wire cloth and screens, boats, trucks, typewriters, cabinets, and wall paper. It is a shipping point for hay, oats, milk, butter, cheese, cabbage, maple sugar, silo corn, and has the largest turkey farms in the State. Pop. (1920) 13,294; (1930) 15,043.

Cortona, kôr-tō′nä, town and episcopal see, Italy, in the province of Arezzo, on the east side of the Val di Chiana; 17 miles southeast of Arezzo. The town is still, for the most part, surrounded by the ancient Etruscan walls; it has a museum of Etruscan antiquities, a cathedral, several ancient churches (with pictures by Luca Signorelli, Fra Angelico, Pietro da Cortona, and others), an academy (1726), a citadel, and remains of Roman baths. Cortona, formerly one of the leading cities of the Etruscans, was subjugated by Rome about 309 B.C. It is the birthplace of Luca Signorelli (1441) and of Pietro da Cortona (1596). Pop. (1936) 31,518.

Corumba, kō-rŏŏm-bä′, town, Brazil, in the State of Matto Grasso, on the west bank of the Paraguay River, about 330 miles southeast of Matto Grasso. The Brazilian naval arsenal, Ladario, stands on the opposite side of the river. It is an important commercial city and has direct communication with Montevideo. Pop. 17,500.

Coruna, kō-rōō′nyä, province, Spain, in the northwestern part, with an area of 3,051 square miles. Its extent of indented coast on the Atlantic affords numerous fine fiord-like harbors. The climate is damp and mild, the country is mountainous, and on the rich pastures many cattle are raised. Maize, wheat, chestnuts, and some wine are produced; fisheries are important and profitable, and food-preserving for export is carried on. Pop. (1934) 792,537.

Coruña or Corunna, known formerly to British sailors as The Groyne, city and seaport, Spain, capital of the province of Coruña, is situated on a tongue of land between two bays; 310 miles N.W. of Madrid. It consists of an old town on the heights and a new town below, now inhabited chiefly by the more wealthy of the population. Features of interest are the town hall, the churches of Santiago (13th century) and Santa Maria del Campo, and the Jardin de San Carlos, where Sir John Moore is buried. The harbor is deep and safe, and there is a large export trade. Fishing and tobacco manufactures are the leading industries. Pop. (1934) 79,614.

Coruña is of Iberian origin and corresponds to the Roman Brigantium. From here the Great Armada sailed for England in 1588. The place was besieged and partly sacked by the English under Drake and Norreys (Norris) in 1598; off the coast the French were defeated by the English fleet in 1747, and again in 1805 (Trafalgar); in the neighborhood the British, under Sir John Moore, in 1809 repulsed the French, at which time Moore lost his life. In 1823 the city was occupied by the French.

Corun′dum, a non-metallic, natural or artificial mineral consisting of alumina (Al_2O_3). It is the second hardest mineral known, and occurs in barrel-shaped hexagonal crystals and also in compact granular and lamellar masses. Transparent crystalline varieties, blue (sapphire), red (ruby), green (adamantine; oriental emerald), purple (hyacinth), and yellow (topaz), are valuable as gem stones. Opaque granular corundum mixed with hematite or magnetite, dark gray or black in color, is known as emery. Corundum has a hardness of 9 and a specific gravity of about 4. It occurs usually in crystalline limestone and dolomite, gneiss, mica, granite, and as grains and pebbles in placers. The best known deposits are in Canada, India, the Transvaal, Madagascar, and the United States, chiefly in North Carolina, Georgia, and Montana. Emery is found principally in Greece, Asia Minor, and in the United States, in New York, Massachusetts, and Virginia.

The principal demand for emery and corundum is for the grinding of optical glass, for which artificial abrasives cannot be substituted, and for making 'emery paper' and 'emery cloth.' The greater part used in the United States is imported.

Corunna. See Coruña.

Corval′lis, city, Oregon, county seat of Benton county, on the Willamette River, and on the Southern Pacific Railroad; 85 miles south of Portland. It is the seat of Oregon State Agricultural College. The chief manufactures are lumber, and flour, and the city is a shipping point for livestock, lumber, and grain. Pop. (1930) 7,585; (1938 est.) 9,000.

Corvée, kôr-vā′, a system of compulsory labor exacted from feudal inferiors, which from the Middle Ages onwards was more or less prevalent throughout Central Europe. It was an almost invariable concomitant of serfdom, though it existed, and still exists, where serfdom is not present. The demand for arbitrary *corvée* by the feudal lords of Southern and Central Germany, in the latter part of the 15th and early years of the 16th centuries, led directly to the outbreak of the Peasants' War of 1525, the abolition of some of these duties and the regulation of others being prominent in the twelve articles which the insurgent peasantry drew up as their rallying-cry. In Mecklenburg, obligations of this kind endured to near the middle of the 19th century; as they also did in Denmark, where their final abolition did not take place until 1864. The same year marks the abolition of *corvée* also in Roumania. It disappeared in Russia in 1861, when the serfs were professedly emancipated. In Egypt the Nile barrage, some twelve miles above Cairo, was built by *corvée* labor (after 1841 to 1867), and year by year the canals in connection with it were cleaned out by *corvées* of 20,000 men; but under British rule *corvée* was finally abolished in 1891.

It is from the institution as it existed in France before the revolution that the name *corvée* is specifically derived. After an abortive attempt by Turgot, in 1776, to put an end to the abuses arising out of it, *corvée* labor was finally and definitely abolished on Aug. 4, 1789. Besides the feudal or seigneurial *corvée*, there was also a royal *corvée*—*i.e.* services claimed by the king or the State. A form of this last still exists in parts of Europe to-day (*e.g.* Norway, Roumania), in the shape of a *prestation* or obligation to repair personally the communal roads of the country, though in some parts the obligation can be discharged by the payment of a tax. Antiquity offers at least one certain instance of public works on a vast scale being performed by *corvée* labor, in the erection of the Egyptian treasure-cities, Pithom and Rameses, by the Israelites; and no doubt, had we sufficient records, it would appear that such gigantic undertakings as the building of the pyramids, the erection of the palaces and gardens of Pasargadæ, the cyclopean walls of Cuzco in Peru, and other great edifices in Central America, owed their execution to the same kind of labor. In the armies of the Continent the manual labor performed by the soldier which is not of a strictly military character, such as cleaning, etc., is frequently known as *corvée*. Consult Fustel de Coulanges, *Histoire des institutions politiques de l'ancienne France.*

Cor'vey, a famous Benedictine abbey in Germany, on the banks of the Weser, near Höxter. It was founded about 822 by Louis the Pious, who richly endowed it, its first inmates being monks from Corbie in Picardy, whence its name *Nova Corbeia* (New Corvei). Directly under the Pope until 1793, it was converted into a bishopric by Pius VI. It was secularized in 1803, and ceded to Prussia (1815). It then passed into the hands of the Duke of Ratibor, who used it as a royal residence. In the ninth and tenth centuries many distinguished scholars went from its school—*e.g.* Ansgar, the apostle of Scandinavia—and its library formerly contained many valuble books and MSS.

Cor'vidæ, a large, widely distributed family of birds, in which are included rooks, crows, ravens, magpies, jays, and choughs.

Corvinus, MATTHIAS. See MATTHIAS CORVINUS.

Cor'vo, the most northern and smallest of the Azores; 12 miles north of Flores. It is little more than a huge rock, 4½ miles long by 3 miles wide. Pop. about 800.

Cor'vus, MARCUS VALERIUS (*c.* 371–271 B.C.), Roman general, was twice dictator of Rome (342 and 301 B.C.) and six times consul (348 to 299 B.C.). He was frequently engaged in war with the Volsci, Samnites, Etruscans, and Marsi, his greatest achievements being two complete victories over the Samnites in 343.

Cor'win, EDWARD TANJORE (1834–1914), American clergyman, was born in New York city, and was graduated (1856) from the New Brunswick, N. J., Theological Seminary. He was pastor of Reformed Dutch churches in New Jersey from 1837 until 1888. In 1897 he visited Holland as the agent of the general synod to make investigations on the history of the colonial churches in New York and New Jersey, and after 1898 was occupied in editing for the State of New York the records there obtained, later published as *Ecclesiastical Records of New York* (1901–05). His other works include *Manual of the Reformed Protestant Dutch Church in North America* (1859–1902), *History of the Reformed Church, Dutch, in America* (1895).

Corwin, THOMAS (1794–1865), American political leader (Republican) and orator, was born in Bourbon county, Ky. He became prominent as a lawyer and particularly as a public speaker. He was a member of the Ohio legislature (1821–2, 1829), representative in Congress (1831–40 and 1859–61), governor of Ohio (1840–2), and a member of the U. S. Senate (1845–50). Corwin was Secretary of the Treasury in 1850–3, and U. S. minister to Mexico (1861–4). Consult Morrow's *Life and Speeches of Thomas Corwin*, and Russell's *Thomas Corwin.*

Coryate, kor'i-*a*t, THOMAS (?1577–1617), English traveller. He lived for a time about the court of James I as a kind of privileged jester, and later travelled on foot through Europe (1608), publishing his experiences (1611) in *Coryate's Crudities*, a valuable record, despite the satirical panegyrics which his friends prefixed to it. In 1612 he set out anew on his travels, proceeding through Asia Minor, Persia, and Kandahar to Agra in India. He died in Surat.

Corybantes, kor-i-ban'tēz, priests of the Phrygian Cybele or Rhea, who celebrated her worship with wild dances to the music of the cymbals and drum. They are associated, also, with Zeus, and are said to have nursed him in Crete, drowning his cries with their music, lest his father Cronos should hear them.

Corydalis, kō-rid'a-lis, a genus of hardy annual and biennial herbs, belonging to the order Fumariaceæ, bearing attractive spur-shaped flowers and finely divided leaves. The principal American species are Pink Corydalis (*C. glauca*), found in rocky regions from New England to Minnesota and southward to North Carolina; Golden Corydalis (*C. aurea*) found from Vermont to Pennsylvania and westward; Pale Corydalis (*C. flavula*) having pale yellow flowers and growing in rocky woods from New York and New Jersey to Minnesota and southward.

Corydalis, or DOBSON, a curious insect belonging to the family Sialidæ. It occurs in North America, where the fly is often called 'hell-grammite,' and the larva, which is frequently used for bait, is known as 'crawler' or 'hell devil.' The fly is a large greenish-brown insect about two inches long, with four wings, having a spread of more than four inches. The female has powerful biting jaws. The eggs are laid in chalky-looking masses on the leaves of trees, near streams. As they hatch, the young drop into the water and spend a three year period of larval life on the bottom. When full grown the larva leaves the water, finds a suitable place, generally under some stone or log, and pupates, emerging in about a month as an adult fly.

Corylus. See HAZEL.

Corymb, kor'imb, a flat-topped inflorescence in which the terminal or apical flowers are the youngest, the flower-bearing axis is lengthened, and the flowers stalked. The flower-stalks or pedicels are of different lengths, those which arise nearest to the apex being shortest.

Coryphæna, a genus of bony fishes. See DOLPHIN.

Coryphæus, kor-i-fē'us, the leader of a chorus or company in a play; also the leader of a party. The term is applied in Oxford University to the assistant of the choragus in the musical praxis.

Coryza, kō-rī'za, or RHINITIS, an inflammatory condition of the mucous membrane of the nose, attended by an increased discharge of mucus or mucopurulent fluid. It occurs independently, as the common cold, is characteristic of such conditions as hay fever or hay asthma, and is seen in the initial stages of such diseases as measles, whooping-cough, and influenza.

Acute coryza, or the common cold, is characterized by a sensation of burning or irritation in the nose and nasopharynx, nasal obstruction, sneezing, and frequently conjunctivitis and lachrymation. The nasal discharge is at first profuse, watery, and intensely irritating, later becoming mucous or mucopurulent in character. Associated symptoms are headache, chilly sensations, and slight fever. Unless complicated by involvement of the trachea, bronchi, or accessory sinuses, the infection usually expends itself in seven to ten days, with a complete return to normal well-being.

That acute coryza is contagious is a generally accepted belief, but no single responsible organism has been isolated. Exposure may be a predisposing cause, and fatigue undoubtedly plays a part in reducing resistance. Nasal abnormalities and pathological conditions in the nose and pharynx are important contributing factors. Preventive measures are avoidance of overheated houses and places of assembly, all measures which build up the general health, and the correction of nasal abnormalities, sinus infections, adenoids, etc. Isolation of infected individuals is desirable but difficult to secure.

Treatment.—General measures include rest in bed, free catharsis, and diaphoresis. The time-honored hot pack accompanied by a mustard foot bath and hot lemonade is undoubtedly beneficial. For the headache, aspirin or other appropriate remedies may be employed. Locally, argyrol in 10 to 25 per cent solution dropped into the nose every two to five hours enjoys wide popularity. Chloride of zinc and nitrate of silver may also be used locally and, as less irritating for children, camphor, menthol, or abolene. Vaccines have been tried, but their value is questionable.

Cos, or Coo, island in the Ægean Sea. It lies s.w. of Asia Minor at the entrance to the Gulf of Cos, and is 21 miles long and about 5 miles wide. A lofty mountain chain stretches along the southern coast, but the remainder of the island is a fertile plain with a fine climate. Agriculture is the leading industry, and grapes and raisins are exported. It is the birthplace of Hippocrates (q. v.). Important excavations have been carried on, and interesting discoveries made. The capital is Cos (pop. 9,809). Area, 109 sq. m.; pop. (1936) 19,731.

Cos was early colonized, was a member of the Athenian League, and enjoyed considerable prosperity. In 1523 it was captured by the Turks, and in 1912, during the Turco-Italian War, was occupied by Italy.

Co'sa, Juan de la (*c.* 1450–1509), Spanish navigator, thought to have been born in Calabria, Italy. He accompanied Columbus as pilot in 1492, and later was sent on several expeditions to explore the newly discovered lands. He is chiefly remembered for two colored maps (1500) designed by him on vellum, one marking out the lands discovered by Columbus and his successors, the other the Spanish possessions in Africa visited by him in his younger days. He died on an island in the Bay of Cartagena.

Coscinomancy, kos'i-noman'si, an old form of divination by sieve and shears. A sieve was either suspended from or fixed on the points of a pair of shears, when a diviner uttered the names of the suspected persons. If the sieve trembled at one of the names, the person bearing it was considered guilty. A similar divination is still practised on the Guinea coast, and by Negroes in the Southern United States. Consult Tylor, *Primitive Culture*.

Cosely, kōz'li, town, England, in Staffordshire, a suburb of Wolverhampton. It has iron and cement works and collieries. Pop. (1931) 25,137.

Cosenz, kō'zents, Enrico (1820–98), Italian soldier and public official, was born in Gaeta. He fought against the Austrians (1848), subsequently assisting in the defense of Venice, after the fall of which he fled to Turin. Returning to active service as commander of one of Garibaldi's regiments (1859), he distinguished himself at Milazzo. Entering the Italian army (1861), he led a division at the attack on Rome, and became minister of war. From 1860 to 1872 he was a member of the Chamber of Deputies and in the latter year was created senator. In 1881 he was appointed chief of the general staff, an office which he held for twelve years.

Cosenza, kō-zent'sä, province in Calabria, southern Italy, in the northern part of the Calabrian peninsula, between the Gulf of Taranto and the Tyrrhenian Sea; area, 2,566 square miles. Except for the valley of the Crati, the surface is mountainous, the northern parts being occupied by the Calabrian Apennines (6,520 ft.), and the southern parts by the Sila (6,330 ft.). Tin, lead, silver, and other minerals are found in the Sila Mountains, which are clothed with chestnuts, oaks, beeches, and conifers. Deforestation has left much area for pasturage. Corn, rice, olive oil, wine, fruits, rock-salt, and cheese are produced. Up to 1871 the province was known as Calabria Citeriore. Pop. (1936) 587,025.

Cosenza, town and archiepiscopal see, Italy, capital of the province of Cosenza, is situated at the confluence of the Busento and the Crati; 33 miles n.w. of Catanzaro. It consists of an old town with steep narrow streets and a new town with wide thoroughfares and modern buildings. Features of interest are the castle, several times shattered by earthquakes, partially restored in 1928; the 13th century cathedral; a seminary; museum; theatre; and academy of science and arts. The town is a center for trade in silk and agricultural products and manufactures cutlery, majolica, and textiles. It suffered earthquakes in 1181, 1638, 1783, 1854, 1870, and 1908. Pop. (1936) 40,032.

Cosgrave, William Thomas (1880–), Irish politician, was born in Dublin and educated at Christian Brothers Schools. He served on the Dublin Corporation as alderman and chairman of the Finance Committee (1909–22); elected a member of the Dail Eireann in 1922, he took a leading part in the Sinn Fein movement and had a large share in negotiations which settled the Irish question. He was chairman of the provisional government appointed in 1922, and the same year became President of the Executive Council of the Irish Free State. He filled this post until 1932, when he was succeeded by Eamon de Valera.

Coshocton, kō-shok'tun, city, Ohio, county seat of Coshocton county, on the Muskingum River, connected by bridges with Roscoe, and on the Ohio Canal and the Wheeling and Lake Erie and the Pennsylvania Railroads; 68 miles northeast of Columbus. It has a city hospital and a public library, and is a manufacturing center and a trade center for agricultural produce. The city was founded in 1801. Pop. (1930) 10,908.

Cosimo, koz'ē-mō, Piero di (1462–1521), Italian painter, a pupil of Cosimo Rosselli, and afterward master of Andrea del Sarto. His best works include a *Conception* and *Madonna* at Florence (Uffizi); *Death of Procris* (National Gallery, London); *Coronation of the Virgin* (Louvre); *Christ and the Baptist* (Berlin); *Wedding of Perseus; Rescue of Andromeda.* He was influenced by Leonardo, but was an eccentric artist, fantastic in design, sometimes admirable in color, but faulty in the proportions of his figures.

Cosimo dei Medici. See Medici.

Cos'mas, surnamed Indicopleustes ('Indian traveller'), an Egyptian traveller, was born in Alexandria in the sixth century. In earlier life, as a merchant trading with Ethiopia and Asia, he gathered material for his work on *Christian Topography* (*c.* 547), which is printed in Montfaucon's *Collectio Nova Patrum Graecorum* (vol. ii. 1706), and is valuable for its geographical notes.

Cosmas and Damian, Arabian Christian martyrs, were born in Arabia in the third century. Educated in the Christian faith, they practised as physicians in Cilicia, where they were noted for kindness to the poor. They were beheaded in the persecution under Diocletian (303), were canonized, and their bones taken to Rome, where a church was dedicated to their memory.

Cosmetics, term used to describe all lotions and preparations intended to beautify the body; face powders, creams and lotions for skin; rouges, lipsticks, dentifrices, mouth washes, hand lotions and nail polishes and dyes; hair tonics, washes and dyes; bath salts, perfumes, toilet waters, deodorants, and a wide variety of toilet preparations.

The use of cosmetics by women is fully as old as humanity. Graves opened by archeologists of women dead 6,000 to 10,000 years, indicate that nearly all the above items of cosmetics were known to the ancients. The deep psychological value of cosmetics is reflected in the discovery (1925) by psychiatrists that many insane women are definitely aided toward sanity by being given plenty of cosmetics, to build up their collapsed self-esteem.

The most widely used cosmetic items in America are: dentifrices 38 million dollars' worth; creams 26; face powder 20; perfumes 12; hair tonics and preparations 8½; talcum powders 8; face lotions 7; rouges 6; lipstick 5½; manicure preparations 5.

Following cosmetic tradition, which connects it with ancient magic, cosmetics are made of almost everything and anything, from herbal compounds to kangaroo glands. One famous cosmetician mentions her 'fundamental ingredients' as 'juice from lily buds, Italian parsley, California grapes, milk, eggs, honey, oranges, lemons, calves' feet and barley.' She insists that 'no two skins are alike,' and she and other makers of cosmetics sell as many as 50 different shades of face powders, requirements of which for quality are perfect adherence, fineness of texture, color and perfume. They are made of rice or orris-root powder or mineral powder, or a combination. Zinc or magnesium-oxide or kaolin are used to make powders adhere to skin. Mineral powders are usually of talc, too heavy for anything but 'export' trade. Shades are created by different ingredients—yellow ochre for cream, ochre and burnt sienna for brunette, phloxine for pink, erythrosine for pink, Armenian bole, orange dyestuffs, sienna and eosine for mauve, orange or mauresque. Eye-shading powder is obtained from cobalt or ultramarine blue. Rouge is made from zinc oxide, chalk and dyes, rouge lipsticks from white beeswax, lanolin, spermaceti, liquid paraffin, cocoa butter, etc., plus carmine.

Skin creams and lotions are made in endless variety from liquid paraffin, lanolin, white wax, with zinc oxide to make whiteness and borax to emulsify. Vanishing creams are made of stearic acid saponified with alkali. Lanolin creams are regarded as best, because absorbed by the skin to a greater extent. Massage creams contain casein preparations. Many (but not all) such varieties of creams as wrinkle, pore, astringent, reducing creams, freckle removers, bleach creams, muscle oils, etc., are on the questionable side. 'Hormone creams' have appeared since science has discovered that hormones can be fed through the skin, but medical opinion is severely against them.

For the hair, bay rum (alcohol, water, Jamaica rum, oils of bay and pimento); brilliantines, for glossy effects (liquid paraffin, almond or peanut oil and fragrant oils); curling lotions (alkaline, carbonates or borax, gum to saponify natural fats of hair); depilatories (freshly prepared barium sulphide and starch); hair tonics (pilocarpine, cantharides, quinine, rosemary oil, glycerine, tartaric acid, ammonia); shampoos, powders or liquid (sodium carbonate, borax, saponine, sodium sesquicarbonate, cocoanut oil, pine tar, and powdered soap—the alkaline bases of which saponify the hair grease, which is washed away in the rinsing), are among the most widely used. Bath salt crystals, perfumed bath tablets, powders for softening water, nail polishes, enamels, mascara for eyebrows, deodorants for body odors, reducing preparations, hair removers, hair dyes and scores of other cosmetics, many harmful, others harmless but misleading, and a few useful, are marketed. The 1938 drug act administers the regulations and advertising claims.

The act outlaws a cosmetic if it bears or contains any poisonous or deleterious substance which may render it injurious to users; and places new drugs under a permit control. Cosmetics under this act are deemed adulterated if violating above provision; if containing any filthy or putrid substance; if packed or prepared under unsanitary conditions, or if containing coal-tar color under certain conditions. Cosmetics are deemed misbranded if label is false or misleading; if not containing name and address of manufacturer, and accurate statement of quantity of contents; if any word or statement vital to the public's protection is not prominently displayed, or if the container is made, formed or filled in a manner to be misleading. The act applies to all cosmetics except soap. Hair dyes are exempted from the coal tar provision temporarily. Broader and stronger provisions for administration and enforcement are enacted than had ever been known before in food and drug regulation. The advertising claims of cosmetics are now much more strictly supervised than ever; this work falling upon the Federal Trade Commission.

Consult F. Chilson, *Modern Cosmetics* (1934); Mary C. Phillips, *Skin Deep* (1934); W. A. Poucher, *Perfumes, Cosmetics and Soaps* (1936); E. G. McDonough, *Truth about Cosmetics* (1937).

J. George Frederick.

Cosmetic Surgery, that branch of surgery which is concerned with the correction of defects or deformities of the face, either (1) acquired, as the result of trauma, burns, or mutilating operations, or (2) congenital, as hare lip. It is also resorted to for the modification of featural types, as unduly large mouth, excessively upturned nose, etc., and for the eradication of wrinkles. It includes skin grafting (see Skin), transplantation of skin and tissue in the form of pedunculated flaps, cartilage and bone grafts or transplants, and prosthetic surgery—*i.e.* the substitution of artificial parts, as plates of metal, celluloid, or ivory in deformities of the skull, the construction of artificial ears, etc. See also Rhinoplastic Operations.

Cosmic Rays. See Millikan Rays.

Cosmog'ony, any theory of the origin of the universe. Most primitive mythologies have legendary accounts of the manner in which visible things came into being. The Abipones and Eskimos are among the few peoples content to take the scene of their existence for granted. The less indifferent commonly imagined a watery chaos to begin with, from the depths of which the earth was, at a given moment, drawn up by some supernatural power. Of creation, in its true sense, there is no trace in any savage scheme of thought; indeed, the gods themselves need to be accounted for—a theogony is the usual prelude to a cosmogony. Hence, the narrative in the Book of Genesis is unique in its portrayal of absolute and majestic omnipotence, no less than for the orderly sequence of the plan it unfolds, and, above all, for the high ethical purpose underlying its disclosures. Its outlines closely follow the Assyrian legend deciphered by George Smith. The six days of creation appear in both with essentially the same progression of events. The Zoroastrian tradition evinced a more elevated conception of Deity, contaminated, however, by a pronounced dualism, Ahriman approaching perilously near the rank of a cocreator with Ormuzd or Auramazda.

The Greeks led the way in the construction of philosophical cosmogonies, or systems of world origins, based upon pure reason, apart from any guidance by tradition or warrant from ascertained fact. The highest type of such a system was exhibited in Plato's *Timæus*. In this sublime discourse there is full recognition of a personal Creator, who moulds inert matter with the impress of eternal ideas, and renders the whole an organic unity by the communication of a living spirit.

The Cartesian philosophy comprised a theory of nature as well as of knowledge, and marked a transition toward the scientific epoch of world building. This was reached in the eighteenth century.

In cosmogonical speculations, heat, air, atoms with rotatory motions, numbers—have all in turn been recognized as the fountain and causes of things. Of hypotheses as to the formation of our own rotating globe, of our system, and of all similar systems in space, the most notable is that of Laplace, founded on observation of the mutual relations of the planets, their common direction in rotation and revolution, their general conformity to one plane, etc., taken in connection with such facts as the rings of Saturn and the fundamental unity of the asteroids. Laplace had in some measure been anticipated by Kant. Thus arose the *Nebular Hypothesis*, the evidence for which was carefully marshalled by Sir William Herschel.

Following up this view of a formation of the planetary globes by natural causes, there have been speculations as to the commencement and progress of organic life upon them, and communication of it from one planet to another, notably by Lord Kelvin. Darwin's work has completely altered the face of biological research and theory (see EVOLUTION; DARWINISM; SPENCER). For the cosmogonies of the various nations, philosophies, and religions, see MYTHOLOGY; MATERIALISM; CREATION.

Cosmopol'itan, a 'citizen of the world'; one whose sympathies and tastes are catholic.

Cosmos. See COSMOGONY.

Cosmos, a genus of perennial plants belonging to the family *Compositæ*. There are some 20 species, most of which are native to Mexico, and a few annuals, of which *C. bipinnatus* is typical, are cultivated as garden flowers. This grows to a height of seven to ten feet, has a smooth stem with pinnately cut leaves and blossoms rose, crimson and white in color. A sandy soil, not too rich, produces the best flowers and it is generally best to sow seeds indoors in April and transplant when danger of frost is past.

Cosne, kōn (Latin *Condate Carnutum*), town, France, in the department of Nièvre, on the Loire; 34 miles northwest of Nevers. It has potteries and woollen mills, and mineral phosphates are found in the vicinity. Pop. 6,000.

Coss, or Kos, an Indian measure of distance, varying from 2½ to 1¼ miles, the average distance being 2 miles, 4 furlongs, 158 yards.

Cos'sa, LUIGI (1831–96), Italian political economist, was born in Milan. He was educated in Pavia and Leipzig and became professor of political economy at the University of Pavia (1860), and later at Milan. Among his works are *Guida allo Studio dell' Economia Politicia* (Eng. trans.) and *Primi Elementi di Economia Politicia* (of which the third volume, 'Taxation,' has been translated into English).

Cossa, PIETRO (1834–81), Italian dramatic poet, was born in Rome. After the political events of 1849 he went to South America, but returned to Rome, and taught Italian literature at a technical school until his death at Leghorn. He achieved his main successes in a series of dramas dealing with stories of ancient and modern Rome — *Nerone* (1871; Eng. trans.); *Plauto e il suo Secolo* (1876); *Messalina* (1876); *Cleopatra* (1879); *Borgia* (1878); *Cecilia* (1878).

Coss'acks (*Kazaku, Kasak*), a name meaning 'freebooters' in Turkish, applied to certain Russian military communities, people who formerly had the special duty of guarding the frontiers, and who won the reputation of being the best light cavalry of the Russian army. They are organized in ten *voiskos* (Don, Volga, or Astrakhan, Ural, Kuban, Terek, Orenburg, Siberia, Semiryechensk, Amur, and Usuri). The unit of cossack life is the *stanitsa*, or village commune.

The Don Cossacks have a regular history from 1554. In 1792 the Cossacks of the Kuban, or Black Sea (Chernomorski), were formed; and other Cossack lines were subsequently established on the lower Volga, on the Terek, on the River Ural, in Western Siberia, and elsewhere. Their military organization dates from Peter the Great; and their adoption of a thoroughly settled life, with its modern characteristics, is largely the work of that monarch and of Catherine II.

Cossack military service begins at the age of eighteen, and lasts twenty years; besides this, all Cossacks able to serve at all belong, without limit of age, to the reserve forces of the 'National Defence.' The military spirit, naturally strong, is carefully fostered, and prior to the Revolution of 1917 (see RUSSIA) the Cossacks formed one of the pillars of Russian autocracy. In March, 1917, however, when the Duma was convened and the election of a provisional government was voted, Captain Karaouloff, representing the Don Cossacks, stood with the new government, taking command of the troops of Tauris Palace. Later the Don Cossacks refused to recognize the treaty of Brest-Litovsk (March 3, 1918) between Russia and Germany, and were implacable in their hostility to the Germans and the Bolsheviki (q.v.).

Following the Revolution and with the advent of the Soviet government the Cossacks have lost their power and prestige and it seems probable that their day is over and that their romantic, though often cruel and bloody, past will soon be all that remains.

Agriculture is the principal industry of the Cossacks, with cattle and horse breeding; but they never adopted any of the comforts of civilization or many modern ideas, fighting and adventure being their only real interest. The Cossack lands cover an area in all of about 225,000 square miles, and the total Cossack population is estimated at 2,700,000. See DON COSSACKS TERRITORY.

Cos'sus. See GOAT MOTH.

Cossus, SERVIUS CORNELIUS, was consul at Rome in 428 B.C., when he is said to have killed the Veian king Lar Tolumnius in single combat, thus winning the *spolia opima*, 'chief spoils,' which could only be gained by a Roman general from the leader of the foe.

Cost, or Cotice, in heraldry. See Bend.

Costa, kōs'tä, Claudio Manoel da (1729–90), Brazilian poet. He was educated at Coimbra University, Portugal, whence he returned home in 1765. Implicated in a political plot, he was arrested, and is said to have poisoned himself in prison. He wrote many poems and sonnets (1751 and 1768), both in Portuguese and in Italian, modelled upon Petrarch.

Costa, Lorenzo (1460–1535), Italian painter, known as the 'Perugino of Ferrara,' was born in Ferrara, but in early life removed to Bologna where, with his pupil Francia he decorated the chapel of St. Cecilia. An allegorical composition showing the Gonzaga court is in the Louvre, Paris, while his *Virgin and Child* and several altar pieces are in Bologna. An excellent colorist, he excelled in landscape backgrounds and in architectural details.

Costa, Sir Michael Andrew Agnus (1808–84), musical conductor and composer, was born in Naples. In 1829 he went to England to conduct his master Zingarelli's cantata at the Birmingham festival, but sang the tenor part instead of conducting. After the production of his ballet *Kenilworth* (1832), he became director of music at the King's Theatre; produced several ballets and operas (including *Don Carlos,* 1844); conducted the Philharmonic concerts (1846–54); was knighted (1869); and eventually conducted at nearly all the festivals. From 1871 he was director of Her Majesty's Opera. His two most prominent works are the oratories *Eli* (1855) and *Naaman* (1864); but his best title to fame is his position as the first great conductor in England.

Costa Rica, kōs'tä rē'kä, a flourishing republic of Central America, extends from the Caribbean Sea to the Pacific Ocean, having Nicaragua on the north and Panama on the south. It is divided into seven provinces, San José, Alajuela, Heredia, Cartago, Guanacaste, Puntarenas and Limón; area, 23,000 square miles.

Except on the coast, the country is generally mountainous, with many volcanoes all under 11,500 feet. On the Atlantic slope, dense forests prevail; but wide savannas are more frequent on the Pacific side. On the Pacific are two extensive bays, the Gulfs of Nicoya and Dulce, and several smaller harbors. The highest peak is Irazu (11,500 feet), popular for tourists. There is scarcely a square mile without a fair-sized stream and water power is unlimited.

Climate varies from tropical at the coast to almost temperate in the higher altitudes. There is a wet and a dry season. Along the coast are marshes and sandy wastes. The flora varies from tropical to alpine. Cedar, ebony, lignum-vitae, pochote, cocobolo, mahogany, oaks, chaparrales, and other varieties of marketable woods stand in virgin forests, but little lumbering is done. More than one-half of Costa Rica lies between altitudes 2,900 and 6,800 feet, and is covered with luxuriant forest. Bird life is extremely plentiful and of great richness of color. Among wild creatures are jaguars, tepescuintes, tapirs, rabbits, deer, wild pigs, and monkeys.

Agriculture is the principal industry. Coffee and bananas constitute 70 and 20 per cent. respectively of the exports. The coffee is the 'mild' variety which receives the highest prices in Europe. All kinds of tropical and subtropical fruits are produced. Cacao is the third ranking export. Among other products are dyewoods, timber, tobacco, sugar, rubber, rice, beans, and corn. There are vast cattle pastures, especially in Guanacaste and cattle fairs are held weekly at Alajuela. Hides and skins are exported. Mining, which is in a backward state, is encouraged by the government. Gold and silver is mined on the Pacific slope. Copper, quartz, alabaster, onyx, granite, slate, and manganese, are also known to exist. Many local needs are supplied by small factories—shoes, tiles, brick, furniture, soap, candles, etc.

Costa Rica's ***foreign trade*** was valued at $22,960,003 in 1931. Exports included coffee, bananas, and cacao, 60 per cent. going to the United Kingdom, 23 per cent. to the United States. Imports included cotton, iron and steel, flour, mineral oil and derivatives, motor cars and trucks, silk goods, etc., of which 52 per cent. came from the United States and 12 per cent. from the United Kingdom. The chief ports are Puntarenas, on the Pacific, and Limón, on the Caribbean.

Transportation.—Both ports are connected with the capital by fine railroads, that from Limón being a marvel of engineering skill, passing along precipices a thousand feet deep and crossing seemingly bottomless chasms. There are postal, telegraph, radio, telephone, and wireless services. In 1930 air mail was inaugurated between San José and Puntarenas and with Central America and the United States.

Population.—The latest census was taken in 1927. It gave the total population as 471,525, and that of the provinces as follows: San José, 153,183; Alajuela, 97,577; Heredia, 38,407; Cartago, 70,199; Guanacaste, 51,142; Puntarenas, 28,739; Limón, 32,278. The principal cities with their population in 1932 were: San José, 55,857; Cartago, 17,177; and Limón, 15,982. The majority of the population are white with no trace of Indian blood.

Religion and Education.—The State religion is Roman Catholic but religious liberty is guaranteed. Elementary education is free and compulsory. Secondary education is offered in schools at San José, Alajuela, Cartago, and Heredia. There are training schools in commerce, nursing, and teaching and professional schools of Law, Pharmacy, and Fine Arts. The government gives a number of fellowships for study abroad in certain professions which are not provided for in Costa Rica. There is a Division of Agricultural Education which directs agricultural work in the public schools. There is also an agricultural school.

The ***government*** is a constitutional republic founded on the constitution of 1871 and frequently amended. The executive power is vested in a president elected for four years and assisted by seven secretaries. The legislative power is in a Constitutional Congress of 43 deputies, one for every 8,000 inhabitants, serving for four years, and half being renewed every two years. Voting is secret, direct and free. There is a supreme court, a court of cassation, appellate and inferior courts.

The revenues in 1932 were colons 26,407,046; expenditures, colons 24,865,179. The monetary unit, the *colon,* is stabilized at four to the American dollar.

The ***army*** numbered 150,485 in 1929. The active army is limited to 500 by a convention reached in 1923 by the Central American States.

History.—Discovered by Columbus in 1493, and probably first settled on his fourth voyage, in 1502, Costa Rica has had much the same history as its neighbors. Its present constitution is the tenth since the declaration of independence in 1821, when the country threw off the Spanish yoke, and joined the Mexican empire of Iturbide. It was one of the states of the Central American Republic from 1824 to

1829, when it became independent.

Since 1847, when her constitution was proclaimed, Costa Rica has enjoyed almost unbroken peace. A boundary dispute with Nicaragua was settled by treaty in 1896, after it was submitted to the president of the United States for arbitration. The boundary with Colombia was not settled until 1921 when the decision of President Loubet of France of 1900 was finally agreed upon. The boundary with Panama remained unsettled in 1933. F. Tinoco's government (1917–19), following a bloodless revolution, was never recognized by the United States. A very able president was Ricardo Jimenez Oreamuno, who served terms commencing in 1910, 1924, and 1932. Turbulent political activities marked the years of the depression after 1929. In 1931 an income tax was imposed and a national financial and economic council was established. In 1928 a law was passed which nationalized electric power to form a government service. See Central America.

Consult Oronzo Quarta, *Costa Rica* (1915); R. Villafranca Carazo, *Costa Rica Guide for Tourists* (1921); W. Thompson, *Rainbow Countries of Central America* (1926); F. G. Calderón, *History of Costa Rica* (1915); U. S. *Consular Reports;* Pan American Union *Bulletins*.

Coster, kos'tėr, Lourenz Janszoon (*c.* 1370–1440), according to the Dutch the inventor of printing by movable types, was born in Haarlem. His claims as inventor were first circumstantially set out by H. Junius in *Batavia* (1588), who said that Coster lived about 1440 at Haarlem, and that while walking in a wood he began to cut letters out of some beech bark. The idea germinated, and soon, by using a thick ink, he began to print whole pages. Then he made letters of lead and tin. His business increasing, he employed workmen, one of whom was Johann Fust (q. v.), or Faust (afterward a partner with Gutenberg), who stole his appliances and went to Mainz, where he opened a workshop for printing. This claim, which is discredited by those who adopt the cause of Gutenberg (q. v.) is set forth in Hessell's *Haarlem, the Birthplace of Printing.* See Printing.

Cost'igan, John (1835–1916), Canadian public official, was born in St. Nicholas, Quebec. He was educated at St. Anne's College and in 1861 entered the New Brunswick legislature, and was reëlected up to the election prior to the Confederation, when he authorized the returning office to declare his opponent the victor in order to avert a riot. Returned to the Dominion House of Commons in 1867, he continuously held his seat until 1907, when he was appointed to the Senate. Between 1882 and 1896 he was Minister of Inland Revenue, Secretary of State, and Minister of Marine and Fisheries.

Cost Keeping. In all factories it is of the utmost importance to know exactly what each article or class of articles costs, so that the manufacturer can regulate his prices. Formerly manufacturers took their costs from estimates in which many items of expenditure may have been overlooked. There has been great improvement in this respect, and in the best organized factories much trouble is taken to analyze every cent of expenditure, and apportion it to the particular work for which it was incurred.

The general scheme of the American cost system is as follows: Each job is given a number; 'jobtickets' bearing that number are issued to all workmen engaged on that job; each of them writes on his ticket the exact time spent on it; each man's work is then valued by a clerk according to the wages paid to him; and the total of all the tickets bearing the same number shows the cost of labor on that job. To this total must be added a percentage, carefully calculated, to cover management, light, heat, depreciation of machinery, and various general expenses, which cannot be specifically apportioned to particular jobs. Materials used are entered and priced on 'requisitions,' also bearing the number of the job to which they apply. The totals of the tickets and the requisitions, with the percentage for general expenses, make up the cost.

Elaborate systems of accounting are also devised to show that the totals of job tickets and requisitions over a period balance with the total expenditure of labor and material during that time, and in this way the manufacturer knows that no items have been omitted from his costs. Cost accounting through the use of standards has invaded the field. It employs predetermined figures in place of actual costs and the total of such assigned figures is compared with the actual production. This plan is less costly and gives an immediate check on the value of changes and improvements.

Cost'mary. See Tansy.

Cost of Living, a condition resulting from the relation of prices and income to the standard of living. Since all three factors are influenced by a multiplicity of conditions and causes it is well-nigh impossible to give the cost of living and its changes with exactitude. However, trends may be determined for given classes of people.

From 1896 through the war the rise in the cost of living was almost world-wide, resulting in an increasing interest in the subject and much discussion as to its causes. The war gave a great impetus to the upward tendency previously prevailing. As a result a number of studies were made at that time, mainly with the idea of adjusting wages to take care of the increased demand upon income. Thus a large part of the literature deals with the cost of living of wage earners. But within more recent years while cost of living fell attention turned on the salaried or *white collar* class, also to the problems of farm agricultural workers.

Compared with Standard of Living.—Changes in the cost of living are difficult to separate from changes in the standard of living. The quality and type of goods demanded are constantly changing. When one type of goods is substituted for another in the family budget, does it mean a change in the standard? It is certainly true that the standard of living has increased as well as the cost of living. In some cases it is easy to segregate the cost of the increased demands, as in the often-used illustration of the automobile. However, in the case of urban rents, for instance, which are generally higher than formerly, it is not so easy to allocate part of the rise to the greater number of bathrooms, better lighting, heating, etc. Since this tendency toward greater comfort is widespread it must be taken into consideration but there is a distinction here which should be borne in mind in any discussion of the cost of living. A rise or fall in the cost of living means increasing or decreasing costs for the *same* standard. It is often said that the cost of living is much less in small towns or in the rural districts but a part of this smaller cost is due to a lower standard.

Chase Woodhouse compared the expenses of a government employee in Washington in 1816–17 and a similar case in 1926–27. The first family paid or spent $1,986.65; the second, $4,853.83. Some items for a large amount spent at the later date were not available in 1816–17, an example being the

Items of Expenditures	1926–27		1816–17	
	Dollars	Percentages	Dollars	Percentages
Food	914.44	18.8	916.35	46.1
Clothing	604.31	12.5	106.04	5.3
Housing	1,241.88	25.8	191.18	9.6
Operating	707.15	14.6	162.84	8.2
Health	118.55	2.4	6.95	0.3
Development	427.08	8.8	44.97	2.3
Furnishings & Equipment	88.08	1.8	367.30	18.5
Personal	58.41	1.2	120.55	6.1
Automobile	166.18	3.4	...	...
Life Insurance	292.15	6.0	...	...
Savings	225.60	4.6	...	...
Miscellaneous			70.47	3.6
Total	4,853.83	100.0	1,986.65	100.0

automobile or some items of food as oranges and canned foods; an example of the latter is the very much improved housing of the present day. Mr. Woodhouse added up the amounts spent in 1926–27 for those items not available in 1816–17 and the difference in amounts spent for those articles which had been greatly improved. If the total of these expenditures is added to the amount spent in 1816–17 the result is very similar to the budget of 1926–27, indicating a higher standard rather than much difference between the cost of living in the two periods.

This indicates the importance of using the same standard of living when measuring differences or changes in the cost of living. Thus a comparison between the cost of living for a wage-earner with an income of $1,500 in 1918 and for a salaried worker with an income of $3,000 is patently misleading. Another complication arises from changing habits of consumption in families of the same occupational and income group without any marked changes in the general standard, which makes necessary periodic revision of family budgets used in determining indexes of the cost of living.

Causes of Changes in the Cost of Living.—Since the cost of living is a result of three variable factors — prices, income, and standard of living—changes in the cost of living are properly stated in terms of one variable, the other factors remaining constant. Prices are usually taken as the variable.

The subject of prices and what determines their changes is highly technical. Prices of some commodities rise while others decline, and no change in the cost of living may result. Moreover, prices of some goods change more rapidly than do others. The causes of these conflicting, lagging or synchronous price movements are manifold, but they are fundamentally the causes of changes in the cost of living.

However, the cost of living is usually analyzed as affected primarily by changes in the general price level. Explanations of these changes vary widely, largely because certain influences operate more strongly at one time than another. Economists generally agree that the rise and fall of the general price level are strongly influenced by the amount of production per capita in relation to market demand, and by the amount of money in circulation in relation to the amount of business to be done. The increased supply of gold is also frequently given as one of the main causes of the upward trend of prices from 1896 to the war. These and other influences are so variable at different times and places as to preclude even a cursory summary; the literature of business cycles should be consulted.

As to the relation of prices and income it is self-evident that if income and prices either rise or fall in the same proportion there is no change in the cost of living. However, all prices never rise or fall in the same proportion. While wages and salaries show an upward tendency in a period of rising prices there is always a lag during which time people dependent upon wages or salaries have a difficult time adjusting income to expenses. At such a time wage-earners are slightly better off than salaried people since there is apt to be steadier work during a period of expansion such as accompanies a period of rising prices. Thus while the hourly rate of a wage-earner may be no higher, his total weekly earnings may be more, due to steadier employment. On the other hand during a period of falling prices there is again a lag but this time in favor of wage-earners and salaried people. During such a period the latter class is more favored for two reasons: (1) there is a quicker adjustment between wages and price changes than between salaries and price changes; (2) during a period of falling prices there is business contraction, more unemployment and smaller weekly earnings among wage-earners even though hourly rates may remain high for a time.

Measurement of the Cost of Living.—The index number is the usual method of showing price changes. A cost of living index number gives the relative changes in price of those items entering into the family budget as compared with a certain year which is taken as standard and represented by 100. In making up an index number the items used are weighted according to their relative importance in the total budget. For instance the investigation made by the United States Bureau of Labor Statistics in 1918 shows that 73.8 pounds of fresh beefsteak and 710.3 pounds of Irish potatoes were consumed per family in a year. The difference in amounts consumed is used as the basis for weighting. Most of the cost of living studies have taken either 1913 or 1914 as their base year.

To get at changes in the cost of living it is necessary to know what comprises the family budget. The family expense will of course vary according to income and standard. A great increase in the cost of precious stones will affect the expenses of few families but a rise in the cost of bread will be felt by all. Thus it is not only important to know what prices have risen or fallen but also how much of the total income goes for various items. If the cost of certain things rises unduly there will be substitution where possible. If the price of oranges goes up while other food stuffs remain at the old level, many families will go without or substitute some other fruit. If there is a general rise in the cost of food the problem of substitution becomes more difficult but there will be some replacement, probably by cheaper cuts of meat and poorer quality. These factors taken with the fact that the type of goods obtainable in the market is constantly changing show the difficulty of getting at a very accurate figure of the cost of living. In order to determine the cost of living it is necessary to decide what income group is to be studied and then get a number of family budgets from this group. In this way a representative budget can be determined for people with a certain range of income. However, since expenditures vary with changing prices and conditions it is necessary to revise such a budget from time to time.

Records of wholesale prices go back much further than do records of retail prices. Wholesale prices are of course not an accurate index for the cost of living as wholesale prices fluctuate more widely and go up or down some time in advance of retail prices. In addition, wholesale price indices are not weighted according to family consumption. However, wholesale prices are indicative of the trend of the price level and do in a general way show the variations in the cost of living. In the Commission of Gold and Silver Inquiry: U. S. Senate Foreign Currency and Exchange Investigation there is an index for the United States going back to 1791 using 1913 as a base. It is interesting to note that in 1814, 1865 and 1919 and 1920 the index number is over 200. Many people feel that high prices are peculiar to the present day, but this series shows that prices have been just as high in other periods. It also shows that the periods of highest prices are those affected by wars. There are several periods during which the index number was under 100 indicating low prices. These periods were 1843–1852, 1858–1861, 1878–1909. During the latter period the index number was 105 in 1882; with that exception the number varied between 67 in 1896 and 1897 and 99 in 1881. In 1927, the last year for which the U. S. Bureau of Labor Statistics constructed the index for wholesale prices on a 1913 base the number was 147.

Studies of the Cost of Living.—Before 1913 isolated cost of living studies were made but no attempt was made to keep records over a period of years to show the changes.

An extensive study of the cost of living for wage earners in the United States in 1890 and 1891 was made by the Department of Labor. It applied only to wage earners in the following industries: iron, steel, bituminous coal, coke, iron ore, limestone, cotton goods, woollen goods, and glass. The findings of the investigation were published in the sixth and seventh annual reports of the Commissioner of Labor. A later study was made in 1901–02.

In 1918–1919 the U. S. Department of Labor undertook another investigation 'working in coöperation with the National War Labor Board . . . .' This investigation covered white families in 92 cities or localities in 42 States, the cities varying in size from New York to small country towns of a few thousand population. In selecting these places it was the aim of the bureau to get representative data that would show living conditions in all sections of the country and in all kinds of localities. The families studied represented the wage-earning and low and medium salaried families. It was found that on an average 38.2 per cent. of the total income went for food, 16.6 per cent. for clothing, 13.4 per cent. for housing, 5.3 per cent. for fuel and light, 5.1 per cent. for furniture and furnishings, 21.3 per cent. for miscellaneous.

A study of 96 academic families made by Miss Peixotto in California shows a different distribution of expenditures at a slightly higher income level with a different standard of living. As an average, 17 per cent. of income was allotted to food and 9 per cent. to clothing. Shelter took an average of 17 per cent.; house operation 13 per cent.; miscellaneous 43 per cent.

In addition to the studies made in the United States there have been several European investigations into the cost of living. One of the most interesting was a series of studies made by the Board of Trade in Great Britain investigating the cost of living in the United Kingdom (1908), Germany (1908), France (1909), Belgium (1910) and the United States (1911). The same type of material and the same methods were used in all of these studies, making comparisons between the different countries possible. While the cost of living is not identical, the general level of prices varies in the same way in all of these countries due to their economic interdependence.

Bibliography.—Consult David Davies' *The Case of the Labourers in Husbandry;* Sir Frederick Morton Eden's, *The State of the Poor;* United States Bureau of Labor Statistics, *The Cost of Living in the United States*, Bulletin No. 357, 1924; and *The Use of Cost-of-Living Figures in Wage Adjustments*, Bulletin No. 369 (1925); National Industrial Conference Board, *The Cost of Living in the United States, 1914–1926* (1927); Peixotto's *Getting and Spending at the Professional Standard of Living* (1927); Irving Fisher's *The Money Illusion* (1928); Chase Going Woodhouse's *The Standard of Living at a Professional Level, 1816–17 and 1926–27* (1929); Paul Douglas' *Real Wages in the United States* (1930).

Costs, in law, a term employed to denote expenses incurred in judicial proceedings. As a general rule, the unsuccessful party is obliged to pay the costs of the successful party, but not necessarily. In England the tendency is to make the awarding of costs a matter of judicial discretion; while in the United States the matter is strictly regulated by Federal and State statutes.

Costume. See DRESSMAKING; MILLINERY; FASHION; VESTMENTS AND INSIGNIA.

Cos'tus, a genus of perennial herbaceous plants, belonging to the order *Zingiberaceæ*, which occur in the tropical areas of the Old and New Worlds. The flowers are borne in brilliant spikes, the bright effect being due to the lip, or enlarged staminodium, of each flower. The leaves are usually arranged spirally on the stem, whence the common name of Spiral Flag given to members of this genus. Among the most attractive species are the Brazilian *C. igneus* with orange-red flowers; *C. speciosus*, with large pink and white flowers; and *C. malortieanus*, with gold and orange flowers.

Cos'way, RICHARD (1742–1821), British miniature painter, was born in Devonshire, and studied in London under Hudson, and in the Royal Academy, of which he became a member in 1771. Having gained the friendship of the Prince of Wales, he was appointed his painter-in-ordinary, and Mrs. Fitzherbert and the other beauties of the coterie sat to him. His small female full lengths are exquisite, and his ivory miniatures are excellent specimens of the art, which he raised into high favor. In 1781 he married MARIA HADFIELD, a skilful musician, also known as an artist; she executed subjects for Boydell's *Shakespeare* and Macklin's *Poets*.

Coswig, kos'vich, or KOSWIG, town, Germany, in the state of Anhalt, 12 miles northeast of Dessau. It has textile manufactures and coal is mined in the vicinity. Pop. (1925) 10,103.

Cotabato. See COTTABATO.

Côte-d'Or, kōt-dôr', department, Southeast France, formed out of the old province of Burgundy; area, 3,391 square miles. The surface is elevated, the chief heights being the Plateau de Langres to the north, the Côte-d'Or Mountains to the south, and the Monts de l'Auxois in the west. The three river basins of the department are those of the Rhone, the Seine, and the Loire. The Saône, an affluent of the Rhone, flows through the southeast of the department.

On the slopes of the Côte-d'Or ripens the grape—the only gold (Côte-d'Or, 'golden hillside') which the country yields (about 30,000,000 gallons), and which has made the wines of Burgundy famous. Other products are wheat, beet sugar, tobacco, oats, barley and potatoes. The district of Châtillonnais, in the northwest, is partly covered with wood; the district of Auxois is rich in meadow land; and the valley of the Saône yields good crops. Coal, iron, and hard building stone are found. Dijon is the capital. Pop. (1911) 350,044; (1921) 321,088.

Cotentin, kō-tän-tañ', THE, the peninsula, projecting from the northwest of Normandy into the English Channel, between the Bay of St. Michel and the Gulf of Carentan, now forming the northern part of the department of La Manche. It is about 55 miles long and 25 broad. The Cotentin is highly fertile, and is famous for its herds of fine cattle.

Côtes-du-Nord, kōt-dü-nôr′, department, France, forming part of Brittany, and bordering on the English Channel for 70 miles; area, 2,787 square miles. A rather indistinct range of hills (highest point, Mount Méné, 1,100 feet) runs east to west, leaving little room for streams other than rivulets toward the sea. Off the coast, which is steep, rocky, and much indented, are the Sept-Iles, Brehat, and other small islands. The principal bays are St. Malo and St. Brieuc.

The soil is poor on the high grounds, but along the shore it is better. Wheat, flax, oats, potatoes, fruit and honey are produced. The department is noted for its horses. Market gardening for Paris and London is developing but the chief occupation is fishing in the English Channel, the North Sea, round the shores of Iceland, and even off Newfoundland and great quantities of sardines are preserved. The capital is St. Brieuc. Pop. (1911) 605,523; (1921) 557,824, a large number of whom use the Breton language.

Coteswold. See Cötswold.

Cöthen. See Köthen.

Cotillon, kō-til′yon, *Fr. pron.* kō-tē-yôn′ (French 'petticoat'), the name of a brisk dance, of French origin, performed by eight persons, of which the quadrille may be regarded as a modification. It has now developed into a form of round dance, long and elaborate, danced to the music of waltzes, polkas, mazurkas, and galops. A long succession of devices for the selection of partners is generally carried through under the direction of a master of ceremonies, and favors are given to the guests.

Cotinga, kō-tĕn′ga, or Chatterer, a genus of Passerine birds, represented by a number of species in Central and in tropical South America. They are fruit-eating birds, and the males are beautifully adorned in blue or violet at the breeding season. They include, among others, the Bell Bird (q.v.) of Guiana, the Umbrella Bird (q.v.), and the Cock of the Rock (q.v.).

Coto Bark, a bark obtained from a large tree grown in Bolivia. The bark which has a pungent, bitter taste is sometimes employed as a powder or tincture for diarrhœa and neuralgia.

Cotoneaster, kō-tō′nē-as′ter, a genus of plants of the order Rosaceæ, sub-order Pomeæ, closely allied to the hawthorn and medlar. The species are shrubs or small trees, some evergreen; with simple entire leaves, more or less woolly beneath; small flowers in lateral cymes; and small, unpalatable, but bright-colored fruit, persistent in winter. *C. vulgaris* and other species are common mountain plants of Central Europe and Asia, and have been largely introduced as ornamental shrubs.

Cotopaxi, kō-tō-paks′ē; *Span. pron.* kō-tō-pä′hē, the loftiest active volcano in the world, situated in Ecuador, in the eastern chain of the Andes, about 50 miles south of the Equator, and 35 miles southeast of Quito. Whymper, who ascended it in 1880 to the edge of the crater placed it at 19,613 feet above the sea. The first eruption recorded was in 1533. Others followed in 1698, 1743, 1744, and in 1768, the most terrible of all. On the last occasion ashes were carried 130 miles distant, and thickly covered an extensive area. In 1803, 1854, 1855, 1856, 1864, and 1877 eruptions also occurred.

Cotrone, kō-trō′nā, seaport and episcopal see, Italy, in the province of Catanzaro, on the eastern coast of Calabria; 43 miles northeast of Catanzaro. It has a cathedral, a citadel, and a small but good harbor, and exports oranges, olives, wine and licorice. Pop. 10,000.

Cotrone represents the ancient *Kroton*, one of the powerful Greek cities of South Italia (Magna Græcia), founded in 710 b.c. It subdued the neighboring city of Sybaris in 510, and in 299 b.c. was captured by Agathocles of Syracuse. It gave many champions to the Olympic games, chief among whom was Milo.

Cotswold Hills, kots′wōld, a range of oolitic limestone hills, running through the middle of Gloucestershire, England. They are over 50 miles long, with an average height of 500 or 600 feet, and seperate the Lower Severn from the Thames. The highest point is Cleeve Hill, 1,134 feet. The hills are noted for a breed of sheep to which they give their name.

Cot′ta, a western suburb of Dresden, Germany. Pop, 12,000.

Cotta, German publishing firm, founded in Tübingen by Johann Georg Cotta in 1659. It first became famous under Johann Friedrich, Baron Cotta von Cottendorf (1764–1832), born at Stuttgart,great-nephew of the theologian, Johannes Friedrich Cotta (1701–79), chancellor of the University of Tübingen. Johann Friedrich undertook the family business in 1787; in 1793 he sketched out the plan for the *Allgemeine Zeitung* (q.v.), which has appeared since 1798; and in 1795 he established the famous *Horen*, a literary journal, under the editorship of Schiller, with the coöperation of Goethe and Herder. He published also the *Almanach für Damen* (1798) and other periodicals, as well as the works of Schiller, Goethe, Herder, Fichte, Schelling, Jean Paul, Tieck, Voss, and the Humboldts.

In 1810 Cotta removed to Stuttgart, and in 1824 introduced the first steam printing press into Bavaria. As president of the Second Chamber he was the fearless defender of constitutional rights, and was the first Württemberg proprietor who abolished servitude on his estates. He was succeeded by his son, Georg (1796–1863), who extended the business of the house still further; and was in turn succeeded by his son Carl (1835–88), during whose administration several of the branches (which were the common property of the family) were sold. The *Allgemeine Zeitung* was sold in 1899 to the Kröner firm in Stuttgart, which now trades under the title J. G. Cotta'schen Buchhandlung Nachfolger.

Cottabato, kō-tä-vä′tō, Cotabato, or Kota-Batu, military district. Mindanao province, Philippine Islands, lying to the north and northeast of the Sea of Celebes and south of the Bay of Illana. It is mountainous, the chief peak being the volcano of Apo (9,000 feet). The capital is Cottabato, on the Rio Grande de Mindanao, one mile from its mouth in Illana Bay.

Cottar. See Crofter.

Cottbus. See Kottbus.

Cotter, a tapered metal bar driven through a slot in the projecting end of a tie bar or fastening pin, to prevent its withdrawal. It answers the same purpose as the nut at the end of a bolt. The small end of the cotter may be split, and the halves turned back, or 'clenched,' when the cotter is in position.

Cottet, kō′tā′, Charles (1863–1925), French painter, was born in Puy, Haute-Loire. He was a pupil of Puvis de Chavannes, and also worked under Roll. In 1889 he exhibited two pictures in the Salon of the Champ de Mars; in 1890 his *Storm on the Meuse* appeared, and from that time on he was a regular contributor. He reached the full development of his powers in his fine triptych in the Luxembourg in Paris (painted 1898)—one of the series of the 'Pays de la mer,' a cycle of ten landscapes that marks a date in the history of French art. His work depicts with deep insight and sincerity the scenery and people of the Breton coast.

Cot′tian Alps, the name given to that portion of the main chain of the Alps which extends between the Maritimes and the Graians. It falls naturally into five districts: (1) The Chambeyron group, which extends from the Col d'Argentière (6,545 ft.) on the south to the Col de Longet (8,767 ft.), and culminates in the Aiguille de Chambeyron (11,155 ft.). (2) The Viso group, from the Col de Longet to the Col de la Traversette (9,679 ft.); its great summit is the Monte Viso (12,609 ft.), the culminating point of the Cottians. (3) The Waldensian Valleys, from the Col de la Traversette to near the Mont Genèvre; the highest point is the Rognosa de Sestrières (10,758 ft.). (4) The Genèvre district, or hills (the highest is Rocherbrune, 10,906 ft.), on either side of the pass of the Mont Genèvre (6,083 ft.). (5) The Ambin group, which extends from near the Mont Genèvre to the Mont Cenis (6,893 ft.), and culminates in the Aiguille de Scolette or Pierre Menue (11,500 ft.). See ALPS.

Cottin, kō-tañ', SOPHIE (1770–1807), French authoress, was born in Paris. She wrote a series of sentimental stories, the best known of which are *Elisabeth, ou les Exilés de Sibérie* (1806); *Amélie Mansfield* (1802); *Mathilde* (1805); *Malvina* (1800). Her works have been translated into English.

Cottle, JOSEPH (1770–1853), English bookseller, started business in Bristol (1791), and being introduced to Coleridge and Southey, then on the point of setting out for America (1794), induced them by his liberal offers for their poems to remain in England. He published Southey's *Joan of Arc* (1796), bore the expenses of Coleridge's paper, the *Watchman*, and published the *Lyrical Ballads* (1798) of Coleridge and Wordsworth. Retiring from business in 1799, he himself wrote various works, including *John the Baptist,* a poem (1801), and an epic, *Alfred* (1801); and in 1837 published his *Early Recollections,* which contain many inaccurate and unnecessary details about Coleridge's private life. Consult his *Recollections; Southey's Life and Correspondence.*

Cotton, a plant of the genus *Gossypium,* a member of the Malvaceæ, or mallow family, and the fiber which it produces. This fiber is one of the most important vegetable products, and on account of its characteristic spiral thickening is readily distinguished from all other fibers, and is especially adapted to spinning. Cotton has been known from remote times, as is shown by the writings of Herodotus, Pliny, and other early historians. It is certain that it was in use in India 3,000 years ago, and in Egypt more than 2,000 years ago. Mummy wrappings from Peru testify to its use there many centuries ago, and the earliest voyagers to the Western Hemisphere found it in use in several other regions.

Nevertheless, the cotton plant is not native to the North American Continent. How or when it was introduced can be determined only when archeologists have ascertained beyond reasonable doubt whence the first Americans came, how they got here, and how they developed the ethnic cultures known to have existed in both North and South America for centuries if not millennia before the advent of the first European explorers and adventurers.

Description.—More than fifty species of cotton have been described, but only four are of great economic importance—namely, (1) *Gossypium barbadense,* the source of Egyptian cotton and of the Sea Island cotton of South Carolina, Georgia, Florida, and the West Indies; (2) *G. hirsutum,* or American Upland cotton, grown chiefly throughout the region from Virginia to Oklahoma southward, and forming about 99 per cent of the American crop; (3) *G. herbaceum,* the Upland cotton of India, found also in China, Arabia, Persia, and Africa; and (4) *G. neglectum,* or Bush cotton, which forms the bulk of the Indian product, and is the source of the 'Dacca cotton' from which the India muslins and the long cloths of Madras are made. In India, Brazil, Peru, and other tropical countries are arborescent species that yield valuable fiber, but they do not enter prominently into the world's supply.

Although varying widely in the different species and the different countries, the cotton plant may be described generally as a shrub of from three to six feet in height, with spreading branches diminishing in length toward the top of the main stem; alternate, more or less lobed leaves; and white, yellow, or red hollyhock-like flowers, surrounded by three or four heart-shaped green bracts. Nearly all the important species are perennial in warm climates, but under cultivation they are best treated as annuals.

A few days after blossoming the flowers fall to the ground, leaving within the calyx a tiny boll, or capsule, which is divided into a number of cells containing the seeds and the fiber which forms the cotton of commerce. On reaching maturity the bolls, then from ¾ to 1½ inches in diameter, burst open, and the cotton is ready for picking. The Sea Island and Egyptian varieties have small, smooth, black or brown seeds from which the long silky fibers are easily separated. In the Upland varieties the fiber is shorter and as a rule coarser, and there is a short adherent fuzz about the seed known as linters, which requires a special process for its removal.

The value of cotton for spinning depends upon the ripeness, length, fineness, and strength of the cotton fiber, and these qualities form the basis of the commercial classification. The following are the chief varieties in use for the spinning of yarns: Sea Island, Florida Sea Island, Peruvian, Brown Egyptian, White Egyptian, Brazilian or Peruvian, American, and Indian. The last three are subdivided into several classes—*e.g.,* Brazilian includes Parahyba, Maranham (Maranhão), Cera, and Pernambuco; American includes New Orleans, Mobile, Texas, and Uplands; Indian includes Bengal, Sindh, Tinnevelli, Broach, and others.

A recently developed strain of the Egyptian variety, called Pima cotton, has been produced with considerable success on the irrigated plantations of Arizona. Pima fibers are very fine and strong, running over 1½ inches in length. This improved American-Egyptian strain is readily adapted to fine spinning, and is used in the production of highly finished fabrics requiring a silky luster.

Cultivation.—For its best production cotton requires a long growing season, with plenty of sunshine, a deep, mellow, rich soil, and a hot, steamy atmosphere, with abundant moisture during the period of greatest growth, and a dryer atmosphere during the ripening and gathering of the crop—conditions found in the Southern States of the United States to a higher degree than anywhere else in the world. The Cotton Belt of America—and in this belt one-half of the world's supply of cotton is grown—lies a little below latitude 37° and extends from the Atlantic Ocean on the east to Texas and Oklahoma on the west.

Since physical conditions necessary for the successful growth of cotton do not exist in Great Britain, that nation must depend upon foreign sources of supply for its great Lancashire mills. The Indian brand of cotton, although plentiful, is coarse; the Egyptian supply is limited. For years, therefore, the United States has been assured of a market in that quarter. But world economic developments are such that it is becoming increasingly difficult to meet or even approximate the practices that prevail in India, Egypt, Russia and South America. In some quarters there is grave doubt of the ability of the United States to maintain supremacy in the production of this important commodity, especially since there has been a pronounced decrease in the amount of cotton exported since 1934. War and post-war demands provided an incentive for extended cultivation of the staple. Yet it was deemed wise to avoid stimulating foreign production and at the same time to correct, if possible, the domestic situation.

The boll weevil by 1921 had spread over most of the Cotton Belt; in that year it had reduced crops more than 30%; but growers learned to combat this insect. Foreign growers of cotton, however, had come to believe that the ravages of the boll weevil had permanently impaired American production; this conviction, coupled with nationalistic desires for economic self-sufficiency, induced them to increase their cotton acreage accordingly.

Although normally 60% of the American crop is sold abroad, more than 50 foreign countries grow cotton. The leaders in acreage production are India, China, Soviet Russia, Egypt and Brazil. Prior to 1932, the United States had produced more than half of the world's supply of cotton. It yielded supremacy in that year for the first time in history; regained it in 1933, and lost it again in 1934 when systematic crop reduction began to produce results. Russia imported American cotton up to 1932; since then cotton has been produced in the Ukraine in such quantities as to transform the USSR into an exporting nation.

In planting, the common custom is to bed up the land by ploughing down a field and back again, throwing the two furrows together, thus securing good drainage and permitting an economical use of fertilizers. The seed is drilled in rows about 4 feet apart, and when the plants have attained a height of 3 or 4 inches they are 'chopped,' or thinned out, so as to stand 12 to 14 inches apart in the rows. Cultivation to keep the ground free from weeds and to minimize evaporation from the soil is begun at this time, and repeated at intervals until July or August, when the crop is 'laid by' to mature. Most of the crop is planted by May 20; blooming begins about two months after planting—in Texas in May, and in Virginia and Tennessee early in July; and the first bolls are ripe about six weeks later. The picking begins early in July in the south of Texas, with correspondingly later dates elsewhere. Picking is done by hand, largely by Negro labor, and requires frequent going through the fields as the bolls mature and open. It may be prolonged until well into December.

For nearly a century, various attempts at mechanical picking have been made, but the results were generally unsatisfactory. The Rust cotton picker, however, gives promise to take its logical place with Whitney's cotton gin as the initiator of a new era in cotton production. While still in the stage of supplemental perfection of some details, its inventors claim that it can pick about one acre an hour and do the work of 50 to 100 hand pickers. In a recent public demonstration, it is said to have accumulated as much cotton in 7½ hours as could have been gathered by one average hand picker in 11 weeks. It is this feature that, in the opinion of some authorities, seems to threaten revolutionary changes in the social and economic structure of the United States South.

The Rust picker can be drawn by a mechanical tractor at the rate of three miles an hour. In passing along the rows it draws the plants through a narrow aperture into a chamber containing a revolving belt of moist spindles which extract the lint and seed from the boll without damage to the plant and with a minimum accumulation of foreign matter. Unopened bolls are left intact for a later application of the picker.

Ginning and Baling.—After picking, the cotton, which contains all the seeds and is known as *seed cotton*, is taken to the gin, which separates the fiber from the seed, the lint being baled ready for market and the seed saved for some of the numerous by-products, as *cottonseed oil* and *cottonseed meal* (see COTTONSEED). In some parts of the world primitive machines are still in use—for example, the Churka gin common in India (Plate I., Fig. 3). In the United States, the roller gin (Plate I., Fig. 2) is used with Sea Island cotton, but the process is considered too slow and expensive for Upland cotton, the greater part of which is separated by the saw gin, invented in 1792 by Eli Whitney (q. v.).

The *saw gin* (Plate I., Fig. 1) consists of a series of circular saws with fine teeth, *a*, revolving with a portion of their circumference projecting through a grid, *b*, into a receptacle for raw cotton, *c*. In revolving, the saws tear the lint or fiber from the seed and carry it through the grid, where it is removed from the saws and carried by a blast from a revolving fan to a suitable receptacle, or else is delivered through the condenser in the form of a lap.

After ginning, the cotton is compressed into a bale, and the bales are covered with jute bagging and bound by steel bands. If they are to be shipped long distances, they are further compressed at a railroad center or seaport.

The weight and dimensions of the finished bale vary greatly. That generally employed in the United States measures 54 to 58 inches in length, 42 to 46 inches in width, and 24 to 30 inches in thickness, and averages about 500 lbs. gross weight. A cylindrical bale, 40 inches long and weighing about 250 lbs., is also in use. Egyptian bales weigh from 672 to 840 lbs.; East Indian from 346 to 531 lbs.; Brazilian from 367 to 428 lbs. pressed, and 100 to 419 lbs. unpressed; and Peruvian from 109 to 504 lbs.

Marketing.—Cotton is occasionally marketed as seed cotton, but is more commonly ginned and baled before selling. It may be purchased directly, in which case the transaction is known as a 'spot sale'; or contracts allowing for the purchase of the cotton on the basis of future delivery may be bought and sold through the leading cotton exchanges located in New York, New Orleans, and Liverpool. These contracts stipulate in writing that a certain amount of cotton is sold or bought, as the case may be, at a stated price payment, which may be at or before some specified future period. According to the contract, cotton must be delivered within the month, and the buyer must receive and pay for it. The contracts are called *options*, because the cotton contracted for is deliverable at the option of the seller at any time during the month for which it is sold; and they are called *futures*, because they provide for the delivery of the cotton at some future period. The cotton contract, while legal, and while it stands for cotton, is sold and bought because of itself, but a large portion of the dealings are purely speculative.

In order to minimize the evils incident to trading in cotton futures, the first Cotton Futures Act was passed by Congress in 1914. It established certain standards for grading cotton and forms of contract designed to eliminate unfair competition, and imposed an excise tax of two cents per pound upon the execution of all contracts for the future delivery of cotton not conforming in every detail to the specifications and conditions enumerated in the act. The act was declared unconstitutional by the

Federal District Court at New York on the ground that it was a taxation measure, and had originated in the Senate, contrary to the provision of the Constitution that all tax measures shall originate in the lower house of Congress; the case was appealed to the Supreme Court of the United States; but before action was taken the bill was reintroduced in the House with slight alterations, and was passed on May 2, 1916.

The standards adopted for white cotton are as follows: Middling Fair, Strict Good Middling, Good Middling, Strict Middling, Middling, Strict Low Middling, Low Middling, Strict Good Ordinary, and Good Ordinary—the grades designated by the word 'strict' being known as half grades. Grading is determined by the amount and character of foreign matter or impurities present in the cotton, and by the color.

The Cotton Plant.

The word 'staple,' as used in the cotton industry, means length of fiber. Thus, a fiber length under one inch is called short staple; one to 1⅙ inches, medium staple; over 1⅙ inches extra staple.

Uses.—The great bulk of the fiber yield of the cotton crop is devoted to the manufacture of cotton yarn and cloth (see *Cotton Manufacture,* below). Other important uses are in the manufacture of cotton wool and of high explosives.

Cotton Wool consists of the hairs of the seed of *Gossypium barbadense* and other similar species. After being separated from the seeds and cleansed from impurities, the mass of fibers is boiled in dilute caustic potash to remove all waxy and fatty matter. It is then washed and bleached by the action of bleaching powder and hydrochloric acid, and again washed and dried. The hairs are separated by a current of air and collected as a soft, fleecy wool. The wool thus prepared possesses absorbent properties, and after thorough sterilization and impregnation with disinfectants—as corrosive sublimate, boric acid, or iodoform—is largely used as a surgical dressing for wounds.

The cotton fiber and linters are almost pure cellulose, and are of great importance in the manufacture of explosives. They form the principal constituent of guncotton and smokeless powder, which have largely supplanted other materials as propulsive ammunition. In the World War the consumption for this purpose alone has been estimated at 3,000,000 bales per annum. In August, 1915, Great Britain declared cotton to be contraband of war. (See Explosives; Guncotton; Gunpowder; Smokeless Powders; Contraband of War.)

The cotton stalk is used as fuel and for making paper. The linters, separated from the seed by a special form of gin, enter into the manufacture of low grade yarns, twine, batting, rope, lampwicks, and filling for mattresses, cushions, and upholstery. The hulls are used for stock feed and fertilizers and in paper mills. The seed itself is the source of cottonseed oil and meal (see Cottonseed).

Cotton Manufacture.—The value of cotton as a textile fiber was early appreciated, and before the industrial revolution in England many hand looms were scattered about the country, two or three in a house, operated by as many weavers, who were usually members of one family. The weavers were the owners of the looms, as a rule, and work was found for them by the merchants in town, who employed a man, known as the 'putter out,' to traverse the weaving districts, and see to the cloth's being woven. About 1750 there arose an inferior class of merchants, called 'fustian masters,' who gave out a warp of linen yarn and raw cotton to the weavers, and received them back in cloth, paying the weavers for the spinning and weaving. The weaver, if the spinning was not done by his own family, paid the spinner for his work, and the latter paid the carder and rover. The master attended the weekly market, and sold his cloth in the gray to the merchant, who afterward dyed and finished it. Instead of traveling with his goods on packhorse, the merchant or his traveler rode from town to town carrying samples, and on his return home all goods sold were sent by carrier's wagon.

With the advent of the power loom, the private system of weaving gave way to the factory system, in which all the machinery is under one roof; and this led to the creation of two separate industries—spinning and weaving—though both are often carried on in the same establishment.

Spinning is the art of twisting the raw cotton into a continuous strand of yarn fitted for weaving or for thread or rope making. Prior to the actual spinning process the fibers are submitted to a series of preliminary operations to free them from extraneous matter, lay them side by side in parallel order, pull them out in a continuous strand or sliver of uniform thickness, and attenuate this sliver until the quantity required to form the yarn is reached.

The first of these processes is *bale breaking.* After a bale has undergone a second compression prior to shipment, the cotton is very closely matted together. It is therefore passed through a bale breaker (Plate i., Fig. 4), consisting of a series of heavily weighted and spiked rollers (*a*) which vary in speed and thus pull the cotton apart in lumps, or through a hopper breaker in which a spiked lattice takes the place of rollers.

From the bale breaker the cotton is carried by means of a traveling lattice or exhaust air tube to the *blending* or *mixing room,* where cotton from many bales is mixed, either by hand or machinery, in order to obtain, as nearly as possible, uniformity in color and in length and quality of staple.

After mixing, the cotton is passed directly or through a hopper feed into an *opener* or *breaker picker,* where it is beaten by spikes or knives which still further open and loosen it, and is driven against cleaning bars which remove the great bulk of the impurities, as dirt and leaves. From here it is carried in the form of a lap or loose sheet of cotton to an intermediate picker which unites several laps, continues the opening and cleaning process, and delivers the cotton to the *finisher picker* or *scutcher* (Plate ii., Fig. v). The finisher picker again unites several laps, further cleans the cotton, and passes it on to the carding machine.

Up to this point the cotton retains its original form, the fibers crossing and recrossing in innumerable directions in a loosely matted mass. In the carding machine the first attempt is made to treat the fibers individually. Small impurities are removed; broken, immature, and stained fibers are eliminated; and the remaining fibers are disentangled and laid approximately parallel. This operation is of the utmost importance, as the quality of the yarn largely depends upon the treatment at this stage.

The revolving top flat card (Plate II., Fig. 2) is the machine in general use for carding, having practically displaced the roller card and the stationary flat or Wellman card formerly used. The flats A, which are covered on one side with card clothing or wire teeth, are arranged in an endless chain, and are driven slowly round in the same direction as the cylinder B, upon the periphery of which is also set card filleting or clothing. The cotton from the finisher picker or scutcher is fixed at C, and passes between feed rollers, which bring it within the reach of the taker-in or licker-in D. This taker-in is made of iron, is about nine inches in diameter, and of the same width as the large cylinder B, and has fixed upon its periphery a large number of coarse, saw-like teeth. As the taker-in revolves, the teeth coming in contact with the cotton presented strike off a portion of fibers from the end of the lap, and pass them on to the card teeth or clothing on the large cylinder B, which carries them round, so that the fibers come in contact with the toothed side of the flat A, which is set very close to the teeth on the cylinder. The slow traverse of flats helps to card or comb the fibers as they travel at a quick rate on the cylinder clothing, and in this way the short fibers and nep, or entanglements, are removed. As the cotton emerges from the cylinder at front in the form of a thin filmy web, it is taken up by means of the doffer E, which is a cylinder twenty-two to twenty-seven inches in diameter, and also covered with card clothing; and as E revolves, a doffer comb F clears the thin web from its surface. The web is then collected by the aid of a V-shaped guide plate called the trumpet, and a pair of calender rollers H slightly compress the strand or sliver, which is then by an ingenious device deposited coiled in a can K. When very fine yarns are desired, the carding process is repeated, and the product is known as 'double carded.' A *combing* process may also be inserted at this point, which removes all short fibers and leaves the remainder of equal length and parallel. The result is a smoother and stronger thread, but the proportion of waste is high.

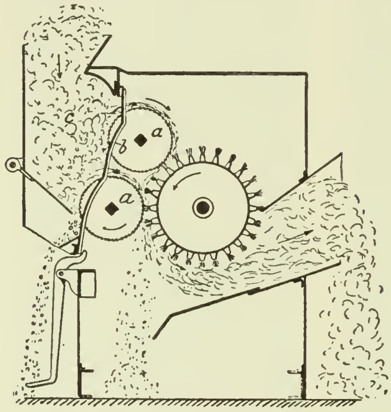


Fig. 1

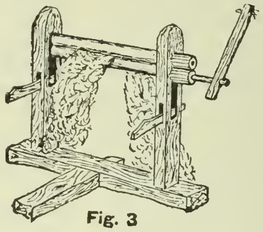


Fig. 3

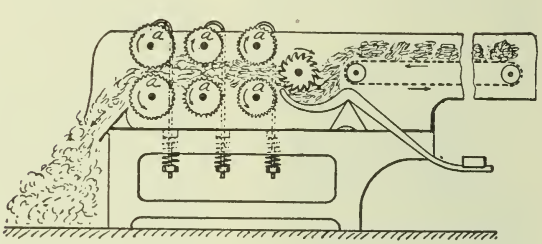


Fig. 4

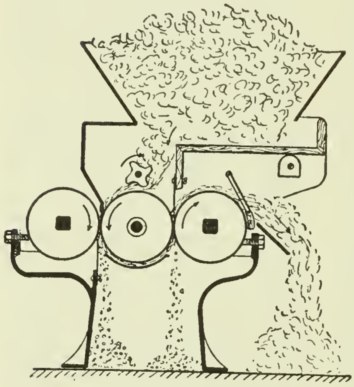


Fig. 2

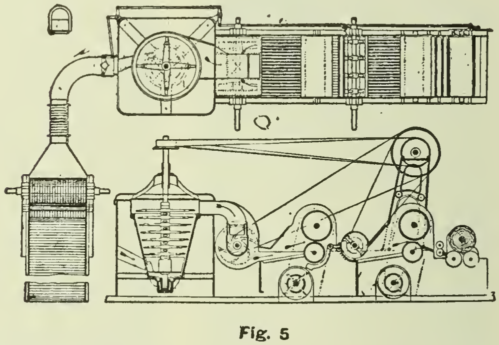


Fig. 5

Cotton Manufacture.—Plate 1.

Fig. 1. Saw gin. Fig. 2. Roller gin: cotton from a hopper passes between leather-faced rollers, the seeds being squeezed out and the fibres scraped off the rollers by knives. Fig. 3. Churka gin: the cotton is crushed between wooden rollers by hand power. Fig. 4. Bale-breaking machine. Fig. 5. Opening machine.

The strength of yarn depends largely upon its evenness and upon the parallelism of the fibers. To correct any inequalities in the slivers, a number are now run through the *drawing frame* (Plate II., Fig. 4), the essential feature of which are pairs of rollers moving at unequal and increasing speed. The result is a single sliver of the same weight per yard as each of its parts. The slivers are thus made more uniform. If six slivers at a time are taken, it is obvious that in two repetitions 6 x 6 x 6, or 216, slivers have been drawn out into one of the same size and weight per yard. As the process can be repeated several times, a number of slivers being taken each time, the doubling often runs as high as 27,000 to 600,000 in ordinary cotton manufacture, and even higher for special yarns.

Slivers which have passed through the drawing frame now go through a series of fly frames. In the *slubber*—the first of these—they are further attenuated, twisted slightly to allow them to be drawn out still more without breaking, and wound upon bobbins. The bobbins of slubbing now go to the *intermediate frame,* which is similar to the slubber, and the strands are further drawn out and twisted.

The next process is a repetition of the above, only on a much finer scale, and is known as roving (Plate II., Fig. 5). The bobbins from the 'intermediate' are placed in the creel at the back of the 'fine frame' or speeder. The strands *a* are drawn out by means of the rollers *b,* and are wound upon a bobbin *c;* the flyer *d* revolves with the bobbins, though at a different rate of speed, and more twist is put into the strands, which now are called roving. For fine work a second roving frame, called a *jack frame,* is sometimes employed.

The product of the foregoing operations is a loose, fibrous roving with just sufficient twist to prevent its breaking as it is taken from one process to another. The actual spinning completes the drawing out and imparts additional twist, transforming the roving into a finished yarn. Two systems are in general use—ring spinning and self-acting mule spinning.

Ring spinning frames are double-sided machines, each side

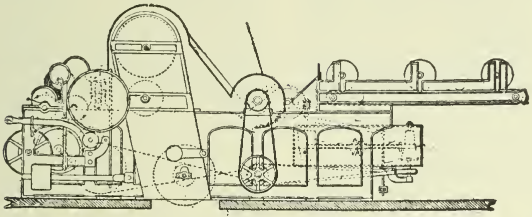


Fig. 1

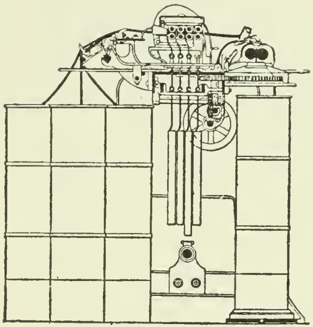


Fig. 4

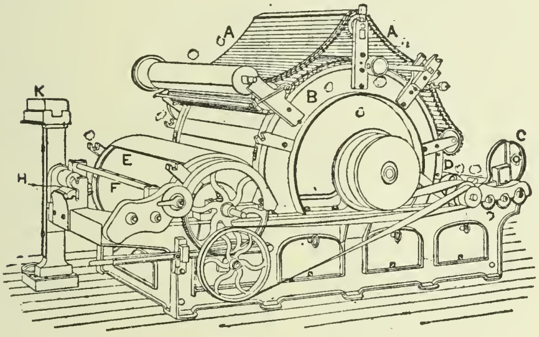


Fig. 2

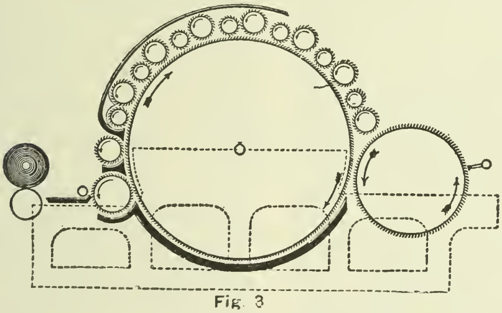


Fig. 3

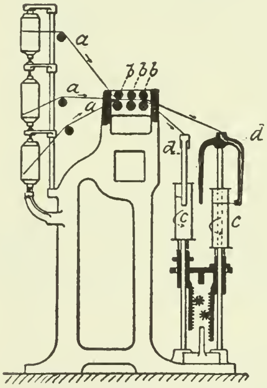


Fig. 5

Cotton Manufacture.—Plate II.

Fig. 1. Lapper. Fig. 2. Flat carding machine. Fig. 3. Roller carding machine. Fig. 4. Drawing frame. Fig. 5. Roving machine. with rack and pinion adjustment for raising and lowering bobbins to secure even winding.

carrying a long line of spindles—a hundred or more—suitably spaced. Crossing the length of the frame is a movable plate having at regular intervals holes, in each of which is fixed a metal ring through which a spindle passes. Each ring is provided with a flange on which a piece of bent steel, known as the 'traveler,' is sprung. The bobbins of roving are placed in the creels in the center of the frame, and the roving is passed between pairs of rollers moving at unequal and increasing speed, which draw it out to the desired size. It is then passed through a guide wire directly above the center of a spindle, through the traveler, and into a bobbin fitted on the spindle. The spindle driven at high speed (from 8,000 to 10,000 revolutions per minute) imparts the final twist, and the resulting yarn is wound upon the bobbin by the traveler. Children or women usually manage these machines. The yarn produced is round and hard, but somewhat irregular on account of the variable tension. The usual limit of fineness is about number 60, though with care number 100 may be spun (see YARNS).

Self-acting mules are employed when fine, soft, elastic yarns are desired; but the process is more expensive than ring spinning, and the product per spindle is less. The chief features of the spinning mule are the headstock, a strong framework consisting of two upright frames connected by cross pieces, and containing the mechanism; the movable carriage carrying the spindles and faller rods; and the creel and rollers which are parallel with the carriage. Only men or strong women can manage these machines, each of which may have as many as 1,500 spindles.

The bobbins A (Plate III., Fig. 3) from the roving frame are fixed in a creel placed at the back of the mule, and covering the width of the carriage. The roving is passed through the guide plate C and three pairs of rollers D, by which it is drawn. As it issues from the front pair it is taken and attached to the spindle E, upon which it is wound, after receiving the desired amount of twist. The spindles are placed in a row, and are driven at great speed by means of endless bands passing from the tin roller H round the spindle E. The tin roller or cylinder extends the whole length of the carriage, and the connections with the spindles are made by means of the endless bands. Both spindles and tin roller are fixed in the movable carriage K, and therefore are carried backward and forward every time a traverse takes place. The yarn, before passing on to the spindle, goes under a faller wire L and over a counter-faller M, which help to guide the thread on to the spindle during the winding-on process. When twisting is commencing, the carriage K, with all its parts, is brought to a position near the rollers D. The latter begin to deliver the roving, the carriage at the same time begins to recede from the rollers, and the spindles E begin to revolve and put the necessary twist in the yarn.

The following operations therefore are taking place simultaneously—*viz.*, the roving is being drawn and delivered by the rollers D, the thread is receiving the necessary twisting, and is kept in tension by the carriage traveling outward. When the carriage reaches the end of the stretch or traverse (usually about 64 inches) it is stopped automatically, and pauses for a brief period. During this pause the spindles are sometimes rotated for a short time to put additional twist into the stretch of yarn; this is known as 'twisting at the head.' On completion of this additional twisting, the revolving of the spindle is stopped and reversed, so that a few coils of yarn which are wrapped on each spindle are uncoiled. While this is being done, the faller wire L drops, and the counter-faller M ascends, so as to maintain the same tension as before, and also to guide the thread on to the cop. The reversing of the spindles is called 'backing-off.' On completion of the backing-off, the carriage begins to go in again, and the spindles turn in their usual direction, so as to wind the thread which has been spun during the outward run on to the cop as it is slackened by the inward run of the carriage, the thread being guided on the cop by the gradual rising of the faller L. When the inward run of the carriage is finished, the winding of the yarn on the spindle also ceases, and the faller and counter-faller change to their first positions clear of the yarn. The parts are now automatically set again for the commencement of another 'draw.' When a sufficient length to form a complete cop has been spun, all the cops are taken off the spindles, and the process is begun again.

Weaving is the process by which the yarn is made into cloth. At the present time a manufacturer of cotton goods equips his weaving mill with machinery suited to one or other of the following classes of work: gray goods (unbleached or natural color), including plain gray goods, fancy gray goods, and special work; and colored goods, including plain, fancy, and special. Colored goods include those in which colored threads are introduced in order to produce a self-colored cloth, or one with a colored pattern. Fancy colored materials show a combination of figured effects with various colorings. Figured effects are produced by special mechanisms attached to the loom in the form of Dobby or Jacquard machines. The special colored work includes tape, band, and ribbon weaving.

Woven cloth consists of two sets of threads—the warp, web, or ends, and the weft, pick, or filling—interlaced to form a fabric. The warp threads run longitudinally in the piece, and are usually stronger and harder twisted than those of the filling, which cross the piece at right angles, being shot or picked in by throwing across the shuttle during the process of weaving. The quality of the fabric is determined by (1) the number of warp threads per inch; (2) the number of filling threads per inch; and (3) the diameter of warp and filling threads. The number of warp threads per inch is regulated by the weaver's reed; the number of weft picks per inch is regulated by special mechanism on the power loom.

The first step preparatory to weaving is the rewinding of the yarn (Plate III., Fig. 4) from the cops or ring bobbins A onto the warper's bobbin B; the cops, as they are emptied, being replaced by new cops and the ends attached. When a sufficient number of warping bobbins have been wound, they are passed on to the beam warper (Plate III., Fig. 5). Here they are placed in a creel A, and the threads from all the bobbins are taken separately through reeds and combs B; and attached to a barrel or beam known as the 'slasher's beam,' C, which is made to revolve by frictional contact with a driving drum D. The ends from the bobbins in the creel are thus drawn off and coiled round the slasher's beam in parallel order in one broad sheet. In the event of a thread breaking during the beam-warping process, the machine stops automatically.

A number of these beams now go to the 'slasher' (Plate III., Fig. 6), and are run through a box containing a glutinous liquid known as size, in order that the fibers issuing from the spun thread may be laid flat. The operation also serves to strengthen the thread to withstand the strain and friction of weaving, and the increase in weight is considerable. Leaving the back beams B, the yarn A is dipped into the size C by an immersion roller D, and is then passed through squeezing rollers E, which press out all su-

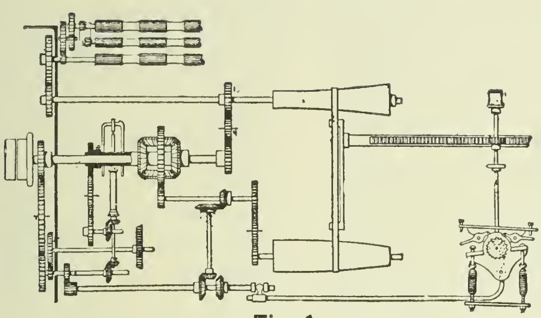


Fig. 1

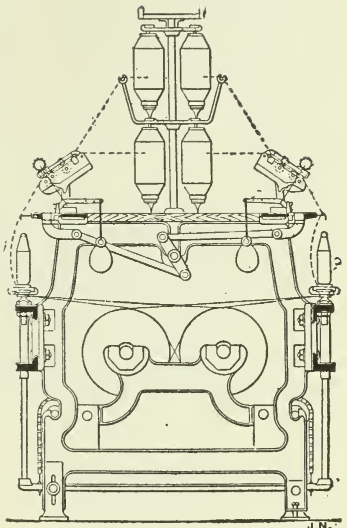


Fig. 2

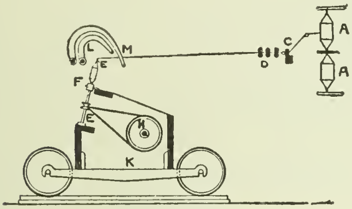


Fig. 3

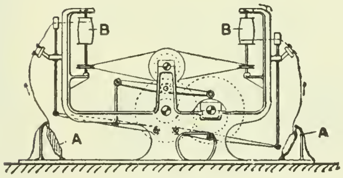


Fig. 4

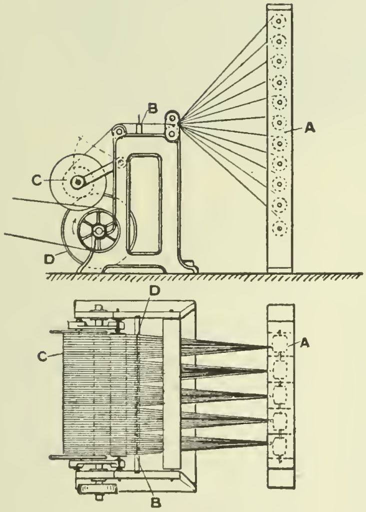


Fig. 5

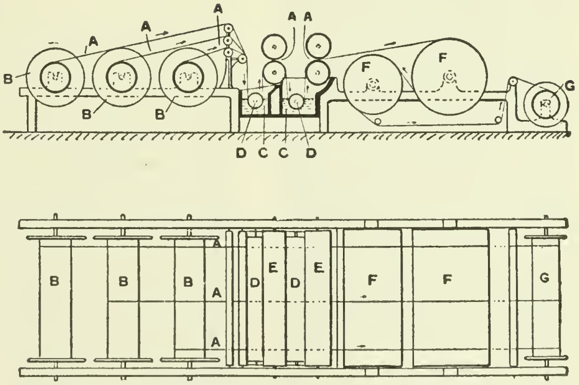


Fig. 6

COTTON MANUFACTURE.—PLATE III.

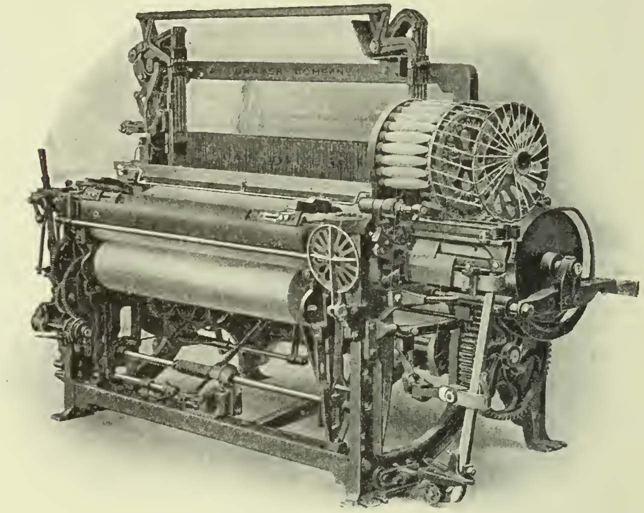
Fig. 1. Differential motion gear for slubbing machine. Fig. 2. Ring spinning machine. Fig. 3. Mule spinning machine. Fig. 4. Warder's bobbin winding machine, with cam motion for raising and lowering guides to secure even winding. Fig. 5. Beam warping machine. 6. Slasher.

perfluous matter. After emerging from the size box, the sheet of threads is passed between steam-heated cylinders F, which help to dry them. The drying is further effected by revolving fans; and the threads then pass through dividing rods, which separate them, and are wound on to the warp beam or weaver's beam G ready for the loom.

From this machine the weaver's warp is taken to the 'twisting-in' or the 'drawing-in' frame. Twisting-in consists in attaching the threads of the new warp to the threads of an old warp, which are already drawn through a set of heddles, or harnesses, and reeds, which determine the number of warp threads to one inch, and also the particular method in which the warp threads shall interweave with the filling as the latter is shot through in the shuttle during weaving. Drawing-in or looming is a process whereby the threads in the new warp are drawn directly through the 'eyes' or 'mails' of the heddles by means of a hook. The threads are drawn in that particular order necessary for the pattern or weave of cloth, after which they are passed through dents or splits in the reed. The warp is now ready for the weaver.

The method of preparing warps for colored goods is somewhat different. Whereas in the gray system the threads are all of one color, in the colored system threads of various colors have to be arranged in various proportions for the particular pattern or combination of colors desired. In the process most commonly followed the warp twist is obtained in the gray bundle or hank from the spinner, and is then dyed and sized to the required colors, the colored threads being then wound from the hank on to a warper's bobbin by a drum winder. After a sufficient number of bobbins of various colors have been wound, they are taken to the warping machine and placed in the creel in the order necessary to form the desired pattern for the cloth. Two distinct methods of warping may be mentioned—'mill warping,' which is effected by a large revolving reel, and 'sectional warping,' which is accomplished by running a section of a full warp at a time on to a cheese or block in a narrow coiled sheet or lap. When a sufficient number of sections have been prepared to form one complete weaver's warp, they are taken and laid side by side on a key shaft at the section beaming frame. The ends from the combined sections, forming a broad sheet of threads in parallel order, are run altogether on to the weaver's beam, thus making a compact coil of warp threads. The colored ends are kept in proper order and straight by means of an 'end and end' lease which is formed at the warping machine. From here the warp in its complete form is ready for drawing in or twisting in.

The Loom.—To produce cloth, three distinct operations are necessary; these are known as the three primary movements. They are (1) opening the shed, or making a division in the warp threads by means of the heddles for the shuttle to pass through with the weft; (2) picking through the shuttle containing the weft; and (3) beating up the weft. In the hand loom (Plate IV., Figs. 1 and 2) the first is effected by the action of the weaver's feet on the treadles A, connected to long and short levers, which thus raise and depress the heddles B, in order to form a division in the warp threads. The second operation is performed by a picker C in the shuttle-box D, on each side of the slay, E, which is connected by a string to a picking-stick F in the weaver's hand; the weaver works the stick alternately from left to right and from right to left, and so propels the shuttle G from one shuttle-box to another. The third operation is effected by the slay E, which is pushed backward and forward with one of the weaver's hands. When it is held back with one hand, the weaver opens the shed H by means of the foot and treadles, and with the other hand (which holds the picking-sticks) propels the shuttle through. As soon as the shuttle passes clear of the shed, the slay or batten which carries the reed and shuttle-boxes is brought forward, and the pick of weft which has just been inserted is forced to its proper place. The warp is fixed in suitable brackets at the back of the loom, and, after passing over a roller, is held in the horizontal position, sufficient tension being given by means of weights and ropes at the back. As the fabric is completed it is wound onto a web or merchandise beam.



Northrop Automatic Loom.

The essential features of the power loom are the same as in the hand loom. The first primary movement is effected by means of the tappet, Dobby, or Jacquard motion (Plate IV., Figs. 3, 4, and 5); by means of specially prepared cams, lattices, or cards, whereby the heddles or harness through which the warp threads are drawn are so moved that divisions or sheds are formed; and as the weft is inserted a pattern or weave is obtained in the cloth. The second primary movement is performed by the picking motion: by a combination of levers an alternate movement of the shuttle from one side of the loom-slay to the other is obtained. The third primary is accomplished by the batten or slay which carries reed and shuttle-boxes. The backward and forward swing is obtained by a connection with a crank on the loom shaft. The parts are set to

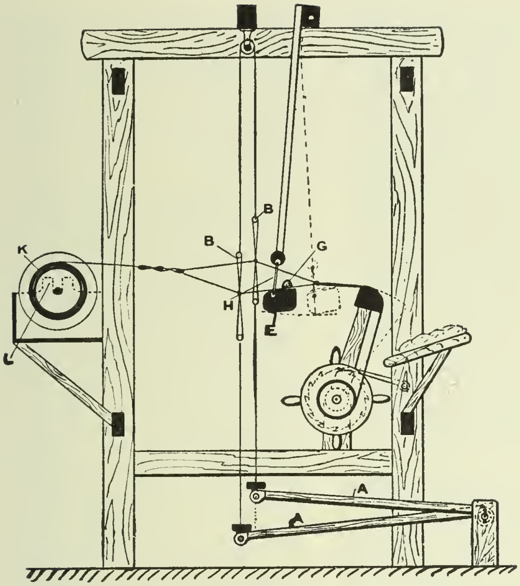


Fig. 1

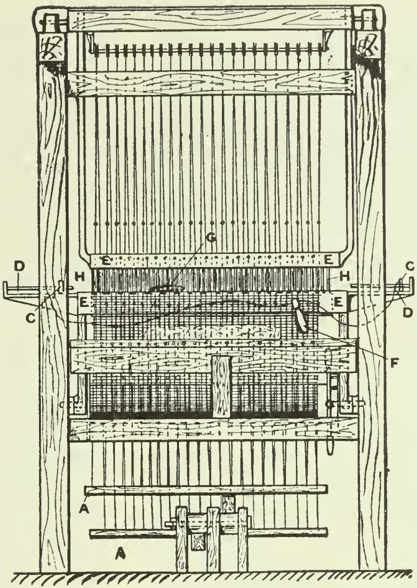


Fig. 2

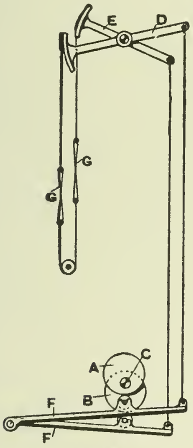


Fig. 3

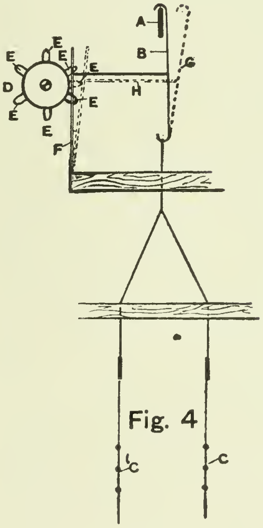


Fig. 4

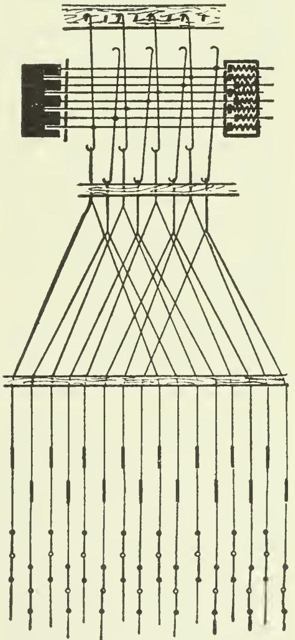


Fig. 5

COTTON MANUFACTURE.—PLATE IV.

Fig. 1. Hand-loom, side section. Fig. 2. Same, front elevation. Fig. 3. Tappet motion: A, B, cams on shaft C, operate the tappet levers D, E by means of pedals F, and raise or lower the healds G as required. Fig. 4. Dobby motion: A, the knife beam, rises and falls with the motion of the loom, and the hooks in the upright position B rise and fall with it; a revolving drum D, fitted with pegs E, forces back the springs F, and by the rods H the hooks G are thrown back, and the healds attached to these do not rise with A. Fig. 5. Jacquard motion. In this the hooks are held upright by rods connected by spiral springs, a card pressing against the ends of these, pierced with holes opposite the ends of the rods connected with the required hooks; the arrangement of holes in the card thus determines the pattern which is woven.

operate in the same order as for the hand loom.

Other auxiliary motions attached to the power loom are the weft-fork mechanism for stopping the loom automatically if the weft breaks, the take-up motion for determining the speed of warp and picks per inch as the loom is weaving and winding the cloth on to a roller at the front of the loom, and various checking motions for operating more than one shuttle containing differently colored yarns. A loom with only one shuttle box at each side of the slay is called a 'stripe' or 'plain' loom. One with more than one box at each side of the loom is spoken of as a 'box' or 'check' loom. With these attachments many different colors can be woven into the cloth.

A weaver on ordinary looms will manage three to eight looms, depending upon the quality, weight, width, and pattern of the cloth, the style and speed of loom, and also upon the skill, strength, intelligence, and aptitude of the weaver himself.

A large part of the weaver's time is occupied in changing shuttles when the bobbins are emptied. This frequently happens, and the loom is stopped during the process. Many attempts have been made to invent a process of continuous weaving. The most successful, the Northrop loom (see illustration), has a creel containing full bobbins at the side of the machine. The empty bobbin is automatically ejected from the shuttle and a full one falls in without loss of time. As a result, a weaver on plain goods may manage from twelve to twenty-four of these machines.

After leaving the loom and before they are ready for the market, the great bulk of cotton goods undergoes a finishing process, as treatment with glycerin, fats, oils, and waxes to impart a soft, supple quality; with starch to give stiffness and weight; with mucilage, gums, and ammonia water to give a glossy finish; or with clay or some similar substance to produce a solid appearance. Gray goods may be used in the natural state, or may be bleached, dyed, or printed. The silky finish of mercerized cotton is attained by a special treatment of the yarn. (See Bleaching; Calendering; Calico Printing; Dyeing; Mercerization.)

Woven cotton textiles are classified on the basis of the character of the weave. The chief varieties are plain or homespun weaves, twills, sateen, fancy cloth, and Jacquard fabrics, which include the most complicated forms of fancy weaves.

In addition to its use in the manufacture of woven fabrics, cotton yarn is used extensively for lace making, sewing thread, and knitted goods. For lace (q. v.) and thread (q. v.) the yarn as it comes from the spindle is often doubled, two or more strands being twisted into one. For the ordinary sewing thread of commerce six or nine strands are thus united; and in order to produce a perfectly smooth product, such thread is often passed at high speed through a flame which burns off the fuzz formed by the ends of the fibers —a process known as 'gassing.' Knitted cotton goods, as underwear, hosiery, and gloves, are manufactured by machines so constructed as to knit parts of a particular shape, which are then cut and sewed together on specially designed machines (see Knitting).

From the time of planting until it is picked, ginned, and marketed, the cotton crop is given special attention by governmental and private statisticians. The yield is usually reported in the number of bales. The weights of cotton bales vary more or less according to locality. The average weight of the American bale approximates 500 pounds gross. Statistics for foreign countries are expressed in bales of 478 pounds net. The extent of the cotton industry is usually measured by the number of active spindles rather than by the amount of cotton consumed, for a large mill devoted to the production of fine yarns or cloth may use less raw cotton than a much smaller establishment which produces only coarser grades. Therefore Great Britain, in which a large number of the mills make fine goods or 'specialties,' leads the world in the number of spindles, though actually using less cotton than the United States.

Diseases and Insects.—The cotton plant is subject to the destructive attacks of a number of diseases and insects. Among the more troublesome diseases is the wilt due to the fungus *Neocosmospora vasinfecta,* which is widely distributed over the Cotton Belt, especially in the sandy soils of the Coastal Plain. It is variously known as *Blight, Frenching, Black Heart,* and *Black Root.* The fungus enters the plant from the soil, penetrates the vascular system of the root, and grows upward into the stem, plugging the water-conducting cells, and causing the plant to become stunted or die. The disease spreads slowly, but its infection of the soil is permanent, and the use of resistant cotton varieties is the only practicable means of relief. *Root Knot,* a disease caused by the nematode *Heterodera radicicola,* which penetrates the roots, causing irregular swellings and galls, often occurs in association with wilt. The cowpea is subject to this parasite, and therefore should not be planted in rotation with cotton.

Another serious fungus trouble occurring throughout the cotton-growing sections of the United States, and causing an annual loss of several million dollars, is *Anthracnose,* caused by *Glomerella* or *Colletotrichum gossypii.* This fungus, which is a mould-like growth of microscopic size, attacks the cotton bolls, the young seedlings, the stems, and the boll pedicles. The boll injury, commonly called *Boll Rot* (q. v.), is the most serious form of disease. It kills or dwarfs the bolls, and discolors the cotton or causes it to decay. Remedial measures consist in the selection of healthy seed, the rotation of crops, and the planting of resistant varieties.

Other fungi parasitic on the cotton plant are *Pythium debaryanum,* which attacks the seedlings, causing well-defined ulcers (*sore shin*) and damping off; *Sphærella gossypina,* a leaf blight; *Ozonium auricomum,* producing a destructive root rot; and *Ramularia areola,* a comparatively harmless mildew. Diseases due to disturbances in nutrition are *Mosaic Disease* or *Yellow Leaf Blight,* known in its later stages as *Black Rust,* and shedding of the bolls.

Of the insect pests that attack the cotton plant, the *Boll Weevil* (*Anthonomus grandis*) is the most important in the United States. Introduced into Texas from Mexico about 1892, it spread rapidly, extending the field of its depredations into Louisiana, Mississippi, Arkansas, Oklahoma, and Alabama. Both adults and grubs injure the plants —the adults by feeding and by puncturing the squares or buds and the young bolls in which they deposit their eggs; the grubs by feeding on the contents of the squares and bolls. The insect multiplies rapidly. The Government has made considerable progress in the study of new methods of control. Moreover, by teaching diversification it has led to enormously increased crop values throughout the South. Early planting, the burning of infested plants, and the use of the chain cultivator are helpful. (See Boll Weevil.)

According to the Department of Agriculture the large cotton crops of 1931 and 1932 did much to overcome fear that the boll weevil and other pests have lessened the country's ability to produce adequate supplies of cotton. During recent years boll weevil depredations were unusually light and offer encouraging prospects for future control. Noteworthy progress in the use of poisons dusted from commercial aeroplanes indicate that this method of control is entirely practicable.

Another important enemy of cotton in the United States is the *Cotton Bollworm* (*Heliothis obsoleta* or *armiger*), identical with the earworm of corn and the tomato fruit worm. The eggs are deposited on the leaves of the cotton plant, and the young caterpillars feed upon the buds and developing bolls. Early planting, early and thorough cultivation, fall ploughing of land likely to contain hibernating pupæ, the use of arsenical poisons, and the planting of trap crops, as corn and cowpeas, have proved valuable in restricting the ravages of this pest. (See BOLLWORM; COTTON WORM).

Other insect pests are the *Cotton Stainer,* comparatively rare in the United States, but abundant in the tropical countries, which attacks the immature bolls and seeds, causing a characteristic brownish stain; the *Cotton Aphis* (*A. gossypii*), a small wingless louse which attacks the under surface of the leaf; various species of *Cutworm* (q. v.), which eat off the young plant at or near the surface of the earth, or climb the stalk and bore into the bolls; the *Cotton Square Borer,* which eats its way into the squares; the *Cotton Sharpshooter* (*Jassidæ*), a small insect which punctures the squares and bolls; and the *Cotton-Leaf Bug.* The Egyptian Cotton Worm, of which there are several species, notably *Prodenia littoralis* and *Earias insulana,* constituted a serious menace to the Egyptian crop.

See COTTONSEED.

Crop Reduction.—A threatened disaster of major proportions, so far-reaching as to endanger the very economic life of the United States, attained its culmination in 1932. To appreciate its magnitude, it is necessary to bear in mind that of the 6½ million farms in the United States, 2 million were engaged exclusively in the production of cotton. A cotton supply that had been steadily increasing for years reached the peak of 26 million bales in 1932. Another enormous crop was in prospect for the following season, notwithstanding the fact that on August 1, 1932, nearly 13 million bales had been carried over—the largest world carry-over of American-grown cotton in history.

As the Government's first step to meet this crisis, which was caused by overproduction in the face of decreasing foreign demand and reduced domestic consumption, Congress on May 12, 1933, authorized the creation of the Agricultural Adjustment Administration and delegated certain emergency powers to the Secretary of Agriculture.

The AAA first proposed the withdrawal of 10 million acres (the equivalent of 3 million bales) from cotton production, in consideration of certain compensatory benefit payments. At that time (1933), cotton was selling at 5 cents a pound on the farm, as compared with a peak price of 32 cents in 1923. Had this crop, estimated at 17,600,000 bales, been permitted to reach maturity, 2 million bales would have been added to the world's oversupply of American cotton, with consequent disastrous effects on market prices. Actually, 10,400,000 acres were taken out of cotton the first year, so that the plow-up campaign reduced the cotton surplus by 4,400,000 bales.

The program applicable to the 1933–34 season provided for voluntary contracts between individual growers and the Federal Government through the Secretary of Agriculture. Over one million such contracts were executed by 98.5% of the producers. For withdrawing 40% of their cotton acreage from productivity, 1,032,000 farmers received $178,550,000 from the Government in the various forms of benefit payments. The average farm price realized for that crop was 10.2 cents per pound, or approximately $683,500,000.

The program applicable to the 1934–35 season was likewise based upon voluntary contracts. It provided for an acreage reduction of 35% to 45%. The growers obtained an average farm price of 12.4 cents a pound for their product, and received $717,000,000 for the crop and $173,000,000 in benefit and option payments. In other words, their income derived from the second season under Federal control, including rental and benefit payments, amounted to an increase of 88%. However, the reduction of the gold content of the dollar was a contributing factor in the achievement of these results.

In the program applicable to the 1935–36 season voluntary contracts were superseded by the mandate of law. It provided for an acreage reduction of 25%, later increased to 35%. Over a million producers kept 15 million acres out of production. Average market price obtained was 11.1 cents a pound. The crop value was $754,000,000 and the rental and parity payments amounted to $123,000,000.

The crop control program of the AAA in providing 'national quotas' of production, had for its main objectives (1) the systematic reduction of acreage planted to cotton; (2) compensation to growers for acreage withdrawn from productivity; (3) market stabilization for the prevention of ruinous prices; (4) a gradual absorption of the oversupply; and (5) a system of processing taxes to equalize the burden and finance the program of benefit payments.

Rental payments on acreage leased to the Secretary of Agriculture were based upon 3.5 cents per pound of cotton that might have been, but was not, produced upon the land thus withdrawn.

During the first year of the program (1933), rental payments averaged $11 an acre, or a total of $110,000,000 for all lands withdrawn from productivity or plowed under.

Governmental regulations provided that sharecroppers were to participate equally with landowners in the benefit payments, but in practice this provision was generally ignored.

Parity payments consisted of 1 cent per pound (increased to 1¼ cents in 1934) on 40% of cotton actually produced and domestically consumed.

Options. At the inception of the program (1933) the Government owned 2,450,000 bales of cotton. Producers were offered contracts to purchase from this surplus at the rate of 6 cents a pound, or approximately $30 a bale, based upon the productivity of the lands they had retired from cultivation, or were willing to rent to the Government. The purpose of this plan was to recompense coöperators with an amount slightly in excess of the sales value of the crop they would otherwise have produced.

Stabilization Loans up to 10 cents a pound (12 cents in 1934) on the unsold portion of the crop, at 4% interest, were made to producers by the Commodity Credit Corporation, established 1933 by the Federal Government. This Corporation receives its funds from the Reconstruction Finance Corporation which in turn is financed by the U. S. Treasury Department. The magnitude of these funding operations is best indicated by the season of 1933–34, during which $500,000,000 was lent to 420,000 farmers.

Processing Taxes to provide funds necessary for rental and benefit payments, effective August 1, 1933, amounted to 4.2 cents per pound, the equivalent of $20 domestically consumed.

This tax was not levied on cotton exported, thus making American cotton available to foreign purchasers at American market prices, and placing American cotton and cotton goods on a favorable competitive basis abroad.

The proceeds of this system of taxation during the first year of operation were approximately $116,000,000. Assuming that this tax was passed on to the ultimate consumer, it is estimated that he paid 3% to 6% more for articles made of cotton, and that it cost each person 93 cents per annum.

A ginning tax of 6 cents a pound was also levied on all cotton marketed in excess of the national quotas.

These and other basic principles of Federal crop control were crystalized into law by the Bankhead Cotton Act, passed April 21, 1934, but repealed February 10, 1936, shortly after the U. S. Supreme Court had declared unconstitutional (January 6, 1936) the control activities of the AAA by means of contracts, benefit payments and processing taxes.

Bibliography.—Consult W. S. Taggart, *Cotton Spinning* (3 vols., 1911–13); S. R. Trotman and E. L. Thorp, *The Principles of Bleaching and Finishing of Cotton* (1911); W. S. Murphy, *The Textile Industries* (8 vols., 1912); M. T. Copeland, *The Cotton Manufacturing Industry of the United States* (*Harvard Economic Studies*, vol. VIII, 1912); M. S. Woolman and E. B. McGowan, *Textiles* (1913); J. W. Lomax, *Fine Cotton Spinning* (1913); F. P. Bennett, *A Cotton Fabrics Glossary* (1914); P. H. Nystrom, *Textiles* (1919); T. Thornley, *Cotton Spinning* (3d ed., 1916); J. A. B. Scherer, *Cotton as a World Power* (1916); J. P. Warburg, *Cotton and Cotton Manufacture* (1921); W. D. Darby, *Cotton, the Universal Fiber* (1924); M. D. C. Crawford, *The Heritage of Cotton* (1931); W. H. Johnson, *Cotton and its Production* (1926); G. H. Collings, *The Production of Cotton* (1926); H. B. Brown, *Cotton* (1927); W. L. Balls, *Studies of Quality in Cotton* (1928); N. B. Allen, *Cotton and Other Useful Fibers* (1929); bulletins of the United States Department of Agriculture and the Department of Commerce; bulletins on *Cotton Production and Distribution* issued by the Bureau of the Census; and the *Statistical Abstract of the United States*, issued annually.

Cotton, CHARLES (1630–87), English poet and translator, was born in Beresford, Staffordshire. After the Restoration he occupied himself mainly with translations, of which that of Montaigne's *Essays* (1685) is the most important, and with miscellaneous writings, which include the descriptive poem, *The Wonder of the Peak* (1681), and gross travesties of Virgil and Lucian. He was an enthusiastic gardener and angler, and a friend of Izaak Walton (q. v.), to the fifth edition of whose *Compleat Angler* (1676) he contributed a treatise on fly fishing. A collection of his poems was published in 1689. His other works are: *Scarronides, or Virgil Travestied* (1664, 1670); *The Planter's Manual* (1675); *Burlesque upon Burlesque* (Lucian, 1675).

Cotton, CHARLES STANHOPE (1843–1909), American naval officer, was born in Milwaukee, Wis., and entered the U. S. Navy as acting midshipman in 1858. He served through the Civil War, participating in the fight in Hampton Roads, Va., in which the *Monitor*, the *Merrimac*, and other vessels took part, and in other notable engagements. Subsequently he was regularly on duty at home and foreign stations until the Spanish-American War (1898), in which he commanded the auxiliary flagship *Harvard*. He was promoted rear-admiral in 1900, commanded the European squadron in 1903, and retired in 1904.

Cotton, GEORGE EDWARD LYNCH (1813–66), Anglican clergyman and educator, was born in Chester. He was educated at Cambridge and became assistant to Dr. Arnold at Rugby, furnishing the model for the 'young master' in *Tom Brown's School Days*. In 1852 he was appointed head master of Marlborough College and in 1858 was consecrated bishop of Calcutta. The most noteworthy event of his episcopate was his foundation of schools in the hills for the children of poorer Europeans, who could not afford to send their children home to be educated. He was drowned in the Ganges. Consult *Memoir* by his wife.

Cotton, JOHN (1585–1652), English nonconformist divine, was born in Derby. He was educated at Trinity and Emmanuel Colleges (Cambridge), and was a fellow and lecturer, in turn, of Emmanuel College. In 1612 he became vicar of St. Botolph's Church, Boston, Lincolnshire, where his nonconformist views and Puritan ideas were constantly getting him into trouble. Accused of nonconformity (1633), to escape Archbishop Laud's persecutions he with some others proceeded to the colony of Massachusetts Bay; and until his death he was teacher of the First Church in Boston. Here he drew up an abstract of the Mosaic law for Massachusetts, the civil laws of which he also helped to frame.

Cotton was a man of great learning, and an able theologian, and his influence over his fellow colonists was noteworthy, even in a theocratic community such as that of early Massachusetts. He was a prolific writer, much of his writings being controversial, and relating particularly to the Antinomian controversy and the so-called Roger Williams controversy, in which he defended the course of Massachusetts Bay. (See WILLIAMS, ROGER.) Among his publications are: *The Bloudy Tenant Washed and Made White in the Bloud of the Lamb* (1647), an answer to a letter written to him by Roger Williams; *Spiritual Milk for Babes* (1646), a famous catechism long in use in New England. Consult McClure's *Life*.

Cotton, SIR ROBERT BRUCE (1571–1631), English antiquary, was born in Denton, Huntingdonshire. Repairing to London, he began to collect valuable manuscripts and other treasures, and his house became the resort of the antiquaries and learned men of his time. Knighted in 1603, he entered Parliament, representing Huntingdon (1604); and was created a baronet (1611), an order which he had himself suggested to the king. He assisted Camden with the 1607 edition of his *Britannia;* opposed the arbitrary policy of James I, suffering imprisonment over the Overbury case; attacked absolutism in his *History of Henry III* (1626); opposed the debasement of the coinage; and gave great offence to Charles I by his political tract on *The Dangers Wherein the Kingdom Now Standeth, and the Remedye* (1628). When Wentworth discovered that the MS. of an ironical pamphlet entitled, *A Proposition for his Majesty's Service to Bridle the Impertinency of Parliaments*, was in Cotton's library, he caused Cotton to be arrested and dispossessed of his library; this so affected his health and spirits that he died in less than two years. A number of his writings were collected and published in 1657 as *Cottoni Posthuma*. His magnificent library was restored to his son, and at a later period passed into the hands of the nation. It was partially reduced by fire in 1731, and in 1753 it was placed in the British Museum.

Cotton Famine, an industrial crisis occurring at the time of the American Civil War, when the cotton mills of Lancashire, England, drew 85 per cent of their supplies of raw material from the Southern United States.

At the outbreak of the Civil War, as soon as the blockade of the Southern ports by the Federals became effective, little cotton was brought to Lancashire, and the mills were forced to shut down. During 1862 great distress was experienced by the cotton operatives, and various relief committees were formed. By November, 258,357 persons were receiving benefit from boards of guardians, and 200,084 from relief committees.

The cotton famine for a time threatened danger to the Federal cause. The Confederacy believed that the shortage of cotton consequent on the blockade would force Great Britain to support the South; and for a time there was a party in England which advocated the recognition of the Southern Confederacy. But hatred of slavery made the cotton operatives prefer to suffer hardship rather than to live in comfort on the proceeds of slavery, and meetings in support of the Confederacy were counterbalanced by demonstrations in favor of the North. By 1863 cotton became available and the famine ended.

Cotton Gin, a machine to separate the cotton fiber from the seed, invented by Eli Whitney (q. v.), in 1792. Until that time the separating had been done entirely by hand, necessitating long and tedious work, so that his invention virtually meant a complete revolution in the cotton industry. At the present time two types of gin are in general use; the Roller Gin which is used with Sea Island cotton and the Saw Gin, of the Whitney type. See COTTON: *Ginning and Baling;* WHITNEY, ELI.

Cotton Grass, any of several species of the genus Eriophorum of the order Cyperaceæ or Sedges. These grasses are found in bogs and wet meadows of the North Temperate zone, and are characterized by having numerous elongated, silky bristles which surround the blossoms at maturity, giving them a peculiar cottony appearance. Among the more familiar species are the slender cotton grass (*E. gracile*) and the Virginian cotton grass (*E. virginicum*). Attempts have been made to spin thread from the bristles, but the fiber is too short to make this profitable.

Cottonmouth Snake. See MOCCASIN.

Cottonseed, an oil-producing seed borne by the cotton plant, the source of cottonseed oil, cottonseed meal, and other products of economic importance. For many years the value of the cotton crop was held to rest solely with the lint or fiber (see COTTON), and the seed was allowed to rot or was dumped in large quantities into rivers and creeks adjacent to the plantations. Its possibilities as a source of vegetable oil were first recognized in modern times in Great Britain in 1783, and by 1829 a machine for removing the hulls and preparing the seed for the extraction of oil had been invented in the United States. The utilization of the seed on an economic basis was long deferred, however. The industry rose most rapidly in France, where it was fairly well established by 1852. In 1860 there were 7 establishments in the United States, in 1870 26, in 1880 45, and in 1890 119. Since that time growth has been rapid until the manufacture of cottonseed products now ranks among the leading industries of the country.

As gathered, cotton is composed of about one-third lint and two-thirds seed, by weight, each boll containing from 32 to 36 seeds almost hidden by the mass of white fiber which constitutes the cotton of commerce. The seed is irregularly egg shaped, and hardly larger than an apple seed; black in the Sea Island and Egyptian cottons, and green in the Indian and American Upland varieties. It consists of three component parts: *linters,* a short lint or fuzz adhering to the seed after the cotton has been ginned, absent in Sea Island and Egyptian cotton; the *hull,* which is the covering or skin of the seed; and the *meat* or *kernel,* which comprises the body of the seed.

Linters.—After the seed has been separated from the cotton by ginning (see COTTON), and cleansed of particles of sand, dirt, and other foreign matter by inclined reels or revolving screens, it is submitted to a second ginning process known as *delinting.* The delinter, which is similar in construction to the saw gin, except that the saws have finer teeth and are set more closely together, removes the greater part of the linters and passes them on to the condenser, where they are formed into rolls ready to be baled in the same manner as the commercial fiber. They are used as a filling for mattresses, cushions, and horse collars, in the making of absorbent cotton and cotton batting, for low-grade yarns from which lampwicks, twine, and carpets are made; and in the manufacture of munitions, as gun-cotton and nitro-cellulose (qq. v.).

The *hulls* are next loosened and detached from the kernels by a machine fitted with sets of knives which cut the seed into small pieces. The mass of broken meats and hulls is fed into a separator, the chief feature of which is a revolving wheel covered with wire screening, which collects the hulls and permits the greater part of the kernels to pass through. The hulls are palatable and rich in the nutrients that furnish heat and fat, and are used chiefly as cattle food, their food value being about half that of ordinary grass or hay. Other uses are for packing and paper stock.

Cottonseed Oil, extracted from the *meat* or *kernel,* is the most important product of the cottonseed. It constitutes from twenty to twenty-five per cent of the kernel, and can be extracted by the *expeller* method, in which the kernel is pressed cold, or by the more common *hydraulic* method, which requires the application of heat. In the latter method the meats are first crushed by pairs of chilled iron rollers to rupture the oil cells, and are then placed in heaters or cookers consisting of circular pans of cast iron or riveted sheet steel, steam jacketed on sides and bottom. In these the crushed meats are cooked for from fifteen to forty minutes to drive off any excess moisture and render the oil more easily separable. They are then formed into cakes of a uniform shape and size, wrapped in camel's hair cloth. These cakes are passed through hydraulic presses that extract the oil and deliver it to a settling tank from which it is pumped, directly or through a filter press, to storage tanks.

The oil thus obtained is a semi-drying crude liquid of a dark brownish or reddish color, composed chiefly of the glycerides olein, stearin, and palmatin. Its specific gravity is about 0.930 at 15° c. It is refined by the addition of caustic soda, which coagulates all impurities and saponifiable matter, causing them to settle at the bottom of the tank. This residue, known as *cottonseed foots,* forms the basis of cottonseed soap and washing powder. It contains also a quantity of glycerin, which may be extracted and used in the preparation of nitroglycerin, in the manufacture of candles, and for medical purposes.

The refined oil is next washed to remove any excess alkali, and is then ready for shipment as *summer yellow,* largely used in the manufacture of oleomargarine (q. v.) and for packing sardines. *Summer white,* obtained by bleaching summer yellow with fuller's earth, is the basis of compound lard. *Winter yellow* and *winter white,* prepared by subjecting the corresponding summer oils to cold pressure, are excellent salad and cooking oils, and are often sold as true olive oil. The poorer grades are used for soap making and as miners' oil.

Cottonseed Cake and Meal.—After the oil has been expressed from the cottonseed, the crushed meats remaining constitute what is known as cottonseed cake. This is broken into small fragments by a cake breaker and marketed as cracked cake, or is ground into meal. Cottonseed cake and cottonseed meal are rich in protein (40 per cent), carbohydrates (35 per cent), and fat (8 per cent), and consequently rank high as food for horses, cattle, and sheep. They act as a poison, however, when fed continuously to hogs, and should also be used sparingly for cows, as they endanger health and have an undesirable effect upon the butter. Young animals like calves have also often been injured by cottonseed meal and its use for them may be dangerous. Experience shows, however, that it can be fed to other animals in large quantities after they become accustomed to it. For cows about two pounds a day seems to be a safe limit for continued feeding, although three or even four pounds are often used. Recently some of this cake has been ground into flour for human consumption.

Cottonseed meal is also an excellent fertilizer, furnishing 6.5 to 7.5 per cent of nitrogen, 1.5 to 2 per cent of phosphoric acid, and 2 to 3 per cent of potash. The more economical method is to feed the meal to animals, and apply the manure to the soil, utilizing both the feed and the fertilizing constituents.

Statistics.—The manufacture of cottonseed products is carried on in all the large cotton-producing countries—India, Egypt, Soviet Russia, Turkey, China, Mexico, Brazil, Peru, and the United States. Among other countries, only Great Britain and Germany have developed the industry to any considerable extent. One ton of cottonseed will furnish about 282 pounds of crude oil (37.6 gallons), 713 pounds of cake and meal, 943 pounds of hulls, and 23 pounds of linters, with 39 pounds of waste products.

This industry has had a remarkable development, although its progress in recent years has been greatly retarded by economic conditions in general, together with the curtailment of acreage devoted to the production of cotton encouraged by the Federal Government (see COTTON). According to the United States Department of Commerce, 4,728,600 tons of cottonseed were produced during the crop year 1936, of which 3,817,751 tons, or about 80 per cent, were crushed by 471 mills. (Ninety equipped mills were reported idle during the same period.) Active mills in preceding years were 478 in 1934–35, 493 in 1933–34, 557 in 1927–28, and 763 in 1916–17. The decrease in the number of seed-crushing mills is proportional to the general reduction of areas devoted to the production of cotton under governmental supervision.

Some mills now obtain more than 150 pounds of linters per ton of seed treated, whereas formerly few obtained as much as 50 pounds. This is due in part to the closer delinting of the seeds for the better separation of the meat from the hulls. This process has been advanced to such a state of efficiency that it has been said that the sand and dirt adhering to the seeds constitute the only waste material. SEE COTTON.

Consult D. A. Saunders and P. V. Cardon, *Custom Ginning* (1915); G. S. Meloy, *Cotton Ginning* (1915); M. K. Thornton, *Cottonseed Products* (1932); bulletins of the U. S. Department of Agriculture, and the Department of Commerce (Bureau of the Census); and reports of the Cotton Textile Institute, Inc., New York.

Cotton Stainer, an insect with a long beak which sucks the sap from cotton bolls and does much injury to the cotton by staining the fiber with a yellowish red excrement. It is red with dark brown or black wings and is quite abundant in Florida. Spraying with kerosene emulsion is a good means of destroying the pest.

Cotton State, a popular name for ALABAMA.

Cottontail. See HARE.

Cotton Whigs. See CONSCIENCE WHIGS.

Cottonwood. See POPLAR.

Cotton Worm, a common name for the caterpillar of an owlet moth (*Aletia xylina*), which is in some years very destructive to the cotton crop of the United States. It is green, with yellow stripes and black dots, and grows to a length of 1½ inches.

Cotyledon, kot-i-lē'dun, in botany, is the lobe within the embryo of the seed (q. v.). The existence of one or more cotyledons is used as the basis of the division of the great kingdom of flowering plants into the two sections of Dicotyledons and Monocotyledons (qq. v.). Sometimes the cotyledons appear above the surface of the earth, and act the part of first leaves; in other cases they remain subterranean throughout, and are said to be *hypogeal*.

Cotyledon, a genus of succulent plants, of the order Crassulacæ. A large number of species are cultivated in beds and under glass. Among these are: *C. grandiflora*, a Mexican species, with reddish orange flowers in late autumn; *C. peacockii*, with reddish brown flowers in summer; *C. coruscans*, with orange flowers in summer; *C. californica*, yellow; *C. atropurpurea*, with purplish gray leaves and red flowers; *C. pachyphytum*, red.

Coucal, ko͞o'kal, a ground cuckoo of the genus Centropus, found in the warmer parts of the Old World, and distinguished by having a large spur on the first toe. An example is *C. sinensis*, the crow pheasant of India.

Couch, SIR ARTHUR THOMAS QUILLER- (1863–1944), English novelist and critic, known under the pseudonym 'Q,' was born in Cornwall. He was a classical lecturer at Trinity College, Oxford (1886–7) and afterwards joined (1891) the staff of *The Speaker*, with which he was connected until 1899. In 1912 he became King Edward VII Professor of English literature in Cambridge University. He published: *Dead Man's Rock* (1887); *Troy Town* (1888); *The Splendid Spur* (1889); *Noughts and Crosses; The Blue Pavilions* (1891); *The Delectable Duchy; Green Bays: Verses and Parodies* (1893); *Wandering Heath* (1895); *Adventures in Criticism* (1896); *The Ship of Stars* (1899); *Old Fires and Profitable Ghosts* (1900); *Laird's Luck* (1901); *Westcotes* (1902); *The Adventures of Harry Revel; Hetty-Wesley; Two Sides of the Face* (1903); *Fort Amity* (1904); *Merry Garden* (1907); *True Tilda* (1909); *Lady Good-for-Nothing* (1910); *Brother Copas* (1911); *Hocken and Hunken; The Vigil of Venus and Other Poems* (1912); *News from the Duchy; Nicky-Nan, Reservist* (1915); *On the Art of Writing* (1916); *Mortallone and Aunt Trinidad* (1917); *Foe-Farrell; Shakespeare's Workmanship* (1918); *Studies in Literature* (1918–29); *On the Art of Reading* (1920); *Charles Dickens and Other Victorians;* Editor, *Oxford Book of Prose* (1925); *Victors of Peace* (1927); *Lectures on Lectures* (1928); and *Poems* (1929). He was knighted in 1910.

Died May 12-1944

Couchant. See HERALDRY.

Couch Grass (*Agropyron* or *Triticum repens*), known also as QUITCH or TWITCH Grass and by a variety of other names, is a widespread and troublesome weed, a species of grass with a creeping underground stem, provided with nodes at intervals. Each node is capable of producing a perfect plant, hence the difficulty of freeing land from this pest. The only effectual way of extirpating it is to dig it out and burn it.

Coudersport, kou'derz-port, borough, Pennsylvania, county seat of Potter county, on the Allegheny River, and the Coudersport and Port Allegheny Railroad; 110 miles east of Erie. Manufactures include truss and furniture factories and tanneries. The surrounding country is agricultural and also has gas and oil wells. Pop. (1930) 2,740; (1940) 3,197.

Coudert, ko͞o-dar', Frederic René (1832–1903), American lawyer, was born in New York City, son of a French Bonapartist refugee. He was graduated from Columbia (1850), was admitted to the New York bar (1853), and with his brothers Louis and Charles formed the partnership of Coudert Brothers, which became one of the best known law firms in the country. He acquired a wide reputation as an orator and public lecturer, and was an influential Democrat in politics. He was prominent in 1876 as an advocate of Tilden's election to the Presidency; was a government director of the Union Pacific Railroad (1885–8), and a government receiver of that road (1892–8); was one of the lawyers who represented the United States before the Bering Sea Tribunal at Paris (1893–5); and in 1896 was a member of the Venezuelan Boundary Commission.

Coué, Emil (1857–1926), French pharmacist, originator of the system of autosuggestion which bears his name, was born in Troyes. He studied pharmacy, and later established himself at Nancy, where he inaugurated a system of clinics for the application of his theories. The fundamental feature of his system is indicated in the formula 'Every day in every way I am getting better and better,' the idea being that by constant repetition and concentration of the mind on one thing, that thing can be accomplished. In 1922 M. Coué visited the United States to lecture and demonstrate his system.

Coues, kouz, Elliot (1842–99), American naturalist, was born in Portsmouth, N. H., and was graduated from Columbian, now George Washington, University (M.D., 1863). From 1863 to 1881 he was a surgeon in the U. S. Army, and was attached to the Northern Boundary Commission and to the Geological Survey. From 1877 to 1887 he was professor of anatomy at the National Medical College, Washington, and later was professor of biology in the Virginia Agricultural and Mechanical College. His contributions to latter-day ornithology were extensive. His chief works are: *Key to North American Birds* (1872; 5th ed. 1903); *Field Ornithology* (1874); *Birds of the Northwest* (1874); *Birds of the Colorado Valley* (1878); *New England Bird Life* (with W. A. Stearns, 1881); *Dictionary of North American Birds* (1882); *The Dæmon of Darwin* (1884). He was connected, as assistant editor and contributor, with the *Century Dictionary,* and edited the *Journals* of Lewis and Clark (1893).

Cougar, ko͞o'gar. See Puma.

Cough is generally a reflex act, produced with the object of removing some substance that is irritating a part of the respiratory system. It consists of a deep inspiration, followed by the closure of the larynx by the epiglottis, and completed by a forced or explosive expiration, which tends to expel the irritative body. Besides irritation caused by inflammation or obstruction in the naso-pharynx, larynx, trachea, bronchi, or lungs, the cause may be cerebral, or gastric, or may even lie in the ear or the teeth.

There are many varieties of cough recognized as characteristic of certain conditions. There is the checked, half suppressed cough of pleurisy; the loud, expulsive cough of bronchitis; the nervous cough; besides the more serious cough suggestive of pressure on nerves, and the paroxysm of expiratory efforts ending in the long-drawn, crowing inspiration of whooping-cough (q. v.).

Treatment of cough must be directed, so far as possible, toward removal of the cause. Measures which merely tend to quiet the cough, without ascertaining and correcting the primary condition, are obviously unsatisfactory. Counter-irritants are useful for relief of the congestion and consequent cough of bronchitis; expectorants, such as ipecacuanha, tartar emetic, squills, or syrup of tolu, will help to expel tenacious mucus in the bronchial tubes; while sedatives may be employed in different forms of tickling and irritative cough.

Coughlin, Charles Edward (1891–), American priest and radio lecturer, was born in Hamilton, Canada, of American parents. He was graduated from the University of Toronto (1911) and received his LL.D. degree from Notre Dame University (1933). He was ordained priest in 1916, taught philosophy at Assumption College, Western University, 1916–22, and became pastor of the Shrine of the Little Flower at Royal Oak, Mich., 1926.

During 1936 Father Coughlin attracted nation-wide attention with a series of broadcasts in condemnation of the New Deal, on finance, labor and economics. With apparently a large following, he organized the National Union for Social Justice to compete in the 1936 presidential election. Though its sponsors predicted up to 10,000,000 votes the party, headed by Congressman William Lemke, gathered only 891,858 votes.

Couillet, town, province Hainaut, Belgium, adjoining Charleroi. It has large iron works and furnaces. Pop. (1931) 12,831.

Coulmiers, ko͞ol'myā', French village, northwest of Orleans, where the Bavarians were defeated by the French in 1870.

Coulomb, ko͞o-lŏm', the practical unit of quantity of electricity, being the quantity conveyed by a current of one ampere in one second.

Coulomb, ko͞o-lôn', Charles Augustin de (1736–1806), French physicist and engineer, was born in Angoulême. He is best known as the inventor of the torsion balance for measuring electrical attraction, and as giving his name to the electrical unit of quantity (see Coulomb).

Coulommiers, ko͞o'lo'myā', town, France, department of Seine-et-Marne, 45 miles east of Paris. It is an agricultural center and has printing plants and tanneries. It was the high-water mark of the German sweep towards Paris (Sept. 5, 1914), but was retaken by the British (Sept. 7). Pop. (1931) 6,679.

Coulter, Ernest Kent (1871–), American lawyer and humanitarian, was born in Columbus, Ohio. He was graduated from Ohio State University (1893) and the New York Law School (1904). He was one of the organizers of the Children's Court of New York (1902–12); founded the Big Brother Movement (1904); an organizer of the Boy Scouts of America (national council), Federated Boys' Clubs and the Berkshire Industrial Farm. In 1931 he was elected honorary member of the council of National Society for Prevention of Cruelty to Children of England; from 1914–36 was general manager and assistant to the president of the New York Society for Prevention of Cruelty to Children. He wrote *The Children in Shadow* and *The History of Child Protection.*

Coulter, John Lee (1881–), American economist and statistician, was born in Mallory, Minn. He was educated at the universities of North Dakota, Wisconsin, Minnesota and Iowa State College. Between 1907 and 1909 he was an instructor at Iowa State College, University of Wisconsin and the University of Minnesota, where he also served (1909–10) as assistant professor of economics. From 1910–12 he was expert special agent of the United States Census Bureau, and from 1912–14 in charge of the Division of Agriculture. In 1914 he was professor of rural economics at the Knapp School of Country Life, Nashville, Tenn.; dean of West Virginia College of Agriculture and director of the Experimental Station (1915–21); president (1921–29) of North Dakota Agricultural and Mechanical College. In 1929 he became chief economist and chairman of the advisory board of the United States Tariff Commission, and was a member (1934–35) of the United States Commission for Reciprocity Information. He wrote *Economic History of Red River Valley of the North* (1910); *Coöperation Among Farmers* (1911); also numerous bulletins, reports and articles.

Coulter, kol'ter, John Merle (1851–1928), American botanist, was born in Ningpo, China. He was graduated from Hanover College, Ind., in 1870, and from 1872 to 1874 was botanist for the Hayden Survey. He was professor of natural science at Hanover College (1874–9); professor of biology at Wabash College (1879–91); president of Indiana State University (1891–3) and of Lake Forest University (1893–6). From 1896–1925 he was professor and head of the department of botany in the University of Chicago. In 1923 he was a member of the National Research Council, and in 1925 became adviser of Boyce Thompson Institute of Plant Research, at Yonkers, N. Y. In 1875 he founded the *Botanical Gazette,* of which he was editor for many years. His published works include *Manual of Rocky Mountain Botany* (1885); *Plant Studies* (1902); *Morphology of Angiosperms* (with Charles J. Chamberlain, 1903); *Elementary Studies in Botany* (1913); *Evolution of Sex in Plants* (1914); *Plant Genetics* (1918); and *Where Evolution and Religion Meet* (with Merle C. Coulter, 1924).

Coulter, Stanley (1853–1943), American biologist, brother of John M. Coulter, was born in Ningpo, China. He was graduated from Hanover College in 1871; and from 1887 to 1926 was professor of biology and director of the biological laboratory at Purdue University; dean of the School of Science, 1907–26. He was a member of the State Board of Forestry, 1902–16; and in 1916 was made a member of the Conservation Commission of Indiana, becoming chairman in 1925. In 1927 he became president of the Indiana Tuberculosis Association. His publications include *Flora of Indiana* (1899); *Pharmacology of Remedies in Common Use;* also pamphlets upon nature study, scientific studies and reports.

Coumarin, ko͞o'ma-rin, or Cumarin, $C_6H_4C_3H_2O_2$, an organic compound occurring in Tonka beans, woodruff, and other plants. It is prepared synthetically by heating salicylic aldehyde with sodium acetate and acetic anhydride, and is a white, crystalline solid with a pleasant smell; sp. gr. .92, m. p. 67° c., b. p. 270° c. It is employed in the manufacture of perfumes and in the preparation of the German *Maitrank* ('May drink').

Council Bluffs, city, Iowa, county seat of Pottawattamie county, on the Missouri river, opposite Omaha, Nebraska, and on the Chicago and Northwestern, the Union Pacific, Burlington, the Chicago, Milwaukee, St. Paul and Pacific, the Chicago, Great Northern, the Rock Island, the Illinois Central and the Wabash railroads. It is located on an alluvial plain at the foot of high bluffs, which overlook the river. It has fine buildings, parks, a tourist camp, and is the seat of the State Institution for the Deaf and Blind. The city's railroads make it an important shipping and industrial center. It has manufactures of agricultural implements, passenger and freight elevators, car wheels, sal soda and soda products, furnaces, carriages, lubricating oils and greases, baskets, beehives, novelties, candy and butter, and railroad repair shops and round houses. Pop. (1930) 42,048; (1940) 41,439.

Council Grove, city, Kansas, county seat of Morris county, on the Neosho river, and on the Missouri, Kansas and Texas, and the Missouri Pacific railroads; 69 miles s.w. of Topeka. It has a Carnegie Library. The surrounding country is an agricultural region, and the city has a flour mill and large dairy interests. Council Grove was settled in 1847, and is situated on the old Santa Fé trail. Pop. (1940) 2,875; (1943) 2,743.

Council of Five Hundred, The, was instituted by Clisthenes at Athens, when he created ten new tribes in order to destroy the local influence of dominant families. It consisted of fifty members from each tribe, and superseded an older Boulé or Council of Four Hundred. This new Council of Five Hundred embodied the principle of local representation, and remained unaltered until 306 B.C., when its numbers were increased to 600. About 126 A.D. it was reduced to 500. The name is applied also to a part of the system of government in France from October, 1795 to November, 1799, known as the Directory. See France: *History.*

Council of Ten, The, was founded at Venice in the fourteenth century, and was an important element in the Venetian constitution. It acted as a committee of public safety, and also had departments of finance and war. See Venice, *History.*

A council called the Ten of Liberty was instituted at Florence about 1370, to defend the laws and protect the weak against the strong.

Council of the Indies, The, formed in 1511 by King Ferdinand v of Spain for the government of Spanish colonies.

Council of War, a conference of military or naval officers, to consider a plan of campaign, determine the order of battle, or give their opinions on some matters in which the commander wishes to fortify his judgment by an appeal to others.

Councils, County. See Local Government.

Councils, Ecclesiastical, or Synods, were early held for the regulation and determination of questions of doctrine and discipline. Some were assembled for a single diocese, or province, or nation; but the ecumenical councils soon overshadowed all others. At these the whole of Christendom was assembled, and their decisions on matters of faith and discipline were binding on all Christians. The right of voting was confirmed from the fourth century to bishops, although the lower clergy and laymen might be present at deliberations. At the latest council, the Vatican (1869–70), cardinals, bishops, mitered abbots, and the generals or religious orders had the power to vote.

The earliest councils, down to the end of the ninth century, were summoned by the emperors, although it is claimed that the presidency of the emperors or their representatives was confined to external matters; but the papal pretensions to the right to summon and to confirm the decrees of the councils were not generally admitted till comparatively late, and not established till the Fifth Lateran Council

(1512–17). Voting was usually individual; but at the councils of Constance and Basel it took place by nations, to overcome the numerical preponderance of the Italian bishops.

The councils recognized by the Roman Catholic Church are: (1) 1st Nicæa, 325; (2) 1st Constantinople, 381; (3) Ephesus, 431; (4) Chalcedon, 451; (5) 2d Constantinople, 553; (6) 3d Constantinople, 680; (7) 2d Nicæa, 787; (8) 4th Constantinople, 869; (9) 1st Lateran, 1123; (10) 2d Lateran, 1139; (11) 3d Lateran, 1179; (12) 4th Lateran, 1215; (13) 1st Lyons, 1245; (14) 2d Lyons, 1274; (15) Vienne, 1311; (16) Constance, 1414–18; (17) Basel, 1431–8; (18) Ferrara-Florence, 1438–42; (19) 5th Lateran, 1512–17; (20) Trent, 1545–63; (21) Vatican, 1869–70. Of these councils the Protestant churches generally recognize the first four; the Church of England, however, virtually the first five. The Greek Church accepts the first seven only. The Gallican Church has always wished to recognize the Council of Constance in its entirety, but orthodox Roman Catholics admit only such of its decrees as were approved by Pope Martin v; and of the Council of Basel it is similarly declared that its decrees are to be accepted only to the end of its twenty-fifth session, and then only so far as ratified by Pope Eugenius iv. The Council of Ferrara was really a continuation of the Council of Basel, and Hefele (the historian of the councils) reckons twenty councils only.

The early councils (which were all Eastern councils, at which Western Christendom was poorly represented, while Greek influence was predominatingly strong) occupied themselves chiefly with different phases of the Trinitarian controversy, and settled the Christian doctrine on that subject. Councils from the ninth to the fifteenth in the main confined themselves to the discussion of the rights, privileges, and dignities of the papal office, and of the method of election to the papal chair. The occasion for summoning the councils from the first to the fifteenth were either heresy or schism, or the conflicting claims of rival popes. The sixteenth, seventeenth, eighteenth, and nineteenth were reforming councils, which the Council of Trent was also in effect, although Protestants denied the sufficiency of the reforms it was prepared to concede. The Vatican Council decreed the infallibility of the pope in matters of faith and morals, and this decree seems to render any further council unnecessary. For the decrees of early councils infallibility was claimed, but Roman Catholics have always asserted that the ratification of their decrees by the pope was necessary. Among Protestant churches the Synod of Dort (1618) and the Westminster Assembly (1643–7) also take the rank of councils; but the Roman Catholic Church claims to be the only church entitled to summon a council representative of Christendom. (See Nicæa, Trent, etc). The fullest history is Hefele's *Conciliengeschichte,* continued by Hergenröther (9 vols.; new ed. 1894); partly trans. as *A History of Christian Councils* (5 vols. 1871–96).

Counsel. A lawyer called in by other lawyers to give advice on a case is said to be 'of counsel.' See also Counsellor and Attorney.

Counsellor, a counselling lawyer or attorney-at-law. It is usual in the United States to call lawyers attorneys and counsellors; some states use the one title counsellor, others use both titles. A counsellor is properly one giving advice, especially legal advice. Some lawyers confine themselves entirely to this branch of practice, leaving all the more formal parts of a trial to a lawyer doing the work of an attorney-at-law. An attorney is an officer of the court to which he has been admitted to practice. In the Supreme Court of the United States a distinction was at one time made between attorney and counsellor, but the distinction is no longer recognized, and the terms are now used almost interchangeably. See Attorney.

Count, a title derived from the Latin *comes,* and corresponding to the French *comte* and Italian *conte.* In some of its applications it is (or was) analogous to the English title *earl* and the German *graf,* with its cognates. Under the Roman empire the *comites* were originally simply attendants on magistrates, etc. Those attending the emperor, however, gradually increased their influence, and obtained commands in the imperial household and in the state.

The Emperor Constantine first gave the title a special dignity; but it soon came to be used almost indiscriminately among the imperial officers. In France, the counts, becoming rulers of provinces, made the title hereditary, and in many cases acquired practically sovereign power in their districts. Since the Revolution, however, the title has only been honorary. The continental custom of conferring the title upon all sons of counts has caused the number of persons who bear the title to become very large, and in consequence detracts somewhat from its dignity. The title has never been adopted in the English peerage, though countess is the title borne by the wife of an earl. The counts palatine of the Middle Ages were at first administrative officers, charged with the care of an imperial palace, with or without its attached territory. Eventually, however, they became judicial officers of the empire, who asserted their right to hand down the office, and the region which belonged to it, to their descendants. The principal counts palatine in the last sense were the Count Palatine of the Rhine and the Count Palatine in Saxony. Both title and office were abolished at the dissolution of the German empire during the Napoleonic era. See also Burgrave and Landgrave.

Counterfeiting. The right to coin or make money is reserved to the government under the laws of all nations. However, a government may empower a bank to issue 'script' money, which is practically demand notes payable by the bank, and allow it to circulate as money. Provisions in the various countries, particularly the United States and England, prohibiting the making of money by all others than the proper government officials, are very complete; and include the prohibition of making or being concerned in the making of money from any substance and by any process, in similitude of genuine money in current circulation; the mutilation or lightening of genuine coin; the making of dies, moulds or other implements or machinery designed to make money; and the possession of such implements, etc., or of counterfeit money with knowledge of that fact, and with intent to defraud the government or individuals. Counterfeiting of postage stamps, government bonds, and other governmental documents is prohibited. The acts above mentioned are punishable by fine and imprisonment, the maximum penalty in the United States being ten years imprisonment and $5,000 fine. In England counterfeiting was formerly treason, but now by statute it is felony and punishable by imprisonment.

Counter-irritants, in medicine, a class of remedies used for external application, which are intended to relieve congestion or pain in one part of the body by setting up irritation in another. A blister, a mustard plaster, or a stimulating liniment will often give relief from neuralgia. The nerve is in a congested or inflamed condition, and the external application of an irritant draws blood to the surface, and thus tends to relieve blood-pressure in the deeper tissues beneath. The pain of a strong counter-irritant also has its effect on the central nervous system, and through that on the general circulation. Possibly part of the relief is also due to a dulling of sensibility in the nerves affected.

Counter-irritants are sometimes divided into three classes, according to their activity. *Rubefacients* cause increased redness and heat of the part to which they are applied—*e.g.* hot water. *Vesicants* raise the skin. Cantharides and iodine are common examples. Boiling water will serve the same purpose, but of course is never used. *Pustulants* form the third class, of which croton oil is the most commonly used.

Counterpoint, in music, originated at the period when a system of signs called 'points' was used for notation. Counterpoint consisted of two or more lines of points, each line representing a melody, which, when set against each other and sounded simultaneously, produced correct harmony. What is called 'plain counterpoint' is usually a melody of simple form, to which a part or parts are added, written generally in one of five different ways, each called a species. To one note of the subject-melody the counterpoint gives, in the first species, one note; in the second, two notes; in the third, four or more notes; in the fourth, syncopated notes; the fifth, which combines the last three forms with various ornamental devices, is termed 'florid counterpoint.' Any number of parts may be added to the subject-melody, which may be above, below, or between the other parts. 'Double counterpoint' is that in which two melodies are so written that either forms a correct bass to the other, though transposed to various intervals. When more than two melodies are employed—any number may be used—any one part may become a bass to the other, but the only interval of transposition is that of the octave. 'Strict' is the term applied to counterpoint written with rigid adherence to its rules; but in modern composition considerable modification of rule is allowed. See *Counterpoint,* by E. Prout (1890).

Counterscarp, in fortification, the exterior slope of the ditch towards the field, in contradistinction to the slope next the rampart, named the scarp or escarp.

Countersign. A watchword used in the army as a guard against passing the lines of sentinels by unauthorized persons, such as strangers, spies, or parties of the enemy endeavoring to effect a surprise. The countersign is usually given out just before dark to the commanders of guards, and sent sealed by a trusted messenger to others whose confidential duties require them to pass the lines. The commanders of guards instruct their sentries when the latter go on post as to the countersign, which may be changed at any moment or any number of times, but is usually given out for the entire twenty-four hours. The countersign is usually the name of a battle, according to the custom of the U. S. army. See also PAROLE.

Counter-tenor, the highest adult male voice, usually called a male alto.

Countess of Huntingdon's Connection. See HUNTINGDON, SELINA, COUNTESS OF.

County, originally the district ruled by a *count.* In the United States the county is an administrative division of a state. Its functions in local administration are important in the Southern and in most of the Western states; in New England it is of little importance, local government being chiefly conducted by the towns. See LOCAL GOVERNMENT.

County Council. Under the local Government Act of 1888 county councils were established in all the counties of England and Wales; and further, owing to the immense area, or to local conditions of isolation or concentration, the three ridings of Yorkshire, the three divisions of Lincolnshire, the two divisions each of Sussex and Suffolk, the Isle of Ely, the Soke of Peterborough, were constituted counties for purposes of administration, each with its own county council. By provisional order the Isle of Wight was subsequently also created an administrative county. The county of London was created out of the portions of the counties of Kent, Surrey, and Middlesex over which the metropolis was spread.

Under the act a county council consists of councillors, aldermen, and a chairman. The chairman is chosen by the council, either from its own members or from the outside. The county councillors serve for a period of three years, and all retire together. The aldermen hold office for a period of six years, one-half retiring every third year.

The chief functions exercised by the councils are:—(1) Authorizing sanitary authorities to take land compulsorily for allotments. (2) Maintenance of main roads and their bridges, with the control of traffic thereon. (3) Enforcement of the River Pollution Prevention Act, 1876. (4) Licensing of theatres. (5) Varying the season for protecting wild birds. (6) Enforcing orders of the Privy Council as to contagious diseases of animals and destructive insects. (7) Licensing magazines and factories of explosives. (8) Formation and regulation of fishery districts. (9) Provision, maintenance, and management of asylums. (10) Establishing and contributing towards reformatory and industrial schools. (11) Deciding claims for compensation for damage by riot. (12) Verifying weights and measures, and regulation of gas meters.

Special powers are given to the London County Council, which succeeded to the duties and liabilities of the Metropolitan Board of Works. The council of London and the metropolitan borough councils have the duty of licensing music halls and theatres; and the councils for the various Yorkshire ridings have, subject to the approval of the Lord Chancellor, the power to make rules for the registration of deeds. In some matters the action of the council is final, but other powers they exercise only with assent of some department of the central government. The control of the police is exercised only jointly with the justices of the quarter sessions.

In the United States county councils were created in the State of Indiana by act of 1899. These councils consist of seven members, three chosen at large and four chosen by districts. Most of the financial powers of the county are exercised by the councils, the executive powers being retained by the board of commissioners.

County Courts. In England these courts, though founded in the days of King Alfred, were reconstituted in 1847 for the trial of civil cases of small importance, and are at present governed by the County Courts Act, 1888. They have really no connection with the old county courts, which are practically obsolete. County court judges, not exceeding sixty in number, are appointed by the Lord Chancellor, except in the duchy of Lancaster. The county has been divided into about five hundred districts, and each judge attends from one to twelve districts. A court is held in each district at least once a month. The court has jurisdiction in all personal actions where the amount claimed does not exceed £50, and in all questions of title where the rent does not exceed £10 a year. But if the claim exceeds £20 in respect of contract, or £10 in respect of tort, the defendant, on giving security for costs, and showing the judge that a point of law is involved, may take the case to the High Court. In most of the American states county courts have criminal and civil jurisdiction within county limits. There are also probate courts for each county. The judges are elective.

Coup d'Etat, an arbitrary stroke of policy carried out by violent means. The most famous examples in history are the *coup d'état* of Napoleon Bonaparte, who in 1799 put an end to the Directory by his 'whiff of grapeshot'; and that of Louis Napoleon, who in 1851 broke up the National Assembly by force.

Couped, kōōpt, or Coupé. In heraldry, when a limb, head, or trunk of a man or a beast is depicted severed as if evenly cut, it is blazoned 'couped'; if the edge is jagged as if torn off, it is 'erased.' The ordinaries, also, are 'couped' when their extremities fall short of the edge of the shield.

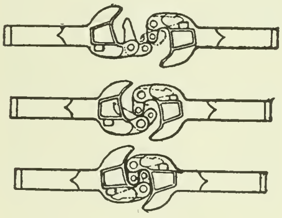
Cou'per, William (1853–1942), American sculptor, was born in Norfolk, Va. He entered the Royal Academy at Munich in 1874, went to Florence in 1875, and remained in Italy till 1897, when he settled in New York. He executed numerous ideal works and portrait statues, busts, and bas-reliefs, among which may be mentioned *The Recording Angel* (Norfolk, Va.); *Angel of the Resurrection* (Chicago, Ill.); *Peace* (Vicksburg, Miss.); *Sailors' Memorial* (Annapolis, Md.); statues and portrait busts of Longfellow, Agassiz, Audubon, Morris K. Jessup, Charles Darwin, Peary, President McKinley, and many other men of note. His art is strongly marked by Italian influence.

Couperus, kou-pā'rus, Louis (1863–1923), Dutch novelist, born at The Hague of Scottish ancestry. He spent his early life in Java, and later traveled in Greece, Italy, and southern France. After publishing a volume or two of poetry, he wrote his first novel *Eline Vere,* a psychological study of fashionable Dutch life, which appeared in 1889 and established the author's literary reputation. It was followed by *The Footsteps of Fate; Majesty; Universal Peace; Psyche; Fidessa; Babel; God and the Gods; The Sons of the Sun;* the four Books of the Small Souls—*The Small Souls, The Later Life, The Twilight of the Souls* and *Dr. Adriaan; Ecstasy; The Mountain Light; The Comedians; The Tour; Abu-Abdallah the Unfortunate; Old People and the Things that Pass.* Most of his works have been translated into English by Alexander Teixeira de Mattos.

Couple, in dynamics, the name given by the mathematician Poinsot in 1804 to a pair of equal parallel forces which act in opposite directions. The perpendicular common to the two forces is called the 'arm' of the couple, and the product of the arm and either force the 'moment.' The moment is the real measure of the couple. It is the same about every axis perpendicular to the plane containing the two constituent forces. The equal and opposite forces may have any directions so long as they are in the same or in a parallel plane; and they may be any distance apart so long as their magnitude is such as to give the same product when multiplied by this distance apart. A couple is completely represented by a directed line or vector, the length of which measures the moment, and the direction of which is perpendicular to the plane of the couple.

Couplet, two lines of poetry, generally but not necessarily of the same length, which rhyme together. The heroic couplet, consisting of iambic pentameter verse, was much used by Pope and Dryden, and by other writers of that era.

Coupling, a contrivance for fastening railway cars together so that they may be readily connected or disconnected. In the United States the automatic coupling is almost universally adopted both for freight and passenger trains. With this system the car has at each end a spring bar, which is at once coupling and buffer. Attached to the end of the bar is a pivoted hook. When the cars meet and the couplings are pushed together, the two hooks engage—their rear ends being at the same time secured by a locking-pin. When it is desired to separate the cars, the locking-pin is lifted by a lever at the side of the car; this releases the hooks, which swing open and disunite the fastening.



Automatic Coupler.

Coupon, kōō'pon, the interest ticket on certain bonds or shares, to be cut off and presented for payment as it becomes due. Each coupon has printed upon it the date upon which it will be paid and the amount, and may be sold or deposited in a bank for collection. It furnishes a convenient form of agreement for each interest payment and is negotiable.

Courant, kōō-ränt', the heraldic term for running.

Courbet, kōōr-bā', Gustave (1819–77), French painter, was born in Ornans of peasant stock. He studied in Paris but was mainly self-taught. In 1871 he joined the Commune and was one of the leaders in the destruction of the Vendôme Column, for which he was fined and imprisoned. He died in Switzerland. Marred by defects of drawing, his works nevertheless possess fine color and are valuable for their firm basis in fact and their truth to an individual impression of nature. His hunting scenes and animal subjects are spirited and vigorous. Among his best known works are *Burial at Ornans, The Stonebreaker, Woman with a Parrot, The Quarry, Young Women of the Seine,* and *Doe Run Down in the Snow.* Consult Brownell, *French Art;* Isham, *Gustave Courbet* in Van Dyke's *Modern French Masters;* Bénédite, *Courbet* in *French Artists of Our Day* (1912).

Courbevoie, kōōr-b'-vwä', an industrial suburb of Paris, 5 miles W.N.W. of the city, on the left bank of the Seine. It has chemical manufactures. Pop. (1936) 58,638.

Courcelles, kōōr-sel', town, province of Hainault, Belgium, 5 miles N.W. of Charleroi. It is a great coal-mining center, and has iron manufactures. Pop. 17,000.

Courcelles, Daniel de Rémy, Sieur de, French governor of Canada, went out as successor of Mézy in 1665, and inaugurated his rule by leading an unsuccessful expedition against the Mohawks. A second expedition, in company with Tracy, was successful, and the five forts of the Mohawks were destroyed. In 1671 Courcelles proceeded with a party up the St. Lawrence for the purpose of selecting a site for a post on Lake Ontario, for protective and trading purposes. He was obliged to return to France the following year.

Courier de Mère, kōō-ryā' dē må'rā', Paul Louis (1772–1825), French writer, was born in Paris. A visit to Florence led to his edition of Longus' *Daphnis and Chloë* (1810). Settling upon his estate in Touraine (1814), he acquired celebrity as the author of several powerful political pamphlets, and as the opponent of the Restoration government. In the *Simple Discours* (1821) he exposed the iniquity of the proposal to purchase the estate of Chambord for the Duc de Bordeaux. For this scathing and effective satire he was tried, fined, and imprisoned for two months. His later writings included the *Gazette du Village*, *Réponses aux Lettres Anonymes*, the *Livret de Paul Louis*, and the *Pamphlet des Pamphlets* (1824), in all of which he showed himself one of the greatest dialecticians and masters of irony, with a style as clear as it was brilliant. His writings are valuable for representation of contemporary facts and events in French history. Courier was found assassinated in the grounds of his own château at Véretz, on the evening of May 10, 1825. Consult *Œuvres Complètes* edited by Armand Carrel in 4 vols.

Courlan, k͞oor′lan, one of several names given to *Aramus scolopaceus*, a long-legged bird found in marshy places in tropical South America. In its general characteristics the bird is intermediate between the rails and the cranes. The bill is long and slender; the tibia partly bare; the plumage is chocolate brown, with metallic reflections above, and some white spots on the head and neck. An allied species occurs in Central America and Florida, and is called the limpkin (*A. pictus*). It is 28 inches long, glossy olive brown striped with white. It walks quickly, limping and jerking the tail, and feeds on lizards, frogs, and the like. The cry is a melancholy wail varied by a clucking note.

Courland. See KURLAND.

Coursing, the pursuit of game by dogs which are guided by their eyes only. Formerly, various animals were coursed; but the sport is now chiefly restricted to the hunting of hares with greyhounds, the quarry being run to earth by sight only.

The first known set of English rules for coursing was drawn up in the reign of Elizabeth, by the Duke of Norfolk; and Swaffham in Norfolk was the seat of the oldest recorded coursing club. This was founded in 1776 by Lord Orford, and was followed by a number of other clubs established at the end of the 18th and in the beginning of the 19th century. But it was not until 1858 that coursing was placed on a really business-like footing by the formation of the National Coursing Club. The sport has taken root in America, chiefly in California and other Western States.

At a coursing-meeting two greyhounds are slipped together, and the judge decides which is the winner of the trial upon the one uniform principle that the greyhound which does most towards the killing—though he may not actually kill—is to be declared the winner. The judge has a recognized code of points to go by, these points being *speed*, for which one, two, or three points may be allowed; *the go-bye*, two or three points; *the turn*—that is, bringing the hare round at not less than a right angle—one point; *the wrench*—bringing the hare round at less than a right angle—half point; *the kill*, one or two points or even less; and *the trip*—where the hare is thrown off his legs—one point.

Court, a tribunal for the public administration of justice. Courts for the punishment of offences against the peace and dignity of the state and for the settlement of controversies among individuals are a necessary part of the machinery of government in every organized society. In a monarchical system the preservation of the peace and the administration of justice are recognized as the highest prerogatives of the monarch. The person to whom these functions are delegated becomes a judicial officer, and the tribunal in which he presides is the court.

As commonly organized a court is composed of one or more judges, a clerk, and a marshal or similar officer for the preservation of order. The counsel or advocates in attendance and, in a proper case, a jury constitute part of the tribunal.

The administration of justice is a public function in England and the United States, and any proper person, whether connected with the business of the court or not, is entitled to attend and witness the proceedings. Another important feature of the English and American judicial system is the fact that the courts do not go out of their way to do justice or enforce the law of the land. They have no inquisitorial functions, nor do they, unless required by statute so to do, give opinions on abstract questions of law, but content themselves with the decision of actual controversies brought before them for determination.

Jurisdiction of Courts.—The jurisdiction and powers of the several courts which divide the administration of justice among them are usually determined by statute, though the superior tribunals of England for centuries exercised a jurisdiction determined by their own customs, and the jurisdiction of the Supreme Court of the United States is defined by the Constitution, and is, therefore, not subject to alteration by act of Congress.

Courts are variously classified according to the scope and character of the jurisdiction which they are authorized to exercise. Thus, a court of first instance, or a *nisi prius* court, is one which exercises an original jurisdiction, while an appellate court is one charged with the duty of reviewing the judgments rendered in an inferior tribunal. Some courts, like the Supreme Court of the United States and the old court of King's Bench in England, may exercise both an original and an appellate jurisdiction, though the present practice is to commit the hearing of appeals to courts which have no other function. The distinction between courts of record and courts not of record is an ancient one, and corresponds closely to the more usual classification of courts as superior and inferior.

Some courts are restricted to a jurisdiction of a special character, as magistrates' or police courts, and courts of general and special sessions, which have only a criminal jurisdiction, and the chancery tribunals, which exercise only an equity jurisdiction. Others, again, like municipal and county courts, are confined to litigations involving small amounts, or to causes originating within a limited territory. A court of general jurisdiction, on the other hand, is one whose jurisdiction is coextensive with the state, or to which a cause of any value may be brought, or which may hear and determine all classes of cases, whether civil or criminal. The most important division of jurisdiction in our legal system has been that between the ordinary tribunals administering the common law and the courts of equity, and this, though abolished in England and some States of the Union, still exists in others.

Courts in the United States.—The Federal system of the United States has resulted in the creation of two distinct and parallel systems of judicial administration—that of the United States courts, which administer the Federal law throughout the United States, and that of the several States within their respective boundaries. The Constitution (Art. III., secs. 1, 2) vests 'the judicial power of the United States in one Supreme Court and in such inferior courts as the Congress may from time to time ordain and establish.' It further provides that 'the judicial power shall extend to all cases in law and equity arising under this Constitution, the laws of the United States and treaties made or which shall be made under their authority; to all cases affecting ambassadors, other public ministers and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more states; between a state and citizens of another state; between citizens of different states; between citizens of the same state claiming lands under grants of different states, and between a state or citizens thereof and foreign states, citizens, or subjects.' This jurisdiction of the Supreme Court is declared to be appellate only, except in cases affecting ambassadors, other public ministers and consuls, and those in which a state shall be a party, as to which the court shall have original jurisdiction.

The Federal courts as at present constituted fall into three classes: the Supreme Court, the Circuit Courts of Appeals, and the District Courts.

Supreme Court.—See SUPREME COURT.

Circuit Courts of Appeals.—Because of the great volume of general litigation coming before the Supreme Court and the resulting delays in disposition, it became necessary to constitute a Circuit Court of Appeals in each of the judicial circuits of the United States. Each has three or more circuit judges, and to each is assigned one of the justices of the Supreme Court, though he seldom takes his seat. In 1942 the 8th and 9th circuits had 7 judges; the 2nd, 6th and 7th, 6 judges; the 3rd, 5 judges; the 5th and 10th, 4 judges; and the 1st and 4th, 3 judges. Circuit Courts of Appeals possess no original jurisdiction. Cases are brought to them from the District Courts, and in some cases a further appeal may be taken to the Supreme Court.

District Courts, which are the lowest class of Federal tribunal, were constituted in 1911, being given the original jurisdiction of the Circuit Courts, abolished at that time. In 1942 there were 192 District Court judges, including those for the District of Columbia but excluding those in non-contiguous possessions.

In addition to these courts there are also a *Court of Claims* (q. v.), which deals with the claims of private persons against the Government of the United States; a *Customs Court;* and a *Court of Customs and Patent Appeals.*

There is great diversity in the judicial organization of the several states. In every state there are three sets of courts: a Supreme court (in some instances a court of appeal), superior courts of record, and local courts. The jurisdiction of the state courts, both civil and criminal, is unlimited except in certain cases in which some point of Federal law arises. In certain cases state courts have a concurrent jurisdiction with Federal courts. In the few states where the people do not elect them, judges are appointed by the governor or elected by the legislature.

There is more similarity in the inferior courts in the several states than in the higher courts. Perhaps the most important of these, apart from certain municipal courts in the larger cities, are the County Courts, which usually exercise an important jurisdiction, both civil and criminal (but not generally equitable), within their respective counties. Concurrent with these are the Surrogates' or Probate Courts (whose functions are in some states performed by the County Courts), and below them are the justices' courts of cities and villages, the courts of rural justices of the peace, the police courts, and the like, which are too various to be described. All of these are knit together by a system of appeals, whereby the action of inferior magistrates is in the last analysis controlled by the higher tribunals.

Courts of Great Britain.—Prior to 1873 the English judicial system was one of great complexity, the result of a thousand years and more of natural evolution. The superior courts comprised the three great common law tribunals—the Court of King's Bench, the Court of Common Pleas, and the Court of Exchequer. These were of nearly equal dignity and importance, though the Court of King's Bench enjoyed a certain preeminence, the presiding judge of the court being styled the Lord Chief Justice of England. Side by side with the common law tribunals the High Court of Chancery, presided over by the Lord Chancellor of England, administered the equity jurisdiction of the crown. The chancellor was assisted by a vice-chancellor and a master of the rolls. Other superior courts were the Probate and Divorce Courts, whose jurisdiction was carved out of that of the ecclesiastical courts, the Court of Admiralty, and the London Court of Bankruptcy. The judicature act of 1873, which reformed the entire judicial system of England, consolidated all of these courts into one Supreme Court of Judicature. The Supreme Court is for administrative purposes divided into two parts, the High Court of Justice and the Court of Appeal. The former of these is further organized in three divisions, known respectively as the Chancery Division, the King's Bench Division, and the Probate, Divorce, and Admiralty Division. An appeal lies from any division of the High Court as well as from the county courts in certain cases to the Court of Appeal, and from that tribunal to the House of Lords (to the judicial body known by that name, not the legislative assembly). The judicial committee of the Privy Council hears appeals in ecclesiastical matters; in cases from the colonies; and, in some instances, from the dominions.

The supreme civil court of *Scotland* is the Court of Session, and from it there is no appeal except to the House of Lords, which has since the Union exercised in this respect a power formerly in the hands of the Scots Parliament. The roots of the Court of Session lie as far back as the reign of James I, but its complete establishment as an effective court may be considered to date from 1532.

The Court of Session is both a court of law and a court of equity. It has no criminal jurisdiction, though it may punish contempt of court and breach of interdict. In certain civil cases it has an exclusive jurisdiction—*e.g.* in actions relating to status and declarators of property. In other cases its jurisdiction can only be sought by way of appeal from inferior courts, appeals from which are brought directly to the inner house.

The supreme criminal jurisdiction in Scotland is vested in the High Court of Justiciary. The judges are the judges of the Court of Session, and the court sits in Edinburgh on the requisition of the lord advocate. Sittings are also held in the circuit towns whenever there are cases for trial. The court has the widest possible jurisdiction with regard to all offenses against the general law, but on circuit prisoners are tried only for crimes committed within the area of the circuit. There is no appeal from the High Court of Justiciary, but appeals lie to it from inferior courts in criminal matters on questions of law.

Canadian Courts.—There are two Federal courts in Canada, the Supreme and Exchequer Courts; the former has appellate jurisdiction—subject to limitations—from the Superior Courts of the provinces. The Exchequer Court has jurisdiction where the revenue or property or other interest of the Crown is involved; and as an admiralty court. In certain cases an appeal lies from the Exchequer to the Supreme Court; and in civil actions only, from the Supreme Court or from a Superior Court to the judicial committee of the British Privy Council.

Each province has a Superior Court, and the majority have county courts. Appointments to both are made by Federal authority. The provincial governments retain the appointment of police magistrates and justices of the peace.

See COURT OF CLAIMS; COURTS, MILITARY; SUPREME COURT; JURISDICTION; LAW PROBATE COURT.

Court, CONTEMPT OF. See CONTEMPT OF COURT.

Court, PRESENTATION AT, a ceremonial function at which the subject is formally presented to his sovereign or representative. This ceremony confers on its recipient so much prestige that it is carefully safe-guarded and the credentials of those aspiring to the honor are closely investigated.

At the British court the names of those desiring to be presented are sent to the office of the Lord Chamberlain, who in turn submits them to the sovereign. Their various rights and privileges and their precedence are then determined, and they are required to rehearse the ceremony under personal direction of the Lord Chamberlain. Full court dress is worn at the ceremony. Subjects of foreign countries may be presented by their own ambassador.

Court Baron. See BARONY.

Courtesy Titles are those titles given by general consent and social custom in Great Britain to sons and daughters of peers, also in a few cases to officials. These titles, however, are not bestowed, like titles of honor, by the sovereign and do not raise persons bearing them above the rank of commoners. The courtesy title 'Lord' is prefixed to the Christian and surnames of the younger sons of dukes and marquises, and 'Lady' in the same way is prefixed to the Christian and surnames of their daughters (daughters of earls also), and if they marry men of lower rank they retain the title prefixed to their own Christian name and the surname of their husbands. The courtesy title 'Honorable' is applied to the children of viscounts and barons, also to the younger sons of earls.

Court'hope, WILLIAM JOHN (1842–1917), English man of letters, was born at St. Malling, Sussex. He was educated at Harrow and at Oxford; he won the Newdigate (1864) and the Chancellor's Essay Prize (1868) at Oxford, and became professor of poetry there (1895–1901). His lectures on English poetry, published in 1901 as *Life in Poetry and Law in Taste,* constitute a valuable exposition of the art. He published *The Three Hundredth Anniversary of Shakespeare's Birth* (1864); *The Genius of Spenser* (1868); *Ludibria Lunæ* (1869); *The Paradise of Birds* (1870); *Addison* (1894) in English Men of Letters; *The Liberal Movement in English Literature* (1885); *History of English Poetry* (6 vols. 1895–1909). He wrote a life of Pope, and edited a standard edition of the poet's works.

Court Martial. See COURTS, MILITARY.

Courtney, kûrt'ni, LEONARD HENRY, FIRST BARON (1832–1918), English public official, born in Penzance, Cornwall. He was graduated from Cambridge (1855), was called to the bar at Lincoln's Inn (1858), and became a judge (1889). He was professor of political economy at University College, London (1872–5), under-secretary of state for the Home Department (1880–1), and under-secretary for the Colonies (1881–2). He succeeded Lord Frederick Cavendish as financial secretary to the treasury, but resigned in 1884; was member of parliament for Liskeard, 1876–85), and for the Bodmin division of Cornwall (1885–1900). He wrote *The Working Constitution of the United Kingdom and its Outgrowths* (1901).

Courtney, WILLIAM LEONARD (1850–1928), English journalist and author, was born at Poona, India, and educated at Somersetshire College, Bath, and at Oxford. He succeeded Frank Harris as editor of the *Fortnightly Review* (1894), and published the *Metaphysics of John Stuart Mill* (1879); *Studies on Philosophy* (1882); *Constructive Ethics* (1886); *Life of John Stuart Mill* (1889), *Studies at Leisure* (1893); *The Idea of Tragedy* (1900); *The Development of Maeterlinck* (1904); *The Feminine Note in Fiction* (1904); *The Literary Man's Bible* (1907); *Rosemary's Letter Book* (1909); *In Search of Egeria* (1911); *The Soul of a Suffragette* (1913); *The Literary Man's New Testament* (1915); *The Passing Hour* (1925). His drama *Kit Marlowe* was produced in 1893; and in 1903 he published a dramatic version of De la Motte-Fouqué's *Undine.*

Court of Claims, a court instituted to hear and determine claims against the state, whether asserted by a citizen or by a foreign state or a subject thereof. A sovereign state cannot be prosecuted in the tribunals created by it except by its own consent. Some states provide by statute for the hearing of claims against them in the ordinary tribunals, but more frequently, in England and the United States, separate courts are created for that purpose. In either case the submission of the state to such a hearing is an act of grace, and not a right of the claimant. The U. S. Court of Claims was instituted by act of Congress in 1855. It consisted originally of three judges, but is now made up of a chief justice and four associate justices. It is empowered to hear and determine all claims founded on any act of Congress, or on any regulation of an executive department, or on any contract, express or implied, with the U. S. government, and all claims which may be referred to it by either house of Congress. Its jurisdiction does not extend to torts or wrongs committed by any officer of the United States, nor does it possess any equity jurisdiction. Proceedings in the court are instituted by petition, and the procedure followed is in general like that of the ordinary tribunals. In cases where the amount in controversy exceeds $3,000, or where a constitutional question is involved, an appeal may be taken to the U. S. Supreme Court. Similar courts with like jurisdiction have been created in most of the states.

Court of Common Pleas, one of the tribunals of common law in England. Magna Charta provided that common pleas, *i.e.,* civil suits between subjects, should be held in a fixed place and not follow the King, which led to the establishment of the Court of Common Pleas at Westminster. In 1873 it was merged in the King's Bench Division of the High Court of Justice.

Court of Session, the highest civil tribunal in Scotland. See COURT, *Great Britain.*

Courtois, JACQUES (1621–76), French painter, born at Saint Hippolyte, Doubs; spent most of his life in Italy, where he was known as 'the Burgundian.' While studying at Milan he became the pupil of Jérôme, afterward working at Bologna, Florence, and Rome. In his thirty-sixth year he entered a monastery at Rome, and painted many sacred pictures. He is seen at his best in battle scenes, of which the smaller canvases are the better. Five of his cavalry pictures are in the Louvre, and many other pictures in European galleries. See Dussieux's *Les Artistes Français à l'Etranger* (3d ed. 1876).

Courtrai (Flem. *Kortrijk*), town, province of W. Flanders, Belgium, on the river Lys, 27 m. by rail s.w. of Ghent, is famous for its linen, its lace, and its linen-bleacheries, for which the water of the Lys is especially suited. Outside its walls, in 1302, was fought the 'Battle of the Spurs,' between the weavers of Bruges, Ypres, and other Flemish towns, and the chivalry of France, the latter being disastrously routed. One of its churches, adorned with a masterpiece of Van Dyck, was the burial-place of the counts of Flanders. Pop. (1938) 40,979.

Courts, Military. Military tribunals, in the U. S. army, are classified as Courts-martial, Courts of Inquiry, and Military Commissions. Of courts-martial there are four:—(1) general, (2) garrison, (3) regimental, and (4) summary courts-martial—which are described below, and which are all intended to try offenders against military law. Courts of Inquiry are for the examination of transactions of officers and soldiers, or of imputations or accusations against them. Military Commissions are for the trial of offenders against the laws of war and under martial law founded on necessity. Officers charged with crime are arrested and confined to their quarters by their commanding officers while awaiting trial, and must be served with a copy of the charges against them within eight days of the time of arrest, and brought to trial within ten days thereafter, unless the necessities of the service clearly prevent. Non-commissioned officers against whom charges are preferred are placed in arrest in barracks, and are not to be confined in the guard-house with privates, unless in aggravated cases where escape is feared. Private soldiers under charges for a minor offense are placed in arrest in quarters, but those to be tried by a general court-martial for more serious offenses are confined in the guard-house, being kept separate, however, from soldiers serving sentences, and not being sent out to work with them. No soldier may be confined without the order of an officer, except for serious disorderly conduct. Courts-martial in the U. S. army are composed of commissioned officers only, and all officers on the active list are available for this duty. Officers of the regular army and the marine corps may be associated together for trial of members of either of these branches of the service, and the same is true of the regular and volunteer forces; but with these two exceptions regular officers are not competent to sit on courts for trial of offenders belonging to other forces. Militia officers may sit on courts for trial of volunteer officers, but militia officers must be tried by courts composed entirely of militia officers.

Courts-martial derive their existence from acts of Congress. Their jurisdiction is limited to the purpose of maintaining military discipline, and their decisions, within this jurisdiction, are not reviewable by any courts whatsoever. As to persons, courts-martial have jurisdiction over all persons in the military pay and service of the U. S., including camp retainers in war time, in any and all places, military offenses not being territorial. Officers, cadets, and candidates for commission can be tried by general courts-martial only.

(1) A *General Court-martial* may be composed of any number of officers from five to thirteen, inclusive, and a judge advocate; but it must have thirteen members if the exigencies of the service permit. If for any reason the court is reduced below five members, the court must notify the convening authority and adjourn. The President, any general officer commanding an army, a territorial division, or a department, or a colonel commanding a separate department, has power to order a general court-martial for trial of persons under his jurisdiction; so also has the superintendent of the Military Academy for trial of cadets.

A military offense having been committed, charges and specifications are prepared against the offender.

A military charge corresponds to a *civil indictment,* and is supported by specifications which set forth the facts constituting the offense. A charge having been preferred, the commanding officer investigates the case, endorses his recommendation thereon, and forwards it to the authority competent to order a general court-martial. The court having been duly ordered, assembles in dress uniform, with swords, at the place and time specified in the order. The members take seats in the order of rank—the president (the senior officer present) at the head of the table, and the judge advocate, named as such in the order, at the foot of the table. The president is the organ of the court to maintain order and conduct the business of the court. The judge advocate 'shall prosecute in the name of the United States,' and shall also consider himself the counsel of the accused so far as to prevent the accused from incriminating himself is concerned. The accused may challenge any member of the court for cause stated to the court, and is entitled to counsel. After these matters have been explained to the accused, and he has no further objections to any remaining members, the judge advocate administers the oath to the members, and is in turn sworn to his duty in the prescribed form by the president. The accused is then arraigned and tried by the court, the findings and sentence being sent to the convening authority for final action. For details of the conduct of business, prescribed forms, calling of witnesses, records of proceedings, limits of punishment, etc., etc., consult authorities mentioned below.

(2) A *Garrison Court-martial* is composed of three members and a judge advocate, and may be ordered by the commanding officer of any post, fort, or other place where troops of different corps are serving. It has been largely superseded by the summary court, its principal use at present being for the trial of non-commissioned officers who object to being tried by the summary court.

(3) The *Regimental Court-martial* is also composed of three members and a judge advocate, differing from a garrison court in that it is ordered by the regimental commander and composed of officers of the offender's own regiment.

(4) The *Summary Court* is composed of one officer designated by the commanding officer of the post, camp, fort, regiment, etc., and he is usually the second officer in rank present for duty. This court cannot try officers, cadets, or candidates for promotion; nor can it try non-commissioned officers who object to such trial, except under special authority of the officer competent to order their trial by general court-martial. It cannot adjudge punishment in excess of one month's confinement and forfeiture of one month's pay, except when the accused consents in writing to the trial, when the limit of its punishing power is extended to three months' confinement and forfeiture. The post commander is the reviewing authority. The summary court is by far the one most used as a means of discipline, and has almost superseded all other inferior courts.

Courts of Inquiry may be ordered only upon the demand of an officer or soldier whose conduct is to be investigated, by the President or any commanding officer. It does not give opinions, except when specially ordered to do so, but simply states the facts disclosed by its investigations into the accusations or imputations against the officer or soldier who has demanded the inquiry, and its conclusions therefrom. A court of inquiry consists of one or more officers, not exceeding three and a recorder. It has the power to summon and examine witnesses, and makes a full examination of all the circumstances following the form of record prescribed for the general court-martial. Consult *U. S. Army Regulations, Manual for Courts-martial* (1901); publications of the judge advocate general's decisions; Winthrop and Davis's *Military Law,* and Birkhimer's *Military Government and Martial Law* (1905). See Military Law.

Cousin, almost equivalent to Lat. *consanguineus,* which was at one time its legal acceptation, but now held to denote primarily a cousin-german (colloquially, a 'full' or 'first' cousin)—*i.e.* the son or daughter of one's uncle or aunt.

Cousin, Jean (?1501–89), French painter, celebrated also as a worker in stained glass, a sculptor, and an author. Born at Soucy, he lived chiefly at Sens. The best of his surviving pictures are *The Last Judgment* (Louvre)—fine and thoughtful; *Eva Prima Pandora* (mentioned in his book, *Entrée à Paris*). His miniatures show dignity and simplicity. Cousin was a great reformer in the art of French glass-painting, obtaining remarkable effects by using enamel colors on white. See Lady Dilke, *The Renaissance of Art in France* (2 vols. 1879); Louis Monse, *La Sculpture Française depuis le XIVe Siècle* (1895).

Cousin, Victor (1792–1867), French writer and philosopher, born in Paris; was appointed assistant professor at the faculty of letters, under Royer-Collard (1815). Having lost faith in the philosophic systems of Locke and Condillac, he adopted the principles of the Scottish metaphysicians Reid and Dugald Stewart, and during a visit to Germany (1817–19) studied the systems of Kant, Schelling, Hegel, Jacobi, and Fichte. Dismissed from his chair on account of his liberalism (1821), he was also imprisoned for a time in Germany, being accused of Carbonarism (1825). Returning to France, he published his *Fragments Philosophiques* (1826), succeeded by two series of *Cours de l'Histoire de la Philosophie* (1827 and 1840); and later, being restored to his chair at the Sorbonne (1827), he completed admirable editions of Proclus and Descartes, and issued the early volumes of his translation of Plato. As a lecturer and teacher Cousin appears to have had few equals in modern times for intense moral earnestness, eloquence of style, and faculty of clear exposition. At this time he was elected a member of the French Academy. In Guizot's ministry he became a member of the Council of Public Instruction, afterwards director of the Ecole Normale, and was created a peer of France (1832). Intimate personal knowledge of the condition of public education throughout Europe enabled him to formulate a successful scheme of primary instruction while minister of public instruction under Thiers (1840). Cousin next published his *Cours de l'Histoire de la Philosophie Moderne* (1841; Eng. trans. 1852), also his *Cours de l'Histoire de la Philosophie Morale au XVIIIe Siècle,* and in 1842 his *Leçons sur la Philosophie de Kant* (Eng. trans. 1853). He published *Etudes sur les Femmes et la Société du XVIIe Siècle* (1853), followed by his celebrated *Du Vrai, du Beau, et du Bien* (1854; 23d ed. 1881; Eng. trans. 1854). Cousin also published editions of Abélard and Blaise Pascal, and critical works on Aristotle, Locke, and Kant. He founded no philosophic system of his own, but is regarded as the prophet of eclecticism. He gave an immense impetus to the study of philosophy. He died at Cannes, and bequeathed his valuable library to the Sorbonne. See Sir William Hamilton's article in the *Edinburgh Review* (1829); *Victor Cousin et son Œuvre,* by Paul Janet (1885); *Victor Cousin,* by Jules Simon, in the Grands Ecrivains Series, trans. by G. Masson (1888), and *Victor Cousin, sa Vie,* etc., by Barthélemy St. Hilaire (3 vols. 1895).

Cousin-Montauban, Charles Guillaume Marie Apollinaire Antoine, Comte de Palikao (1796–1878), French general, born at Paris. From 1831–57 he served in Algiers. When war broke out in China (1860), he commanded the combined forces of the French and British, and in less than three months took Peking, gaining the battles of Chang-kia-huang and Palikao. Appointed premier and minister of war (Aug. 9, 1870), he held office for only twenty-four days; but in that short time he armed, fortified, and provisioned Paris, and raised a force of 140,000 men, whom he posted at Châlons. After the fall of the empire he fled abroad, lived a short time in Belgium, and on his return to France published *Un Ministère de la Guerre de Vingt-Quatre Jours* (1871).

Cousins, Samuel (1801–87), English mezzotint engraver, born at Exeter. He executed (1826) the notable engravings of *Lady Acland and Children* and *Master Lambton* after Lawrence, was elected A.R.A. (1835), and became the first academician engraver (1855). He bequeathed £15,000 to the Academy in trust for poor artists. See G. Pycroft, *Memoir,* privately printed (1887).

Couthon, Georges (1756–94), French politician, born at Orcet (Auvergne); studied law, and became advocate at Clermont-Ferrand in 1785. He adopted the ideas of the Revolution, and was elected in 1791 to the National Assembly. Upon being re-elected to the Convention he attached himself to Robespierre, and showed great vindictiveness in the pursuit of his adversaries. In May, 1793, he was elected with Saint-Just on the Committee of Public Safety. Then he accompanied the army which was besieging Lyons, and after its capture (Oct. 9, 1793), contrary to his wont, treated the town with moderation. In December, 1793, he became president of the Convention, but soon after was guillotined with Robespierre, Saint-Just, and others (July 28, 1794). See Morse Stephens, *The French Revolution* (1891).

Couvade, a term in use among anthropologists to denote the curious custom of 'man-childbed' practised by many ancient and some modern races—*e.g.* the ancient Corsicans, and in modern Guiana and Yün-nan (China) and Assam. An adaptation of the Old French *couvade* ('brooding,' or 'sitting on eggs'), and first used derisively, it was introduced into literature by Francisque Michel (*Le Pays Basque,* 1857, p. 201), and by Professor E. B. Tylor in his *Early History of Mankind,* 1865, p. 293, where the practice is described. This remarkable custom consists in the father of a new-born child affecting to undergo all the physical pains of maternity, being carefully nursed and waited upon by friends, while the mother herself returns to her work in the fields shortly after the birth. Mr. Elton is disposed to see in this a survival of *Mutterrecht,* or matriarchate, by which men are placed in subjection to women; and the problem has been discussed from other points of view. From Strabo's statement, that this ceremony was in force among the Celtiberi, it has been asserted that the modern Béarnais and Basques still continue the custom; but this has been proved to be incorrect (*Academy,* October–December, 1892). See Rodway, *In the Guiana Forest* (1895), Ploss, *Das Weib* (1897).

Couvreur, J. H. See Tasma.

Covenant. **(1.)** In law, the general term 'contract' comprises in the language of law every description of agreement, obligation, or legal tie whereby one party binds himself or becomes bound expressly or implicitly to another to pay a sum of money, or to do or refrain from doing any particular act. The term 'covenant' is properly applied to a contract *under seal* that something has or has not been, or shall or shall not be, done. **(2.)** The word plays a great part in the Bible, not only from the frequent occurrence of pacts among human beings, but principally from its application to the relation between Yahweh and His people Israel. Among purely human covenants we have those between Isaac and Abimelech (Gen. 26:26 *ff.*), Jacob and Laban (Gen. 31:44 *ff.*), Joshua and the Gibeonites (Josh. 9), Jonathan and David (1 Sam. 18:3), etc. Covenants between Israel and the Canaanites were forbidden (Ex. 23:32; 34:12–15). Such compacts seem originally at least, to have been ratified by an oath or curse (Gen. 26:31) and by some kind of sacrifice, the parties walking between the pieces of the victim (see Jer. 34:18). We have also various covenants between Yahweh and (representative) individuals—*e.g.* Noah (Gen. 9:9–17), Abraham (Gen. 15, renewed ch. 17), David (2 Sam. 23:5), which, however, may be regarded as sporadic confirmations of the great national covenant with Yahweh, called in Isa. 55:3 'the everlasting covenant,' and known as the Sinaitic covenant (Ex. 24:8), or the covenant of works. In this, of course, while there is present the idea of mutual agreement, the dominating element is the favor and promise of God to the people—their part being obligation and submission: see in Gen. 15:17 a striking symbolization of this in the fact that a lamp of fire (the divine presence, not Abraham) passed between the fragments. The unfaithfulness of Israel having rescinded this original bond, another rose in its place, the new covenant, predicted by Jeremiah (Jer. 31:31)—a union not so much national as spiritual, and realized in Jesus Christ (*New Testament* means 'new covenant'). This is sometimes spoken of as the covenant of grace, or of redemption, and is considered to subsist either between the Father and the Son, or between God and the human race, with Christ as the ratifying sacrifice (Heb. 8:6 *f.*; 12:24; see also Mark 14:24), the ultimate object being the salvation of mankind. In the comprehensive view of St. Paul, however, the new covenant is but the realization of the old, the promise to Abraham not being fulfilled in Abraham's 'seeds' (the Israelites), but his 'seed'—*i.e.* Christ, with whom, of course, all true believers become one (Rom. 9:6 *f.*; Gal. 3:16). See Schultz, *Old Testament Theology,* 1892, ii. p. 1 *ff.*; Candlish, *Expository Times* (1892—October, November); W. R. Smith, *Religion of the Semites* (1894); Kraetzschmar, *Bundesvorstellung im Alten Testament* (1896).

Covenant, Ark of the. See Ark of the Covenant.

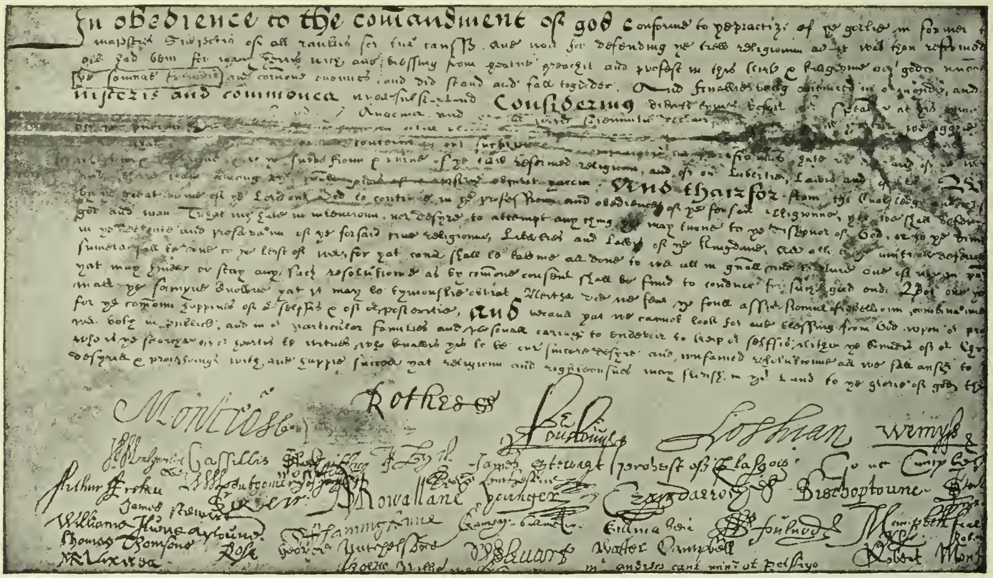
Covenant, Book of the, a name applied by scholars to the section Exodus 20:22–23:3. See Exodus.

Covenanters, the name by which the subscribers of the covenants, mentioned in the succeeding article, came to be known, especially in the persecuting times after the restoration of 1660. In 1662 the covenants were declared to be unlawful; in 1682 they were formally repudiated; and in 1685 adherence to them was declared to be treason. While many were but too eager to follow the royal example in renouncing them, a large party in Scotland clung heroically to their vows, and a dismal and cruel struggle ensued. In 1666 a band of Covenanters was dispersed at Rullion Green, on the south side of the Pentland Hills; in 1679 the Covenanters defeated Claverhouse at Drumclog, on the borders of Lanarkshire and Ayrshire, but three weeks later were totally routed by Monmouth at Bothwell Brig, 8 m. s.e. of Glasgow. Though the narrowness and fanaticism of the Covenanters must be admitted, most fairminded critics will grant that their cause was right in the main. The revolution of 1688, with its edict of religious toleration, at once evinced the justice of their contention, and brought the unhappy struggle to a close. See Scotland, Cameronians; Gilfillan, *Martyrs, Heroes and Bards of the Scottish Covenant* (1852); Chapman, *Notable Women of the Covenant* (1883); Simpson, *Traditions of the Covenanters* (1889); and Brown, *Covenanters of the Merse* (1893).

Covenants. The Scottish covenants were bonds of agreement, the signatories of which pledged themselves to maintain the reformed religion against Romanism or (what seemed to them little better) Episcopacy. A covenant was signed at Edinburgh in 1557 by a considerable number of the aristocracy and landed gentry—*e.g.* the Earls of Argyll, Glencairn, and Morton, and Erskine of Dun—its object being the furtherance of Protestant principles in the face of actual and possible opposition from Rome. A second bond of the same nature was signed at Perth two years later. The distinctively Scottish covenant, however, is that known as the National Covenant, which bears the sub-title 'Confession of Faith,' but which, as such, must not be confused either with the reformation Confession of 1560, or with the Confession drawn up by the Westminster Assembly in 1644–6. It was originally drafted by John Craig, and signed by the king and the royal household in 1580, and by people of all ranks in 1581. It was renewed in 1590 and 1596; in 1638 it was attested by thousands in Greyfriars' Churchyard, Edinburgh, as a repudiation of the Episcopal prayer-book, copies of it being also distributed throughout the country; and in 1650 at Speymouth, as well as at Scone in 1651, Charles II set his name to the document. The principal points in the National Covenant were the renunciation of Popery; adherence to the true religion, and to the Presbyterian form of it; and loyalty to the throne. The Solemn League and Covenant, though probably composed by a Scotsman—*viz.,* Alexander Henderson—was intended to unite the three kingdoms in a treaty for the defense of religion—*i.e.* the Presbyterian form of Protestantism. In 1643 the Scottish Estates and the General Assembly consented to join the English Parliament in a union for the better guarding of civil and religious liberty, and the outcome was the Solemn League and Covenant, the chief objects of which were the preservation of the reformed religion in Scotland, England, and Ireland, the securing of religious uniformity, and the defense of parliamentary privileges and of the king's person. This was accepted by the English Parliament, and by the Westminster Assembly, then sitting. The independents, however, did not care for it, and this accounts for the Scottish antagonism to Cromwell. These covenants will usually be found in editions of the Westminster Confession of Faith.

Covent Garden, a square in London, England, between Long Acre and the Strand. The name is a corruption of Convent Garden, the district having formerly been the site of a convent garden belonging to Westminster Abbey. It was laid out by Inigo Jones in 1632, and soon after that became a fashionable residential quarter. It is now famous for its vegetable, fruit, and flower market, having been used as such since the 17th century. (See London Markets). A burial-ground once occupied part of the site of the present market.

Covent Garden Theatre, founded by John Rich, opened Dec. 7, 1732, Quin being leading actor. In June, 1746, Garrick played for six consecutive nights, and in 1747 joined Rich for the season. From the outset Covent Garden and Drury Lane were bitter rivals. In 1750–1 took place the historic contest for popular favor, when Spranger Barry and Mrs. Cribber played *Romeo and Juliet* at the former house, in rivalry with Garrick and Miss Bellamy at the latter. In November, 1740, Peg Woffington made her *début* as Sylvia in the *Recruiting Officer,* and it was at this theatre that she died while playing Rosalind. In 1773 Goldsmith's *She Stooped to Conquer* was produced, but almost in defiance of theatrical prejudice. On May 7, 1789, Macklin, aged ninety-nine, took leave of the stage as Shylock. In October, 1790, Incledon astonished London by his singing in *The Poor Soldier* by Shield. In 1800 G. F. Cooke made his bow as Richard III; and in 1803 John Kemble became proprietor of one-sixth of the patent. In December, 1804, 'Young Roscius' appeared upon its boards. On Sept. 30, 1808, the house was destroyed by fire; but within eight months Kemble rebuilt it. In 1812 Mrs. Siddons took leave of the stage as Lady Macbeth. In 1816 Macready here made his London *début;* and in the next year John Kemble retired in favor of his brother Charles, under whom the theatre drifted into serious difficulties. In 1888 Augustus Harris took up the management, which he retained till his death, in 1896. After Harris's death the house passed into the hands of a company. Covent Garden is almost as well known for its fancy-dress balls as for its operatic season. A concise history up to the year 1856 is given in *The London Stage* (1889), by H. Barton Baker.



Photograph of a Portion of the National Covenant, showing some of the most interesting signatures.

Coventry, city, county and parliamentary borough, Warwickshire, England; on London and North Western Railroad, 10 miles N.E. of Warwick. The church of St. Michael (1373) was the cathedral, and Christ Church has a spire dating from the 14th century. A 16th-century tapestry is one of the treasures in St. Mary's Hall. Bablake's and Ford's hospitals contain beautiful 16th-century wood carvings. The workhouse incorporates parts of an early 14th-century Carmelite friary. There are remains of a Carthusian monastery (1381) and of the cathedral, originally the church of the Benedictine priory, founded some three centuries earlier by Earl Leofric and Lady Godiva. Very little now remains of the walls which encircled the town in earlier times. Woolen goods were made from 1436 to the end of the 17th century; 'Coventry true blue' gives an indication of the permanence of the dye used. In the 18th century, camlets, shalloons, and plushes occupied the looms. Calico-weaving continued from 1770 to the beginning of the 19th century. The manufacture of silk, piece goods, and ribbons was established early in the 18th century. Watch-making, the manufacture of sewing-machines, bicycles, pneumatic tires, and motor cars have now become of prime importance, though printing and iron-founding are also carried on.

The great show-fair, formerly held for eight days, was later limited to five. It was instituted about 1217, and the pageant of Lady Godiva and Peeping Tom, introduced in 1678, and now held only occasionally, appears to have been a development from the mysteries and miracle plays for which the city was in earlier times famous. After the Norman Conquest Coventry was bestowed on the earls of Chester. Henry IV held his Laymen's Parliament here; that held by Henry VI was styled by the Yorkists *Diabolicum,* because of the numerous attainders passed against the Duke of York and others. On Nov. 15, 1940 the city was bombed by the Germans for 10½ hours. Large sections were laid waste, and the cathedral was destroyed. Pop. (1937 est.) 204,700.

Coventry, town, Rhode Island, Kent county, on the Flat River, and the south branch of the Pawtuxet, and on the New York, New Haven and Hartford Railroad. Cotton manufacturing is the chief industry. Pop. (1940) 6,998.

Coverdale, kuv′ẽr-dāl, MILES (1488–1568), English bishop and translator of the Bible, was born in Coverdale, Yorkshire. He studied philosophy and theology at Cambridge, took orders at

Norwich in 1514, and entered the Augustinian monastery at Cambridge. Here he fell under the influence of Robert Barnes, who was later arrested as a heretic, and having changed his religious views, left the convent about 1526 to devote himself to evangelical preaching. He then went abroad and in 1535 issued the first complete English translation of the Bible, probably at Zürich. In 1538 with the permission of Henry VIII and Francis I he went to Paris to superintend a second edition of the Scriptures in English, but before its publication an edict was issued suppressing it and consigning the entire edition of 2,500 copies to the flames. Some few copies, however, were saved from destruction and carried to London and in 1539 the *Great Bible* or *Cromwell's Bible* was produced under Coverdale's direction. From 1540 to 1548 Coverdale lived in exile on the continent, teaching and preaching for his livelihood. Upon his return to England, he was appointed chaplain to Edward VI, and later became bishop of Exeter (1551). In 1552 he wrote his *Christen State of Matrimonye.* He was deposed from his see and imprisoned upon Mary's accession to the throne, but was released upon the intercession of the king of Denmark, and permitted to leave England. While in Geneva, he is said to have assisted in the preparation of the celebrated *Geneva Bible.* After the accession of Elizabeth, Coverdale again returned to England, and though he did not recover his see, owing to his Calvinistic views, he was given the living of St. Magnus, near London Bridge.

Coverdale's writings and letters were edited for the Parker Society by the Rev. G. Pearson (2 vols., 1844–6). Consult also *The English Bible,* by Christopher Anderson; *The Bible by Coverdale* by F. Fry; Hoare, *The Evolution of the English Bible;* Pollard, *Records of the English Bible* (1911).

Cov'erture, a term denoting the legal condition of a wife according to the old law of England. She is *sub potestate viri* (under her husband's 'wing or cover'), a *femme couverte.* Modern decisions and legislation have largely modified this view of a married woman's position. See Husband and Wife.

Covilhã, kō-vēl-youṅ', town, Portugal, district of Castello Branco, stands at the eastern foot of the Serra da Estrella; 30 miles north of Castello Branco. It has manufactures of cloth, and warm mineral springs. Pop. (1930) 15,640.

Co'ville, Frederick Vernon (1867–1937), American botanist, was born in Preston, N. Y., and was graduated in 1887 from Cornell University. In 1888 he was appointed assistant botanist in the U. S. Department of Agriculture, and, in 1893, chief botanist and curator of the National Herbarium. The results of a botanical expedition to the famous Death Valley in 1890–1 are set down in his *Botany of the Death Valley Expedition* (1893).

Covington, kuv'ing-t'n, city, Georgia, county seat of Newton county, on the Central of Georgia and the Georgia railroads; 35 miles S.E. of Atlanta. It has cotton industries. Pop. (1930) 3,203; (1940) 3,900.

Covington, city, Indiana, county seat of Fountain county, on the Wabash River, and on the Cleveland, Cincinnati, Chicago and St. Louis Railroad; 68 miles N.W. of Indianapolis. Pop. (1930) 2,008; (1940) 2,096.

Covington, city, Kentucky, county seat of Kenton county, on the Ohio River, below its junction with the Licking, and on the Chesapeake and Ohio, and Louisville and Nashville railroads, opposite Cincinnati. A suspension bridge connecting Cincinnati and Covington crosses the Ohio River. The bridge was begun in 1863 and was finished in 1865, the first of its kind in the United States. Newport and Covington are connected with two bridges crossing the Licking River. The city has a public library; a new Federal Building which was completed in 1942; a Roman Catholic Cathedral, a duplicate of the cathedral at Rheims, except for the spires. This cathedral contains the second largest stained glass window in the world, the only other larger being at Rheims. The wall murals in the Bishop's chapel are the work of the celebrated artist, Frank Duveneck. The largest x-ray manufacturing plant in the world is located in Covington. Other industries are the manufacture of furniture, stoves, steel and iron fences, the largest jail and prison builders in the United States, fruit processing, and machine tools. Pop. (1930) 65,252; (1940) 62,018.

Covington, town, Louisiana, county seat of St. Tammany Parish, on the Gulf, Mobile and Ohio, and the Yazoo and Mississippi Valley railroads; 35 miles north of New Orleans. It is the center of a fruitful truck gardening district and has a number of large dairies. Pop. (1930) 3,208; (1940) 4,123.

Covington, town, Tennessee, county seat of Tipton county, on the Illinois Central Railroad; about 40 miles N.W. of Memphis. Cotton yarn is manufactured. Pop. (1930) 3,397; (1940) 3,513.

Covington, town, Virginia, county seat of Alleghany county, on the main line of the Chesapeake and Ohio Railroad; 82 miles west of Staunton. Pop. (1930) 6,538; (1940) 6,299.

Covode, John (1808–71), American legislator, was born in Westmoreland county, Pa. He engaged in farming and later gained considerable wealth as a woolen manufacturer. He was a member of Congress in 1855–63 and again in 1867–70, and in 1860 was made chairman of a special committee to investigate charges of corruption against President Buchanan in regard to the Lecompton Bill (see Lecompton Constitution). The charges were said to have been sustained as to Buchanan's questionable use of patronage.

Cow'all, or Cowal, peninsular district, Argyllshire, Scotland, lying between Loch Long and Firth of Clyde on the east and Loch Fyne on the west. It is about 40 miles long by 15 miles wide. The chief town in the district is Dunoon.

Coward, Noel (1899–), British playwright and author, was born at Teddington, Middlesex, and was educated privately. He made his first appearance on the stage in 1910 and appeared occasionally as an actor in subsequent years. Among his plays are: *I'll Leave it to You, The Young Idea, The Vortex, Easy Virtue, Fallen Angels, Hay Fever, The Queen was in the Parlour,* 1926; *This was a Man, The Marquise,* 1927; *On with the Dance* (revue), *Home Chat, Sirocco, This Year of Grace* (revue), *Bitter Sweet* (operette), 1929; *Private Lives,* 1930; *Cavalcade,* 1931; *Words and Music* (revue), 1932; *Conversation Piece,* 1934; *Point Valaine,* 1935; *To-Night at Eight-Thirty,* 1936; *Operette,* 1938. His other publications include: *Collected Sketches and Lyrics,* 1931; *Present Indicative* (autobiography), 1937; *To Step Aside,* 1939.

Cowbane (*Cicuta*), a poisonous plant known also as Water Hemlock (q. v.).

Cow Berry, the Mountain Cranberry. See Cranberry.

Cowbird, any of several species of gregarious passerine birds belonging to the genus *Molothrus,* found in almost all parts of North America. These birds are remarkable for their parasitic habits, for, like the European cuckoo, they make no nests of their own but place their eggs in the nests of other birds for incubation. The most familiar species, *M. ater,* is among the more numerous of the birds of the eastern

United States and Canada. It is a small glossy black bird, with head and breast a chocolate brown. In small flocks, it haunts fields and pastures, feeding upon insects stirred up by the cattle, a habit from which it derives its name. The females lay one pepper-and-salt-spotted egg in the nest of any bird (up to the size of a cat bird) which may be accessible. When this is hatched, the young cowbird throws out the other eggs or young, and usurps the attentions of the foster parents. Other species are common in Central and South America. They are fully described by C. Bendire in the Smithsonian *Report* for 1893.

Cow'dray of Midhurst, Viscount, Weetman Dickinson Pearson (1856–1927), British contractor, became a partner in his grandfather's contracting business when a young man. His firm constructed railways, docks and tunnels in many parts of the world, notably the Blackwell Tunnel in London and the docks at Dover and Southampton. The firm later acquired large oil interests. He was a member of Parliament for Colchester from 1895 to 1910 and president of the British Air Board 1917–18.

Cow'ell, Edward Byles (1826–1903), English Sanskrit scholar, was born in Ipswich. He was appointed professor of history at Calcutta in 1856, and two years later became principal of the Government Sanskrit College. Three years after returning to England (1867), he was appointed professor of Sanskrit at Cambridge. He was a man of wide, deep learning, and, though singularly self-effacing, exerted a profound influence upon younger scholars. He published *Prākrit Grammar* (1854), *The Aphorisms of Sândilya* (1878), *Vikramorvâsî: an Indian Drama* (1851), *The Sarva-Darsana-Samgraha* (1878), *Buddha-Karita* (1893), *The Jataka* (1895); besides completing several other works—*e.g.*, Wilson's edition of the *Rigveda;* and a number in collaboration with others—*e.g., The Black Yajurveda,* with Dr. Roer (1858–64); *Catalogue of Buddhist Sanskrit MSS.,* with Dr. Eggeling (1875); *Divajávadána,* with R. A. Neil (1886); and *Harsa-Karita,* with F. W. Thomas (1897). He also made valuable contributions to *The Journal of Philology* and *Cymmrodor.*

Cow'en, Sir Frederic Hymen (1852–1935), English musical composer and conductor, was born in Jamaica and held various important appointments as conductor—Melbourne Centennial Exhibition, London Philharmonic Society, Liverpool Philharmonic Society, Handel Triennial Festival, Cardiff Festival, and the Scottish Orchestra. He was a prolific and versatile composer, his works including symphonies, oratorios, operas, cantatas, overtures, and pianoforte pieces, as well as settings of about three hundred songs. His chief works are the cantatas *Rose Maiden* (1870) and *Sleeping Beauty* (1885); *Scandinavian Symphony* (1880); *Ruth, an oratorio* (1887); *Ode to the Passions* (1898); *The Veil,* an oratorio (1910); also the operas *Thorgrim* (1890), *Signa* (1893), and *Harold* (1895). He received the honorary degree of Mus. Doc. from Cambridge University in 1900, and from Edinburgh in 1910. He was knighted in 1911.

Cowes, kouz, seaport and summer resort on the north shore of the Isle of Wight, Hampshire, England; 12 miles s.e. of Southampton. It is divided by the Medina River into East Cowes and West Cowes. In West Cowes, on the left bank of the river, is Cowes Castle, built by Henry viii, once used as a state prison, but occupied since 1856 as the headquarters of the Royal Yacht Squadron, the most exclusive yacht club in the world. The annual regatta held in August is famous as 'Cowes Week.' East Cowes, connected with West Cowes by a floating bridge, is largely occupied by the industrial classes. About a mile to the southeast is Osborne House (q. v.) presented to the nation in 1902 by Edward vii as a memorial to his mother. Cowes has a fine harbor and there are shipbuilding and engineering works of importance. Pop. (1931) 15,774.

Cowhage, Cowage, or Cowitch, consists of short, slender, brittle hairs, which cover the pods of species of *Mucuna,* a papilionaceous climber, particularly *M. pruriens* of the W. Indies and *M. urens* of the East. These hairs readily stick in the skin and cause intolerable itching, and were hence formerly used (as still in their native country) as a vermifuge.

Cowles, kōlz, William Lyman (1856–1926), American educator, was born at Belchertown, Mass. He was graduated from Amherst College (1878) and subsequently continued his philological studies in German universities (1883–4). He was instructor in Latin at Amherst in 1880–3, and associate professor in the same subject from 1884 to 1894, when he became Moore Professor of the Latin Language and Literature. For some years he was also associated with Smith College as lecturer and acting professor. He edited the *Adelphæ* of Terence (1896) and *Selections from Catullus* (1900).

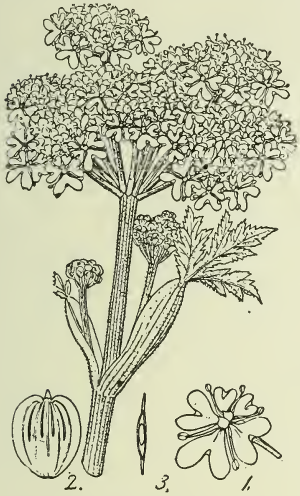
Cow'ley, kou'li, Abraham (1618–67), English poet, was born in London. His first volume of poems, *Poetical Blossoms,* appeared when he was only fifteen. Ejected from Cambridge, after he had taken his m.a., as a royalist (1644), he retired to St. John's College, Oxford, and later (1646), followed the queen to France, and was employed in conducting the cipher correspondence between her and Charles i. Returning to England (1656), he was arrested as a royalist spy, and remained under bail till the Restoration. In 1656 he brought out a collected edition of his poems, consisting of *Miscellanies,* including the *Anacreontiques; The Mistress* (published in 1647); *Pindarique Odes;* and *Davideis,* 'a sacred poem of the troubles of David' (four books). In 1665 he retired to Chertsey in Surrey, where he died.

Though during his lifetime he was considered the greatest English poet, Cowley's fame rapidly declined, till Pope could ask, 'Who now reads Cowley?' (*Epistle to Augustus,* 1:76). He represents the transition from Jacobean to Restoration poetry. His conceits and extravagances of wit made Johnson consider him the representative of the 'metaphysical school'; but on the other hand, he exemplifies some of the common-sense qualities of the newer poetry, and he helped, with Waller and Denham, to establish the heroic couplet. His *Pindarics,* his most successful work, set the fashion to Dryden's *Odes* and *The Pindarics* of the 18th century. Consult his *Collected Works,* edited by Grosart (2 vols.) and *Essays,* edited by Lamby; also biographies by Sprat and by Dr. Johnson.

Cowley, Hannah, *née* Parkhouse (1743–1809), English dramatist, was born in Tiverton. Between 1776 and 1795 she produced thirteen plays, most of them printed in her *Works* (1813). Her *Belle's Stratagem* (1782) was acted by Sir Henry Irving and Ellen Terry. She wrote several volumes of verse, and carried on a poetical correspondence with 'Della Crusca' (Robert Merry), under the name of 'Anna Matilda,' which earned her a place in Gifford's *Baviad and Mæviad* (1851).

Cow Lily (*Nymphæa advena*). See Nymphæa.

Cow Parsnip, or Hogweed, (*Heracleum spondylium*), a tall-growing umbelliferous plant with a hairy stem and large, roughly-serrated leaves. The umbels are compound, and the flat fruit is composed of two carpels, which, being neither beaked nor prickly, are united in their faces. Both the general and the partial bracts are numerous. The white flowers appear in late summer. Its succulent stems furnish a grateful green food, or salad, for Indians and voyageurs, in Canada, in the earliest spring. Certain Siberian species have been proposed for cultivation as fodder-plants, since they are very large, and afford much herbage, particularly in spring.



Cow-parsnip.
1, Flower; 2, fruit; 3, carpel (section).

Cowpens, vil., Spartanburg co., S. Carolina, 8 m. N.E. of Spartanburg; pop. in 1900, 692. Here on Jan. 17, 1781, along Broad River, about 2 m. s. of the N. C. boundary line, Gen. Morgan, with an American force of about 1,100, defeated Col. Banastre Tarleton with an approximately equal force, the battle being, on the American side, one of the best planned during the Revolutionary War. Tarleton, on the other hand, acted with his usual rashness, and, moreover, took his troops into action before they had had time to rest after a long day's march. The British loss (including about 600 captured) was about 800 men; that of the Americans was 12 killed and 60 wounded.

Cowper, William (1731–1800), English poet, born at Berkhampstead in Hertfordshire. He was educated at Westminster School, with Churchill, the poet, and Warren Hastings. In 1763 he was named clerk of the journal of the House of Lords, but to qualify for this he had to appear publicly in the Lords, and to submit to scrutiny. From this he shrank with a horror which drove him to attempt suicide, and he became for a time insane. He was put under the control of Dr. Cotton of St. Albans, but in 1765 went to Huntingdon, where the gentle recluse attracted notice of the Unwins (father, mother, son, and daughter). Cowper was induced to quit his lodging and dwell with this household. But after the father died, in 1767, the family with their friend migrated to Olney (Buckinghamshire), where they already had a close acquaintance with John Newton, curate of that place. A man of strong character and some literary gift, he exercised over the poet a powerful influence. The friends worked together in visiting the poor and composing the Olney hymns, of which Cowper wrote sixty-eight. At the close of 1779 Newton left Olney for London. In 1781 began Cowper's interesting friendship with Lady Austen, a baronet's widow, who occupied a house close by, and associated with them daily. Sprightly and clever, she was also pious and sympathetic. From 1782 dates Cowper's literary fame. The quiet humor which so pathetically stood between him and despair was strangely combined with the earnestness of the Hebrew prophet in the volume which included *Table-Talk*, *The Progress of Error* (1782), *Truth*, *Expostulation*, *Hope*, *Charity*, *Retirement*, in all rhymed heroics. He next versified (1782) the story of John Gilpin, heard from Lady Austen, who also encouraged Cowper to write blank verse, the result being the discursive *Task* (1785). Before its completion that friendship which was coextensive with so much of his best literary effort came to an end. Lady Austen disappears out of the poet's life, and her place was taken (1786) by Lady Hesketh, sister of the Theodora Cowper with whom in his earlier days the poet was in love. Lady Hesketh induced Cowper and Mrs. Unwin to remove from their unhealthy dwelling to Weston Underwood. Before this Cowper had published the *Task;* with it (1785) appeared *Tirocinium* in rhymed heroics, an attack on the public schools, advocating in preference education at home. In 1787, in spite of his better surroundings he again went mad and attempted suicide. Through all his hallucinations he found an escape from horror in gardening, in his tame hares, and in country walks, but chiefly and most lastingly in literary work and in correspondence with his friends. In his translation of Homer (published 1791) he was the pioneer in the many attempts to render the *Iliad* and *Odyssey* in blank verse. A projected edition of Milton brought him the friendship of Hayley, who was engaged on a life of that poet. Of Cowper's undertaking little remains except his version of Milton's Latin and Italian poems. With the failing health of Mrs. Unwin his own powers drooped and flagged. In 1795 his young kinsman, the Rev. John Johnson, took him and Mrs. Unwin to the neighborhood of East Dereham, Norfolk, with occasional visits to Mundsley on the sea-coast. At Johnson's house, in Dereham itself, Mrs. Unwin died (Dec. 17, 1796). Cowper sank to rest April 25, 1800, and was buried in Dereham Church. On the occasion of the 105th anniversary of his death, a memorial window in the church was unveiled, in April, 1905.

William Cowper.

Cowper's power as a satirist has been unjustly depreciated; he has passages of Juvenalian vigor. He anticipates Wordsworth in the character of his reflection; and, like Wordsworth, he links nature with genuine human beings, and not with the conventional rustic or the Damons and Musidoras of Thomson. He was so far hampered by tradition that he was prejudiced against the Doric of Burns; yet he rebelled against the excessive smoothness of Pope's many followers, and materially helped poetry in its progress towards freedom and sincerity. See *Lives* by Hayley (1803), Southey (1836), Grimshawe (1835), Goldwin Smith (English Men of Letters, 1880), and Thomas Wright (1896); *Works* and *Letters* in editions by Southey (1836) and Grimshawe (1834–7).

Cowper, William (*c.* 1664–1723), English statesman, first Earl Cowper, was the eldest son of Sir William Cowper, a Whig politician. Made lord keeper of the great seal in 1705, and in the following year appointed a commissioner for the treaty of union between England and Scotland, he took a leading share in the negotiations between the two countries. Becoming first Lord Chancellor of Great Britain in 1707, on the fall (September, 1710) of the Whig ministry he resigned his office, which, however, was restored to him by George I. In 1718 he again resigned his office. As an orator he was possessed of considerable powers.

Cowper, William (1666–1709), English surgeon, born at Petersfield in Sussex, and admitted a barber-surgeon (1691). He published *Myotomia Reformata* (1694), a treatise on the muscles, and *The Anatomy of the Human Body* (1698). He was also the discoverer of 'Cowper's glands.'

Cowper's Glands, two small bodies situated immediately below the membranous urethra in the male, and behind the bulb.

Cowry, or Cowrie (*Cypræa*), the name of a genus of gasteropod mollusks, including a number of species inhabiting the warmer oceans. In all, the spire present in the young shell is concealed in the adult, and the outer lip of the shell is thickened and inflected, so that the aperture becomes long and narrow. The money cowry (*C. moneta*) found in the Pacific and the Eastern seas is used by W. African and S. Asian tribes as a basis of barter, while *Cypræa annulus* is employed by other tribes in a similar fashion. Many species are of great beauty, the shells, protected in life by upturned flaps of the mantle, being highly polished and richly colored.

Cowry.
a, C. moneta; *b*, C. annulus; *c*, C. europæa.

Cowslip. The cowslip (*Primula officinalis*) is one of the plants most intimately associated with England, as is shown, among other things, by the popular names it bears—*e.g.* fairy cup, petty mullein, paigle, and several others. The description of it in *A Midsummer Night's Dream* is as true scientifically as it is poetically. Cowslips have tufts of soft green, wrinkled foliage, and heads of small, pale yellow flowers. Both the wild yellow and the many orange varieties seen in gardens are easy to cultivate. In a wild state they grow in meadows. The cowslip of early spring in eastern America is *Caltha palustris*, while the shooting-star (*Dodecatheon Meadia*) is called the American cowslip in the Middle States; *Mertensia Virginica* is known as the Virginian cowslip.

Cowslip.
1, Flower (section).

Cow-tree (*Galactodendron utile*) is a tall-growing urticaceous tree which occurs in Venezuela. It derives its popular name from the milky juice it exudes when an incision is made into the bark. The ancient Venezuelans held it in high honor. Humboldt calls it the *palo de vaca*, and describes it thus: 'On the barren flank of a rock grows a tree with coriaceous and dry leaves. Its large woody roots can scarcely penetrate into the stone. For several months of the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced, there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant.'

Cow-wheat. Yellow-and-purple flowered species of the genus Melampyrum (*Scropmilariaceæ*) are known as cow-wheats in Europe.

Cox, David (1783–1859), English landscape painter, was born at Birmingham; settled at Dulwich, near London, and supported himself by teaching drawing; joined the Society of Painters in Water Colors (1813); drawing master at Hereford (1814–26); from 1827 till 1841 resided in London, where he taught drawing in several schools; but from 1841 till his death lived at Harborne, near Birmingham. In his own lifetime Cox never got beyond £100 for his pictures; but in 1875 his *Hayfield* brought £2,950, the largest sum paid up to that date for a water color. His oil paintings date from 1839. His *Vale of Clwyd*, returned unsold from the Liverpool Exhibition (1846), changed hands in 1872 for £2,200, and his small *Peace and War*, originally sold for £20, brought £3,601 at the same sale. Cox's favorite scenery was around Bettws-y-Coed. In 1814 he published *A Treatise on Landscape Painting*. See Hall's *Biography* (1881); Solly's *Memoir* (1875); Redgrave's *Century of Painting* (2d ed. 1893) .

Cox, Sir George William (1827–1902), English mythologist, born in Benares; appointed vicar of Scrayingham, York (1881–97). He published *Mythology of the Aryan Nations* (1870); *Popular Romances of the Middle Ages* (1871); *History of Greece* (2 vols. (1874); *The Crusades* (1874); *The Athenian Empire* (1876); *British Rule in India* (1881); *Introduction to the Science of Comparative Mythology and Folklore* (1881); *Life of Bishop Colenso* (1888), an exhaustive vindication. He edited, with W. T. Brande, a

Cow-wheat.
1, Flower, side view; 2, flower, posterior view.

Dictionary of Science, Literature, and Art (3 vols. 1865–7).

Cox, Jacob Dolson (1828–1900), American soldier and statesman, was born, of American parentage, in Montreal, Canada. He was graduated (1851) from Oberlin College, was admitted to the bar of Ohio in 1853, practised in Warren, O., served in the State senate, and entered the Union army as brigadier-general of volunteers, having been active in raising troops. He fought through the Civil War with brilliancy, and was commissioned major-general in 1864. At its close he was elected governor of Ohio as a Republican (1866–7). He presided at the convention which nominated Grant for the presidency, and was Secretary of the Interior in Grant's cabinet (1869–70). He was U. S. representative, 1877–79. Among other military books he published *The March to the Sea: Franklin and Nashville* (1882), and *Military Reminiscences of the Civil War* (published posthumously, 1900).

Cox, James Middleton (1870), American editor and public official, was born in Jacksonburg, Butler County, Ohio, of English and German descent. He taught for two years, became a reporter in Middletown, Ohio, and later on the *Cincinnati Enquirer*. He went to Washington as Secretary to Congressman Paul Lorg in 1894 and in 1898 became owner and publisher of the *Dayton News*. In 1903 he bought the *Press Republic* of Springfield, Ohio, and changed its name to the *Daily News*, operating both papers under the News League of Ohio. He was elected to Congress from the Third Ohio District in 1908 and again in 1910. Two years later he was chosen governor of Ohio, was defeated for re-election in 1914, and was again elected in 1916 and 1918. As Governor of Ohio he was known for his executive ability, and as a supporter of progressive legislation. At the Democratic National Convention in San Francisco in July, 1920, he was chosen candidate for President on the 44th ballot.

Cox, Kenyon (1856–1919), American painter, son of Jacob D. Cox, was born in Warren, O. He studied in Cincinnati and Philadelphia, and under Carolus-Duran and Gérôme at Paris, (1877–82), acquiring the academic qualities seen in his early paintings from the nude. Returning to New York, he became a member of the Society of American Artists in 1882, and gradually devoted himself to mural painting. He was a member of the group which decorated the buildings of the Columbian Exposition, and his work is to be seen in the Library of Congress, the Minnesota State Capitol, the Appellate Court of New York City, and in many lesser public and private edifices. His writings include *Old Masters and New* (1905), something like a general view of painting since the 16th century; *Painters and Sculptors* (1907); *The Classic Point of View* (1911). He was elected a member of the National Academy of Design in 1903 and was a member of the American Academy of Arts and Letters.

Died July 24, 1924

Cox, Palmer (1840), Canadian-American artist and author, was born at Granby, Quebec, Canada, received an academic education, and from 1863 to 1875 resided in San Francisco, contributing to local papers. He removed to New York in 1875, where, ten years later, after publishing several humorous books, he developed his idea of 'The Brownies,' little sprites in the costumes of all nations, whose experiences he described in verse and illustrated with his own drawings. *The Brownies, Their Book* (1887) was followed by six or seven other volumes giving their comic history. Mr. Cox also published a series of *Queer People* books (1888).

Cox, Samuel (1826–93), English theological writer, was born in London. He studied at Stepney College, and later at London University. He became pastor of the Baptist chapel at Southsea (1852–4), and at the Isle of Wight (1854–9). Appointed pastor of Mansfield Road Chapel, Nottingham (1863), he remained there for twenty-five years. In 1875 he became editor of the *Expositor*, the first twenty volumes of which are almost entirely his own work. He was the author of *Salvator Mundi* (1877), and its sequel, *The Larger Hope* (1883), and of numerous other theological treatises.

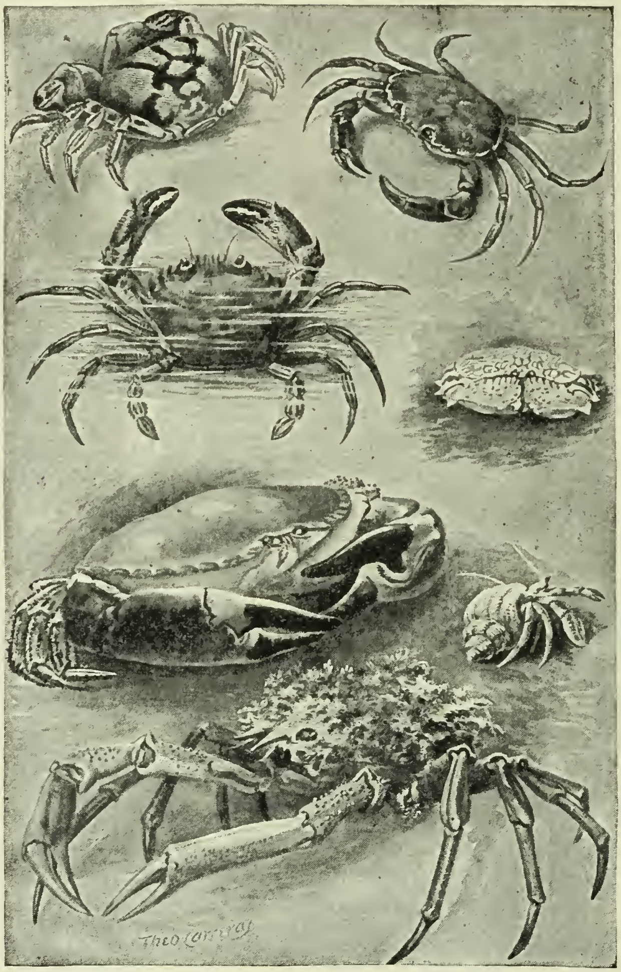
Cox, Samuel Sullivan (1824–89), known also, from one of his articles entitled *The Great Sunset*, as 'Sunset' Cox, American political leader, was born in Zanesville, O. He was graduated from Brown University in 1846, studied and practised law, and in 1853–4 was editor, at Columbus O., of the *Ohio Statesman*. He became prominent, as a Democrat, in politics, and was representative in Congress from Ohio (1857–65) and from New York, representing the latter State almost continuously from 1869 until his death. A bill introduced by him and passed by Congress, raising the salaries of letter carriers and procuring them vacations with pay, led to the erection of a statue of him in New York by the letter carriers of the country. In 1885 he was U. S. minister to Turkey. He published *Puritanism in Politics* (1863), *Why we Laugh* (1876), *Arctic Sunbeams* (1882), and *Three Decades of Federal Legislation, 1855–85* (1885).

Coxe, Arthur Cleveland (1818–96), American Protestant Episcopal prelate, was born at Mendham, N. J., and was graduated (1838) from New York University. He was the son of a leading Presbyterian clergyman, but early adopted Episcopal tenets, and studied theology at the New York General Theological Seminary. He was ordained deacon in 1841 and priest in 1842, and was rector of Protestant Episcopal churches at Hartford, Conn., and Baltimore, Md., from 1842 to 1863. After a brief rectorship in New York City, he was consecrated assistant bishop of Western New York in 1865, and became bishop of that diocese the same year. In 1853 he took part in the movement which resulted in the revision of the prayer-book. He published numerous theological works.

Coxe, Henry Octavius (1811–81), English palæographer, was born at Bucklebury, Berkshire. He joined the manuscript department of the British Museum (1833), was appointed sub-librarian (1838), and later head librarian (1860) of the Bodleian Library. He is author of the *Catalogue of Greek MSS.* (1852–4) at the Bodleian, and of the manuscript collections of the Oxford Colleges. He edited *Roger of Wendover's Chronica* (1841–4) for the English Historical Society; and Gower's *Vox Clamantis* (1850), Roxburghe Club.

Coxe, Tench (1755–1824), American politician and political economist, was born in Philadelphia, Pa., and became a partner in his father's counting-house at twenty-one. At the outbreak of the Revolution he became a Royalist, but on the departure of the British troops turned Whig, and subsequently a Federalist and then Republican, holding various appointive and elective offices. He was made purveyor of supplies by Jefferson in 1803, retiring in 1812. He performed very great services in promoting the cotton industry in the United States, and in the development of the country's economic system.

Coxe, William (1747–1828), English traveller and author, was born in London. He was vicar of Kingston-on-Thames (1786–8), held the living of Bemerton, near Salisbury (1788–1828), and was elected archdeacon of Wiltshire (1804). His early works relate to travel, particularly in Switzerland, and in Russia and Scandinavia (1784). In 1807 appeared his valuable *History of the House of Austria.* He also published *Memoirs* of Sir R. Walpole (1798), of H. Walpole (1802), of the first Duke of Marlborough (1818–19), of the Spanish Bourbons (1813), Shrewsbury (1821), and Henry Pelham (1829).



Crabs.

1. Land crab (*Gecarcinus ruricola*). 2. Green shore crab (*Carcinus mænas*). 3. European velvet crab (*Portunus puber*). 4. *Calappa flaminea* (closed). 5. European edible crab (*Cancer pagurus*). 6. Hermit crab (*C. pagurus*). 7. Spider crab (*Labinia dubia*), male.

Coxsackie, kŏŏk-sä'ki, village, Greene county, New York, on the Hudson River and on the West Shore Railroad; 22 miles south of Albany. It has valve works, foundries, shirt and collar factory, and other industries. Pop. (1910) 2,494; (1920) 2,121.

Coxswain, or COCKSWAIN (pronounced *coxn*, and often abbreviated to *cox*), the steersman of a boat, and commander of the boat's crew.

Cox'well, HENRY TRACY (1819–1900), English aëronaut, was born in Rochester, England; made his first ascent in 1844, and his last in 1885. In 1848 he conducted a series of experiments in military aërostatics in Germany and Austria; and in 1862, with James Glaisher, turned his attention to meteorological ballooning, reaching a record height of seven miles. He managed the war balloons for the Germans during the Franco-German War (1870). He founded (1845) and edited *The Balloon* and wrote *My Life and Ballooning Experiences* (2 vols. 1887–9).

Coyote, kī-ō'ti *or* kī'ōt, or PRAIRIE WOLF (*Canis latrans*), a small wolf, smaller than the gray wolf but very like it in general appearance. It varies in color at different seasons of the year, being a bright brown in summer and a yellowish gray in winter, both of which colors are overlaid with a shading of black. The fur is thick and long, and the tail, always carried low, is bushy. The animal ranges from the City of Mexico northward through the Great Plains and Rocky Mountains to Alberta, being very abundant in Texas and New Mexico. It is less savage and destructive than the wolf and is never dangerous to man. Its cry, which is characteristic and easily recognizable, is a sort of dog-like yelping, half-howl and half-bark.

Coypu, koi'pōō (*Myopotamus coypu*), a large South American rodent, belonging to the same section as the porcupine. It lives near water, feeds on aquatic plants, and has much the habits of a beaver, except that it does not build dams. Its fur, when freed from the long and stiff outer hairs, resembles that of the beaver, and is known to furriers as 'nutria.'

Coysevox, kwaz'voks', ANTOINE (1640–1720), French sculptor, was born in Lyons. He decorated the interior of the palace of Versailles, and executed the tomb of Cardinal Mazarin; the statue of Condé, and the monument of Colbert (S. Eustache, Paris); busts of Le Brun (S. Nicholas, Paris), Vauban, Fénelon, and Racine, a statue of Louis XIV. (Notre Dame); a bas-relief *Louis* XIV. (Salle de la Guerre, Versailles); and a *Nymph* and *Venus*, delicate imitations of the antique (Louvre).

Cozens, kuz''nz, JOHN ROBERT (1752–99), English landscape painter in water colors, son of the painter Alexander Cozens (d. 1786). He began to exhibit at the Incorporated Society of British Artists, and travelled (1776–82) in Switzerland and in Italy and later he became insane (1794). Previous to Turner, Cozens was the greatest of English painters in water colors.

C. P. A., chartered or certified public accountant.

Crab, a name applied generally to those of the decapod (ten-legged) Crustacea which have the tail short and inturned (brachyura); applied also to the hermit crabs and their allies, in which the tail is long. In the more typical forms, such as the blue or edible crab (*Callinectes sapidus*), the body is depressed, and the strong shield or carapace which covers it is expanded laterally. The lateral regions lodge the gills, here more efficiently protected than in lobster or prawn. The chelipeds, or great claws, are so curved that in repose they fit closely to the margin of the carapace; the other legs are inserted at a considerable distance apart, and are adapted to support the whole weight of the body. The abdomen, or tail is only slightly developed, has no tail fin, is kept permanently inturned, and has rudimentary appendages only. In accordance with the sedentary mode of life, the antennæ are short, instead of long as in the lobster, and the eyes are placed in sockets, into which they can be retracted.

Like other crustaceans, crabs periodically cast their chitinous and limy shells. The moults are most frequent in youth, when the rapid growth of the body conflicts with the rigidity of the armature. Extra feeding may accelerate the process. Before moulting the old shell becomes virtually dead, reserve stores are used in fresh growth, a new shell begins to form within the old, and finally with considerable, and sometimes fatal effort, the shell is cast. It is left in apparent intactness, a very image of its lost tenant. The new suit, which is at first soft, requires several hours or days to acquire firmness.

The Blue Crab is found from Cape Cod to Florida and is taken for market in immense quantities, often immediately after moulting, before the new shell has hardened, when it is known as the 'soft-shelled crab.' The Swimming Crab, abundant on the Atlantic coast, green in color, spotted with yellow, has its posterior feet flattened to form swimming paddles; the lady-crab (*Platoyonichus ocellatus*) is an example. The Walking Crab is found on sandy and rocky shores, at or below low-water mark; *Cancer irroratus* and *C. magister* are examples. The Fiddler Crab, found in great numbers on the Atlantic coast, is characterized by the excessive development of one claw, popularly likened to a fiddle. The Spider Crab, which is often covered with seaweed, hydroids, and other organisms has a rough shell set with spines and hairs. The Oyster Crab lives in the gill cavity of the oyster.

Crabs are generally scavengers, but the land species are also vegetarian in diet. They are very active, great fighters, and often wily in averting danger. From the time they leave the egg until they attain adult form they pass through several complete metamorphoses; the most marked forms are known as *Zoëa* and *Megalops*. Crabs move sideways instead of forward, often with great rapidity. They vary greatly in size and color, green, blue, and gray being the most common hue. They are of economic importance as a food in many parts of the world and are taken in wicker traps baited with meat, or in shallow nets of coarse material, baited and hauled up at short intervals. Consult Mayer's *Sea-shore Life;* Arnold's *Sea-Beach at Ebb-Tide*.

Crab Apple, a term applied somewhat vaguely to any sour or uncultivated species of the apple family. The Siberian or True Crab Apple belongs to the species *Pyrus baccata* and is a native of Asia. The best known American species *P. augustifolia*, a small tree growing to about 30 feet in height, and *P. coronaria*, somewhat larger in diameter and not as tall, have masses of fragrant and beautiful blossoms, and their fruits, hard and astringent, make excellent preserves, jellies, and marmalades, as well as high grade cider. The Asiatic species are often planted for their beauty of fruit and flower alone. *P. pulcherrinea*, *P. halliana*, *P. spectabilis*, and *P. prunifolia* are favorite species.

Crabbe, krab, GEORGE (1754–1832), English poet, was born in Aldeburgh, Suffolk, the son of a salt master. After studying surgery in London for a time, he became assistant to an Aldeburgh surgeon, but longing for a literary career he resolved to go to London and try his luck. There he was befriended by Edmund Burke, who took him into his house, and secured a publisher (Dodsley) for his poem, *The Library* (1781). His name was speedily made, and, having taken orders, he accepted the curacy at Aldeburgh, and soon after procured, through Burke, a chaplaincy to the Duke of Rutland at Belvoir Castle. After occupying various cures in Southern England he at length settled in Trowbridge, Wiltshire (1814), where he remained until his death. Among his publications are *The Village* (1783), *The Newspaper* (1785), *The Parish Register* (1807), *The Borough* (1810), *Tales* (1812), and *Tales of the Hall* (1819).

Crabbe is as much the poet of East Anglia as Scott of the Borderland or Wordsworth of the Lake Country. Its scenery and the life of its fisher-folk and peasantry he described with a realism comparable to Zola's. 'The tragic power of Crabbe,' says Swinburne, 'is as much above the reach of Byron, as his singularly vivid, though curiously limited, insight into certain shades of character.' Consult *Life* by George Crabbe, his son; *Leadbeater Papers;* Leslie Stephen's *Hours in a Library;* Ainger's *Crabbe*, in 'English Men of Letters Series;' Huchon's *George Crabbe and His Times* (Eng. trans.).

Crab Eater. See SERGEANT FISH.

Crab Grass, a popular name for *Panicum sanguinale*, a coarse annual grass common throughout the United States. It grows to a height of from one to four feet and generally has from three to six reddish-brown spikes, two to five inches long. In the South it is considered a good hay crop, but in gardens and lawns it is a pest and can be eradicated only by careful hand labor. The name is also applied to Eleusine (q. v.).

Crab Plover, a peculiar bird (*Dromas ardeola*), so called from its habit of feeding chiefly on crabs. It inhabits the coasts of the Red Sea and Indian Ocean, usually in flocks. It is about sixteen inches long, with long pointed wings, and is nearly pure white in color. It lays a single large white egg in a hole dug in the sand.

Crab Spider, a species of spider belonging to the family Thomisidæ, so called from its broad, short body, the crab-like attitude of its legs, and its habit of walking sidewise. It spins no web, and is found chiefly on plants and fences.

Crabtree, CHARLOTTE ('Lotta') (1847–), American actress, was born in New York City, and made her first appearance on the stage at Petaluma, California, when ten years old. She afterward acted with her mother in variety, and made her first New York appearance at Niblo's Garden in 1864. Her first great success was as Little Nell in Brougham's version of *Little Nell and the Marchioness*. Other favorite comedy parts were Topsy, Bob, Firefly, The Little Detective, Musette, Nitouche, and Sam Willoughby. 'Lotta' retired with a fortune in 1891, and thereafter made her home in New York. Died Sept. 25, 1924

Cracked Heels, a condition in horses due to washing their legs and imperfectly drying them, or permitting the animals to stand in accumulated filth and exposed to drafts, so that the skin becomes inflamed, tender, itchy, thickened, and by and by cracked. An ichorous and fetid discharge exudes, and lameness often results. In animals with round *gummy* legs it is sometimes constitutional; underbred horses with rough hairy fetlocks present the majority of cases; white heels, being more delicate, are especially affected. The hind limbs, exposed as they are to filth and cold, suffer most frequently.

Cracker, or Biscuit, a small flat bread made dry and crisp by baking. The former name is the one commonly used in the United States, while the latter is employed in England and elsewhere. Crackers are made of flour, water or milk, and salt, with the addition of flavorings and other ingredients, such as sugar, nuts, raisins, spices, or fruits, as required.

The manufacture of crackers is a large and important industry in the United States, dating from the latter part of the eighteenth century, but reaching large proportions only with the last quarter of the nineteenth century. According to a Census Bureau report, the number of establishments in 1921 engaged primarily in the manufacture of biscuits and crackers was 149, with a product valued at $187,509,000. Nearly half of these factories were located in New York, Pennsylvania, California, Massachusetts, Ohio, and Illinois. Methods of manufacture have reached a high degree of perfection. The various ingredients are run into a kneading machine, where they are thoroughly incorporated into a stiff dough. The dough then 'braked'—i.e., passed and repassed between rollers until pressed into long sheets with smooth surfaces. These sheets are next placed on a cutting machine provided with a pair of rollers set to compress the dough, as it passes between them, into the desired thickness. It is then carried along by a woollen or canvas web, beneath a block containing cutters, which descend and cut the crackers to the desired shape. As the block rises, the web carries the cut dough onwards, onto a wire frame travelling through a heated chamber or oven. The passage through the oven occupies about fifteen minutes, during which the crackers are completely baked. So rapidly is this operation conducted that about 2000 pounds of crackers are passed through one of these ovens daily.

Crackers, a popular name for the poor mountain white population of the Southeastern States of the United States, particularly Georgia, probably in reference to their diet of cracked corn.

Cracker State, popular name for the State of Georgia.

Crackle Ware, or Cracklin, a Chinese pottery whose decoration consists of a network of cracks giving it the appearance of being broken without falling apart. Various theories have been advanced as to the process employed in its production, one being that steatite was mixed with the glaze and that the piece before firing was exposed to the sun, which caused the glaze to craze or crackle. Red pigment or black Chinese ink was then rubbed into the cracks to accentuate them. The colors most frequently met with in crackle ware are grayish white, pale green, and pale gray or fawn color, although turquoise blue, yellow, and purple are sometimes found. Good imitations of crackle ware are now produced in various American potteries.

Cracovienne, a Polish national dance with strongly marked rhythm in $^{2}/_{4}$ time, and frequently having words sung to the tune.

Cracow, krā'kō (Germ *Krakau*), fortified city and archiepiscopal see, Poland, on the left bank of the Vistula; 160 miles southwest of Warsaw. Viewed from a distance, Cracow presents an imposing appearance by reason of its many churches and towers, and the castle perched high above the city. The old walls have been mostly demolished, and their cincture converted into promenades. The modern fortifications consist of a series of detached forts, separated from the city itself by a chain of suburbs. Among the churches are the beautiful Gothic cathedral church, built in 1320–59 on the site of an 11th-century edifice. It contains monuments of Polish kings, patriots, and poets, including the royal Jagellon family, John Sobieski, Joseph Poniatowski, Kosciuszko, and Mickiewicz, and is adorned with sculptures by Thorwaldsen and with other works of art. Scarcely less interesting is the Gothic church of St. Mary, built in 1226 and restored in 1889–93, with a splendid altar piece (1477–89) by Veit Stoss, and ornate tombs of Polish magnates. The Dominican church (rebuilt in 1850), the church of St. Peter and St. Paul (1619), and the university church (1689–1703), with a monument to Copernicus, are also notable. The most imposing of the secular buildings is the castle or citadel, first built in the 14th century, used after 1846 as a barrack and hospital and more recently restored as a national museum. There are also the Jagellonian University, founded in 1364, provided with new buildings in 1881–7; the bazaar known as the Cloth House; the Museum Czartoryski, and the municipal theatre (1891–3). The educational, artistic, and other institutions of the city include the National Polish Art Museum (1883), the picture gallery, the university library of over 400,000 vols. and 7,500 mss. (valuable for Polish literature), the Academy of Sciences (1873), the botanic garden, observatory, industrial and technical museum, archæological museum, and Academy of Art.

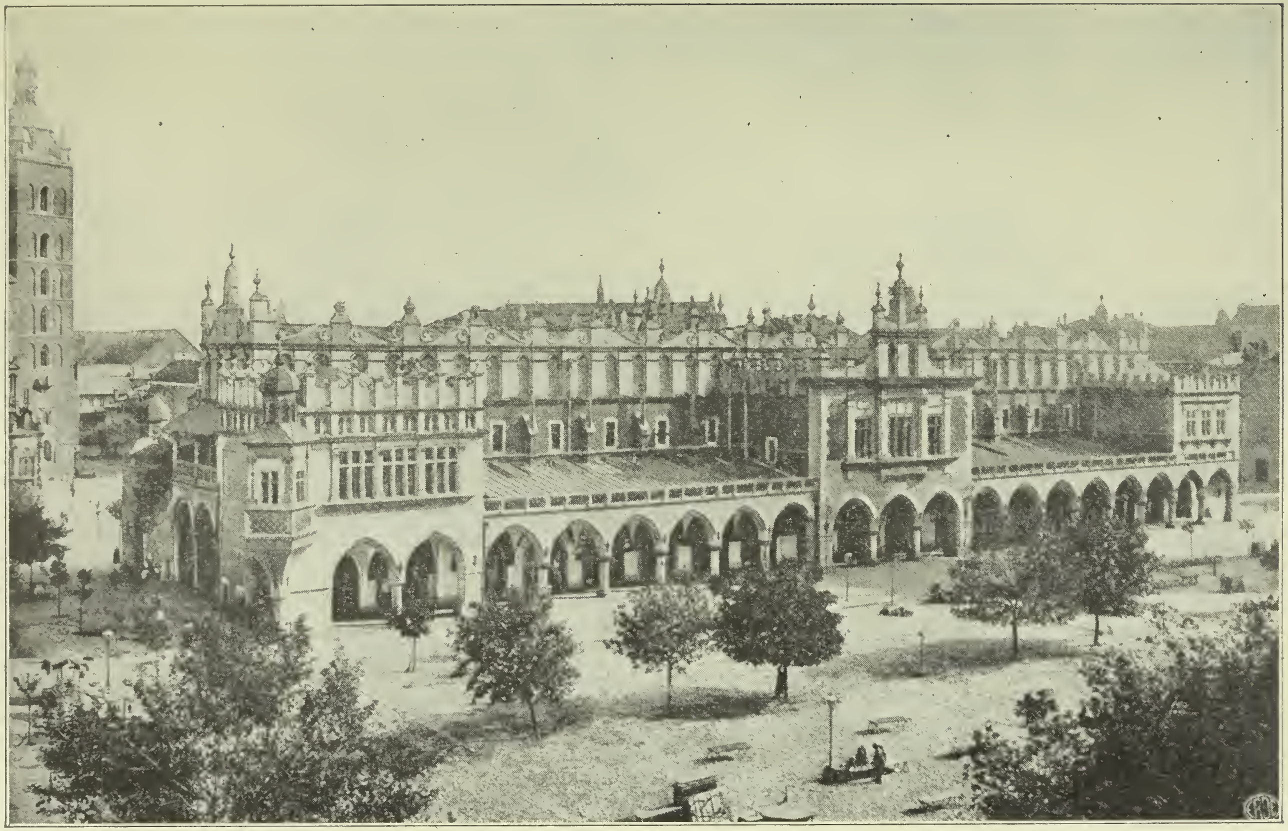
Cracow is the centre of a large trade in agricultural produce, salt, timber, cloth, and linen, and manufactures machinery, chemicals, beer, sausages, oils, and tobacco. About 8 miles to the south are the famous salt mines of Wieliczka. The population (1921) numbers 176,463. In the 16th century it was about 80,000; at the end of the 18th century, 10,000; in 1900, 91,310.

In the 11th century Cracow (Lat. *Cracovia*) was made the see of a bishop. After being destroyed by the Mongols in 1241, 1260, and 1281, the city was rebuilt by German immigrants in 1257, and in 1320 was chosen by King Ladislaus Lokietek as the capital of Poland—a dignity which it enjoyed down to the year 1610, when it was supplanted by Warsaw, continuing however until 1764 to be the place of coronation and burial of the Polish kings. The city was twice captured by the Swedes (in 1655 and 1702) and in 1768 it was stormed by the Russians. The last partition of Poland, in 1795, bestowed it upon Austria, though from 1815 to 1846 it was the capital of a small semi-independent state. From 1849 until the close of the Great War it formed a part of the Austrian crownland of Galicia, when by the Treaty of Versailles it was allotted to Poland. During the Great War Cracow was seriously menaced; in the fall of 1914 the Russian army advanced perilously near to its walls, and early in 1915 the Austro-German struggle to regain Galicia from Russia raged nearby.

Craddock, Charles Egbert, pseudonym of Mary Noailles Murfree (q. v.).

Cradle, in *building,* a timber frame in which rest heavy or unwieldy objects which it is desired to sustain in a position otherwise involving a state of unstable equilibrium. In *mining* the term is applied to a primitive machine formerly used for gold washing (see Gold).

Cradock, Sir Christopher (1862–1914), British naval officer, was born in York county. He served in the Sudan in 1891; on the Royal Yacht, 1894–96; and was Transport Service Officer in the Boer War. In 1900, for gallantry at Taku (China) he was promoted Captain, and in 1910 was made Rear-Admiral. Early in the Great War he was sent with a small squadron to protect the southern trade routes and Chilean coast, watching for von Spee's German Pacific squadron. He sighted the German ships off Coronel, Nov. 1, 1914, a battle ensued, and Cradock's flagship the *Good Hope* was sunk and he was drowned. He published *Sporting Notes in the Far*



CRACOW, POLAND: THE CLOTH HOUSE

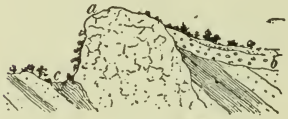
East (1889); *Wrinkles in Seamanship* (1894); *Whispers from the Fleet* (1907).

Crafton, borough, Pennsylvania, Allegheny county, 2 miles from the Ohio River, on the Pennsylvania Railroad; 4 miles west of Pittsburgh, of which it is a suburb. Pop. (1910) 4,583; (1920) 5,954.

Crafts, James Mason (1839–1917), American chemist, was born in Boston, Mass. He was graduated from the Lawrence Scientific School, Harvard, in 1858 and from 1859 to 1865 continued his scientific studies at Freiberg, Heidelberg, and Paris. From 1865 to 1868 he was in Mexico, engaged in examining mines, and on his return to the United States, was professor of chemistry at Cornell (1868–70), and at the Massachusetts Institute of Technology (1871–5). He was then in Paris (1875–91), during which time he carried on important research work in collaboration with Charles Friedel, the chief result of which was the development of a synthetic method for the production of new carbon compounds through the catalytic action of chlorid of aluminum. In 1892 he rejoined the Massachusetts Institute of Technology as professor of organic chemistry, and from 1898 to 1900 was president of that institution, after which he resumed research work in Boston. He was a member of the National Academy of Sciences and a Chevalier of the Legion of Honor. He published *A Short Course of Qualitative Chemical Analysis* (1869) and numerous scientific papers.

Crafts, Wilbur Fisk (1850–1922), American clergyman, was born in Fryeburg, Me., and was graduated (1869) from Wesleyan University. He prepared for the Methodist Episcopal ministry at the Boston University Theological School, and preached in Methodist churches until 1879, when he united with the Congregational Church and became pastor of the Brooklyn Church of Christian Endeavor. From 1883 to 1888 he was pastor of the First Union Presbyterian Church of New York. Dr. Crafts founded the American Sabbath Union in 1889, and from 1895 until his death was superintendent of the International Reform Bureau. He edited several church periodicals, and wrote extensively for and about the young. He wrote also *Practical Christian Sociology* (1895), *Social Progress* (1896), *Protection of Native Races against Intoxicants and Opium* (1900), *Internationalism* (1908), *Prohibition Handbook* (1911), *That Boy and Girl of Yours, The Kingship of Christ.*

Crag and Tail, a term used to designate a peculiar hill formation, in which a bold and precipitous front exists on one aspect of a hill, while the opposite is formed of a sloping declivity. The structure owes its origin to the juxtaposition of rocks of variable degrees of durability—the harder rocks having resisted denudation, and so protected the more readily eroded rocks. The crag-and-tail phenomena are due to glacial erosion and accumulation. The crag faces the direction from which the ice came, and thus by opposing its advance induced excessive erosion upon the ground immediately in front. A hollow has thus usually been scooped out in this place, and continued along either side of the obstruction. A characteristic and well-known example is the Castle Rock of Edinburgh.



Crag and Tail.
a. Crag. *b.* Tail (boulder clay, drift, etc.) *c.* Hollow in front of crag.

Crag Martin or Rock Swallow, a swallow found during the summer in the mountains of the Old World, from Portugal eastward to China. It is allied to the sand martin but generally nests in inaccessible places such as the roofs of caverns in rocks. It is a light brown above, with creamy buff under parts and dark brown tail feathers spotted with white.

Craig, John (?1512–1600), Scottish reformer, was born in Aberdeenshire, was educated at St. Andrews, and entered the Dominican order. After a brief imprisonment on suspicion of heresy (1536), he went to Rome, and was appointed master of novices in the Dominican convent at Bologna. Being found there reading Calvin's *Institutes,* he was condemned to the stake, but was released in the riot that followed the death of Pope Paul iv. (1559). Returning to Scotland by way of Vienna and England, he joined the reformers, was appointed minister of Holyrood (1561), and colleague of Knox in the High Church (1563). His attitude to Mary was less irreconcilable than was that of Knox and he was one of the moderate party in the disputes between the kirk and James vi., to whom he was chaplain (1579–94). He was twice moderator of Assembly, and was author of the *Short Confession, or National Covenant of 1580.* Consult Craig's *Catechism,* ed. T. Graves Law.

Craig, Sir Thomas (1538–1608), Scottish jurist. He was admitted advocate in 1563, was appointed justice-depute, the head of the criminal department the following year, and sheriff-depute of Edinburgh in 1573. His chief works are a treatise, *De Hominio* (1605), on the early relations between England and Scotland; and his *Jus Feudale* (1603, new edition by James Baillie, 1766), written to prove the common origin of feudal law in both countries.

Craighead, Edwin Boone (1861–), American educator, was born in Ham's Prairie, Mo. He was graduated from Central College (1888) and subsequently studied at Vanderbilt University, and in Leipzig, and Paris. He became professor of Greek in Wofford College (1890); was president of Clemson College, Central College, Missouri State Normal School, Tulane University (1904–12), and the University of Montana (1912–15). He is a member of the American Board of the *Hibbert Journal..*

Craighill, William Price (1833–1909), American military and civil engineer, was born in Charlestown, Va. (now W. Va.). He was graduated from West Point in 1853, and had charge of the fortification of Fort Sumter (1854–5). He was an assistant professor of civil and military engineering at West Point (1859–63), and, in the latter part of the Civil War, captain (commissioned March 1863) of engineers. He superintended the construction of defences at Pittsburg, Pa. (1863), and in 1865 was brevetted lieutenant-colonel for his services 'during the war and particularly in the defence of Cumberland Gap and the ulterior operations of General Morgan's forces.' After the war he was engaged in the construction or improvement of harbor defences, including those at New York, and in the improvement of various rivers, including the Patapsco, the James, and the Potomac; was president of the American Society of Civil Engineers (1894–5), and in 1895 became chief of engineers of the U. S. Army, with the rank of brigadier-general. In February 1897, he retired from active service. He translated (1863) Dufours's *Cours de tactique,* and with Mendell (1862) Jomini's *Précis de l'art de guerre;* and compiled an *Army Officer's Pocket Companion* (1861).

Craigie, Pearl Mary Teresa. See Hobbes, John Oliver.

Craik, George Lillie (1798–1866), Scottish man of letters, was born in Kennoway, Fife; settled in London (1826), where he devoted himself to literature in connection with Charles Knight's publications. He was professor of English literature and history in Queen's College, Belfast (1849–66). Much of Craik's best work was done for the Society for the Diffusion of Useful Knowledge—*e.g.* his articles for its biographical dictionary, and *The Pursuit of Knowledge under Difficulties* (1830–1). His published works include *A Manual of English Literature* (1862; 9th ed. 1883), *Spenser and his Poetry* (1845), *The Pictorial History of England* (1837–41), *The Outlines of the History of the English Language* (1851).

Craik, Dinah Maria Mulock (1826–87), English novelist was born in Stoke-upon-Trent. She produced her first novel, *The Ogilvies*, in 1849, and several others appeared before the publication of *John Halifax, Gentleman* (1856), by which her reputation was established. Her other works include *A Life for a Life* (1859), *Studies from Life* (1862), *Sermons Out of Church* (1875), *Concerning Men, and other Papers* (1888), *The Little Lame Prince.*

Craiova, krä-yō′vä, town, Roumania, on the Jiu River; 115 miles west of Bucharest. It is in a rich agricultural region and has a trade in cereals, fish, cattle and timber. It was for a time the capital of Little Wallachia; and in the Great War was occupied by the Germans (Nov. 1916). Pop. (1914) 51,877.

Cram, Ralph Adams (1863–), American architect and writer, was born in Hampton Falls, N.H. He was educated at Princeton University and in 1889 began to practise as an architect. His firm, whose personnel has undergone several changes, has designed some of the most notable ecclesiastic and academic edifices in the United States, among which are the Graduate Tower, Princeton University; Williams College buildings; St. Paul's Cathedral, Detroit; St. Thomas' Church, New York City; St. Albans Cathedral, Toronto; Cathedral of St. John the Divine, New York City; and Choate School, Conn. He is a member of the National Institute of Arts and Letters and is supervising architect for Princeton University, Bryn Mawr College and Wellesley College. His publications include *Church Building* (1901); *The Ruined Abbeys of Great Britain* (1906); *Impressions of Japanese Architecture and the Allied Arts* (1906); *The Gothic Quest* (1907); *The Ministry of Art* (1914); *Heart of Europe* (1915); *The Great Thousand Years* (1918); *Walled Towns* (1919); *Towards the Great Peace* (1922).

Cra′mer, Gabriel (1704–52), Swiss mathematician, was born in Geneva. He was a friend of Nicholas Bernouilli, whose notice he attracted when competing for the chair of philosophy at Geneva in 1724. On becoming professor in 1750 he wrote his *Introduction à l'analyse des lignes courbes algêbriques.* He edited the works of Johann Bernouilli (4 vols. 1742) and of Jakob Bernouilli (2 vols. 1744), and the correspondence of Leibnitz and the former (1745).

Cramer, Johann Baptist (1771–1858), Anglo-German musician, was born in Mannheim, but went as a child to London where he lived for most of his life. Almost entirely self-taught, and a disciple of Haydn and Mozart rather than of Beethoven, Cramer was the foremost pianist of his day. He wrote an immense amount of now forgotten pianoforte music, but his *Eighty-four Studies* is an accepted classic in the musical world.

Cramp, a metal bar with both ends bent over at right angles. It is used in masonry for firmly connecting adjacent blocks of stone, each end of the cramp being let into a stone and secured with cement or lead.

Cramp, the sudden, painful, and involuntary contraction of a muscle or group of muscles. In persons who are subject to it, cramp is apt to come on under the influence of fatigue or cold. The form of cramp most to be dreaded is that which attacks swimmers.

Cramp, Charles Henry (1828–1913), American shipbuilder, was born in Philadelphia. He learned the shipbuilding trade, and became a partner in the firm of William Cramp & Sons, Philadelphia, and later president of the Cramp Shipbuilding Company, the largest concern of the kind in the United States. The firm has built many of the vessels of the U. S. Navy.

Crampton, Henry Edward (1875–), American zoologist, was born in New York City. He was graduated from Columbia University (1893), where he became assistant in biology (1893–5). He was instructor in zoology at the Massachusetts Institute of Technology (1895–6), instructor (1896–1901), (adjunct) professor (1901–4) and professor (since 1904) of zoology at Columbia University; and in 1909–20 curator of invertebrate zoology at the American Museum of Natural History. He has taken part in various scientific expeditions and is the author of *The Doctrine of Evolution* (1911), and of several monographs.

Crampton, Thomas Russell (1816–88), English engineer, was born in Broadstairs, Kent. For several years he worked under the elder Brunel, and afterward under Daniel Gooch, by whose direction he designed the first locomotive for the Great Western Railway. Between 1842 and 1847 he improved his 'Crampton' locomotive and in 1851 he succeeded in laying the first working cable for a submarine telegraph between Dover and Calais.

Cranach, kran′*ak*, Lucas, also known as 'Lucas Müller' (1472–1553), German painter, was born in Kronach, Upper Franconia. At twenty-one he accompanied Frederick the Wise, elector of Saxony, to Palestine, afterward became his court painter at Wittenberg, and held the same office under his successors, John and John Frederick. During his stay at Wittenberg, of which he was burgomaster, he became a friend of Luther, whose tenets he adopted and whose portrait, as well as that of Melanchthon, he often painted. His pictures deal chiefly with Scriptural subjects, his figures being quaintly German in type; but he excelled in portraiture.

His work has none of the dark mystery of Dürer, is naïve in composition, thoroughly realistic, but is at times characterized by grotesqueness and stiffness in draughtsmanship. Berlin has the finest collection of his pictures, including *Hercules and Omphale* and *The Fountain of Youth*, typical examples of his realism. Munich has a large picture, *The Woman taken in Adultery*, and two smaller ones, in which he is at his best—*Adam and Eve in Paradise* and *Lot and his Daughters in a Grotto.* Other works include the *Portrait of a Young Girl*, (National Gallery, London), *Judith, Christ on the Cross, Venus and Cupid.*

Cranach, Lucus, 'the Younger' (1515–86), German painter, second son of Cranach 'the Elder,' whose pupil he was. He became burgomaster of his native town, Wittenberg, which has his *Crucifixion, Nativity,* and *Lord's Supper.* Other works are in Berlin, Munich, Dresden and New York. The woodcuts in Luther's Bible (1542) are from his designs.

Cranberry, the fruit of the genus *Vaccinium,* much grown in North America. It is a trailing evergreen shrub with oval leaves and small pinkish flowers. The fruit, a small, firm, red berry on a slender stem, ripens in September and October. There are two species, the small *V. oxycoccus,* and the large *V. macrocarpum,* which is native to acid swamps in the cooler parts of the United States and Canada. The small cranberry is found in North America, Europe and Asia. It is sparingly cultivated in the Old World. The low-bush cranberry (*V. vitis idæa*) is common in Europe and is much used in Nova Scotia and in the United States, but is not cultivated. There are three centres for cranberry cultivation in the United States, Massachusetts, where it begun and whence comes the largest proportion of the berries; New Jersey; and Wisconsin. Nova Scotia is also an increasingly important centre for cranberries. The requirements for cranberry cultivation are level land in a sandy region; water for flooding; good drainage; and a comparative freedom from frosts. The best soil is one of peat, with sand underneath, which is in its turn superimposed on clay. The vines are planted about 12 inches apart, cuttings of 8 or 10 inches being used of which from 3 or 4 inches are exposed above ground. The crop is largely handled by co-operative associations and forms an increasingly important industry in the United States, the annual yield being about 40,000,000 quarts.

Cranberries are always cooked before using. They are usually made into a sauce or jelly or are used as a filling for pies and tarts. The chief disease to which the cranberry is liable is scald, a fungous disease due to *Guiguardia vaccinii*, controlled by spraying with bordeaux mixture. The worst insect pests are the fireworm (*Rhopobata vacciniana*), and the spanworm (*Acrobasis vaccinii*) the former of which defoliates the bushes and the latter attacks the fruit. Both are best controlled by applications of kerosene oil or Paris green. Consult U. S. Department of Agriculture, *Farmer's Bulletin No. 176*.

Cranbrook, city, British Columbia, in Kootenay District, on the Canadian Pacific Railway; 300 miles east of Vancouver. The leading industries include mining, lumbering and agriculture. Pop. (1921) 2,725.

Cranbrook, town, England, in Kent, 12 miles east of Tunbridge Wells. Brewing and malting are the chief industries. Pop. (1921) 12,909.

Cranbrook, GATHORNE GATHORNE-HARDY, FIRST EARL (1814–1906), English public official was born in Bradford. He was educated at Oxford, studied law and became Secretary of State for the Home Department (1867–8), War Minister (1874–8), Secretary of State for India (1878–80), and Lord President of the Council (1885–92). He was raised to the peerage in 1878.

Cranch, CHRISTOPHER PEARSE (1813–92), American painter and poet, was born in Alexandria, Va. He was graduated (1853) from the Cambridge Theological School, but was never ordained. He studied art in Italy, 1846–8, and resided in that country and in Paris from 1853 to 1863, when he returned to the United States. His paintings include many Venetian scenes. He made a blank verse translation of the *Æneid* (1872) and published *Poems* (1844), *The Bird and the Bell, with Other Poems* (1875), and *Ariel and Caliban* (1887).

Crane, an extensive class of hoisting appliances which are capable of both lifting their load and moving it laterally. There are many types, a few, of specially wide utility, have characteristic names, and can be described separately, but most of them are individual adaptations to a particular location or class of service.

Motive Power. The motive power for manipulating a crane may be hand, steam, hydraulic, pneumatic, or electric power. At the present time, the steam drive and the electric motor drive are the most important. Hand-operated cranes are used mainly for small loads. Compressed air has been applied to cranes in a few instances, though traveling hoists worked by air are much used. Hydraulically operated cranes are used to a limited extent, particularly in England. Cranes having a fixed range of motion are operated by electricity wherever electric power is readily available and those used on construction work are usually driven by steam power.

Crane Motions.—A crane moves its load (1) by lifting, (2) by traversing it along the crane structure, (3) by swinging, the crane being set on a vertical pivot, and (4) by traveling; *i.e.*, by a motion of the entire crane along a suitable track. The hoisting movement is common to all cranes; of the other movements, one, two, or three may be present in a particular crane. These motions are produced either by rope tackle—rarely by chain tackle—or by geared drive, usually acting on smooth-rim carrying wheels. The hoisting motion is practically always worked by rope tackle, the rope being wound in by the drum of a hoist motor or engine. The traversing motion of the hoist-carrying trolley along the arm or bridge of the crane is operated sometimes by driving the carrying wheels of the trolley, sometimes by an endless rope stretched along the length of the arm and looped around a drum on the trolley. This rope drive is convenient when the engine or motor is not carried directly on the trolley, but occupies a fixed position on the crane. When the hoisting and traversing motors are on the trolley carriage itself, the wheel drive is best used. The longitudinal travel of the crane is almost always actuated by wheel drive, while for a swinging motion a gear meshing with a circular rack is suitable.

Bridge Crane.—The most widely distributed type of crane is the overhead traveling or bridge crane used in shops, heavy manufacturing plants and power stations. It consists of a cross bridge of plate-girders, running on a longitudinal track carried on the side columns of the building; a transverse track of T-rails laid along the girders of the bridge, and a 'trolley' or hoisting carriage running on this latter track. On account of the great convenience of electric operation, such cranes are to-day nearly always equipped with motor drive. The preferred arrangement is to use three motors, two of which are mounted on the trolley and operate respectively the hoisting and traversing motions, while the third, carried at one end of the bridge, drives the main carrying wheels for the traveling motion. Bridge cranes are built in all load capacities and all lengths of span. When it is desired to avoid fixed supports, the ends of the bridge are extended downward to form legs running on a track laid directly on the ground.

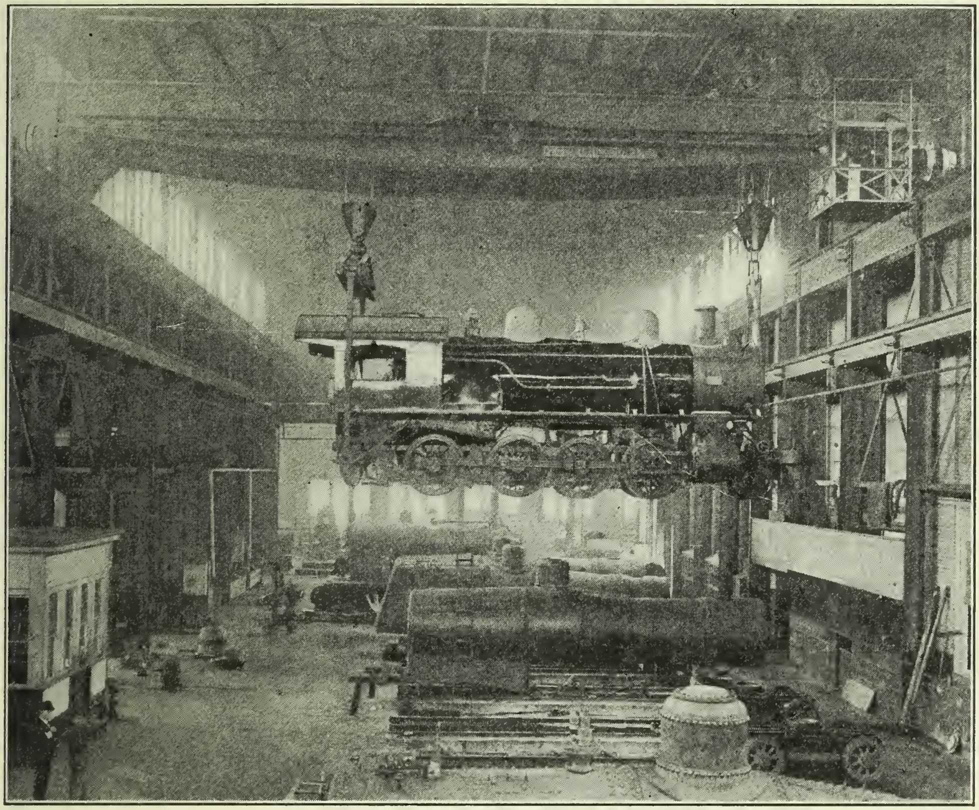
Jib Cranes are cantilever structures, the boom on which the hoist hangs or travels projecting out from its support. Jib cranes mounted on a railway truck prove convenient for yard purposes.

Tower Cranes.—For wharf purposes, tower cranes having all four of the motions previously mentioned are often employed. A pyramidal or other tower adapted to run on a track along the edge of the wharf carries on top a turn-table supporting a jib extending out. A hoisting carriage runs on the jib. By combination of the traversing, rotating, and traveling motions the crane commands a large area. Wharf cranes are used more in Europe than in the United States, where a special field of freight service—ore and coal shipping on the Great Lakes—has produced a remarkable line of cranes and associated devices.

Unloaders.—Ore and coal unloaders are the most interesting of the cranes just mentioned. The bucket, fixed to a rigid vertical leg, has a scraping motion in closing, which gathers in loose material in the hold of the vessel and secures a full bucket load. It discharges into chutes on the deck of the crane, whence the ore either flows into cars on the tracks below or is delivered to a storage pile at the rear by a conveyor on the gantry frame.

Bridge-erecting Cranes.—An erecting 'traveler' moves longitudinally on tracks set on the erection falsework, and constitutes a support for all the hoisting tackle required for lifting the members of the bridge into place and holding them until connected up.

The working end of a crane is usually either a hook or a bucket. In handling iron, large electromagnets have come into extensive use. Such magnets can lift a ton or more, and have the advantage of picking up their load (after being lowered down to contact with it) by the mere throwing of a switch to send an electric current into their windings. See HYDRAULIC and ELECTRIC MACHINERY.



A Heavy Traveling Crane in a Locomotive Shop
(Niles-Bement-Pond Co.)

Crane, a large water-bird related to the herons, various species of which constitute the family Gruidæ. There are about twenty species, the greater number of whom are confined to the Old World. All species are long-legged, long-necked, with the head partly naked, sometimes, tufted; the beak longer than the head, straight and compressed; with the wings short but powerful; short tail, feet unwebbed and having four toes each, of which the posterior toe (the hallux) is much elevated and bears a sharp claw. The best known is the European crane (*Grus grus*) which is about four feet high, gray in color, with throat and head almost black. The two foremost American species are the whooping crane (*G. americana*) which is white with a dull-red cap, and is practically confined to the central part of the country, particularly the Mississippi Valley; and the sandhill crane (*G. mexicana*), somewhat smaller and a slate-gray in color, although the young birds are usually brown. They feed on fish, frogs and insects, nest upon the ground and utter loud raucous cries. The demoiselle crane (*G. virgo*) and the handsome African or Balearic crowned crane (*Balearica pavonina*) are common species in the warmer parts of the Old World.

Crane, STEPHEN (1870–1900), American author, was born in Newark, N. J. He was educated at Lafayette College, Easton, Pa., and Syracuse University and became a reporter for the New York *Tribune* and other papers. He was war correspondent in the Graeco-Turkish and Spanish-American wars and later went to England. His first work of fiction was *Maggie, a Girl of the Streets* (1890), which was well received. It was followed by *The Black Riders and Other Lines* (1895), *The Red Badge of Courage*, a realistic tale of the Civil War, *George's Mother* (1896), *The Third Violet* (1897), *The Open Boat* (1898), *War is Kind* (1899), and *O'Ruddy* (1900).

Crane, THOMAS FREDERICK (1844–1927), American educator, was born in New York City. He was graduated (1864) from Princeton, and was admitted to the New York bar (1866). He was professor of Romance languages (1868–1909), dean of the College of Arts (1896–1902), dean of the University Faculty (1902–9) and acting president (1912–3), at Cornell. His publications include *Italian Popular Tales* (1885); *The Exempla* (stories from the *Sermones* of De Vitry: 1890); *Le romantisme français* (5th ed. 1907); *La société française au dix-septième siècle* (2nd ed. 1907); *Chansons populaires de la France* (1891); *Tableau de la révolution française* (9th ed. 1907); *Miracles of the Virgin* (1911); *Italian Social Customs of the Sixteenth Century* (1920). died Dec 9,'27

Crane, Walter (1845–1915), English artist of remarkable versatility, was born in Liverpool. He was largely self-taught, was influenced by Botticelli and strongly sympathetic to the ideas of William Morris. His easel pictures are allegorical and fanciful in conception, but too much attention is paid to minute decoration. Grace of composition, however, beauty of flowing line, and skilfully-disposed drapery characterize his productions. In 1904 he was awarded the Albert gold medal of the Society of Arts. Among his notable pictures are *The Bridge of Life* (a fine pictorial allegory), *The Chariots of the Hours*, *The Roll of Fate*, and *Later Summer*. Several of his drawings and designs for tapestries are in the South Kensington Museum. He illustrated Spenser's *Faerie Queene* and *The Shepherds Calendar*, and several of Shakespeare's plays. He also wrote *The Bases of Design* (1898; 2d. ed. 1903), and *Line and Form* (1900).

GOOSE GIRL
O WIND BLOW CONRADS HAT AWAY
AND MAKE HIM FOLLOW AS IT FLIES:
WHILE I WITH MY GOLD HAIR WILL PLAY
AND BIND IT VP IN SEEMLY WISE:

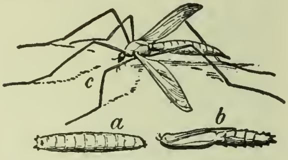
Design for Tapestry by Walter Crane: 'The Goose Girl'

Crane, William Henry (1845–), American actor, was born in Leicester, Mass., and made his début in Utica, N. Y., in 1863. He was engaged as the original Le Blanc in *Evangeline* as produced by Alice Oates and her company. After a short period in California he formed a partnership with Stuart Robson which lasted from 1877 to 1889, during which period they produced *Our Boarding House*, *The Henrietta*, and other notable plays. After 1889 Mr. Crane appeared as a star in such productions as *David Harum*, *On Probation*, *The Senator*, and *Business is Business*.

Died Mar. 7, 1928.

Crane, Winthrop Murray (1853–1920), American public official was born in Dalton, Mass. He served several years as a member of the Republican national committee and was lieutenant-governor of Massachusetts in 1897–99; governor in 1900–02; U. S. Senator in 1904–13.

Crane-fly (*Tipula longicornis*), a common dipterous insect, of the family Tipulidæ. In England it is called 'daddy-long-legs,' but this name refers in the United States to another kind of insect. The adult is characterized by its long and fragile legs. The abdomen of the female is furnished with an ovipositor, by means of which she deposits her eggs on the ground. These develop into sluggish - looking subterranean larvæ, often destructive to grass.



Crane-fly

a, larva; *b*, pupa; *c*, imago.

Craniata, a name applied to all the higher vertebrates from cyclostomes upwards. The great majority have the notochord of the embryo replaced in the adult by a backbone, and there are never more than eight gill-slits. The groups of Craniata are cyclostomes, fishes, amphibians, reptiles, birds, and mammals.

Craniota'bes, a thinning of the skull in spots, generally associated with rickets or syphilis.

Cranium. Se ANTHROPOLOGY; SKULL.

Crank ('twist, bend'), in mechanics, a U-shaped bend in any revolving shaft. It is generally used for converting rectilinear reciprocating motion into circular, or the reverse. The handle of a grindstone is a 'single crank' attached to the end of an axis in order to communicate circular motion. The reciprocating rectilinear motion of a piston rod when connected with the crank of a wheel communicates circular motion to the latter. In the 'bellicrank' it merely changes rectilinear motion in one direction into rectilinear motion in another.

Cran'mer, Thomas (1489–1556), Archbishop of Canterbury, was born in Aslacton, Nottingham. He was ordained in 1523, and taught and lectured at Cambridge, but left the university in 1529 to avoid 'the sweating sickness.' Henry VIII.'s divorce was then prominently before the nation, and to Gardiner and to Fox Cranmer expressed his conviction that the marriage was actually void, being contrary to the law of God, and that it could be dissolved without an appeal to Rome by taking the opinion of the universities. The commissioners reported this to Henry, who sent for Cranmer and commanded him to write a treatise in support of his position. He was next sent on two important embassies to the Pope (1530) and the emperor (1532), and while in Germany married a niece of the reformer Osiander. On the death of Warham (1533), Cranmer was created Archbishop of Canterbury.

Cranmer was in a measure Henry's tool, and in the matter of Henry's marriages with Anne Boleyn, Anne of Cleves, and Catherine Howard, and their dissolution, was little better than the royal pander. His appeal in favor of Thomas Cromwell showed courage, and he offered (1539) some opposition to the Six Articles 'for Abolishing Diversity of Opinions'; but his character was essentially timid, at least during Henry's lifetime. He was appointed one of the council to govern during the minority of Edward VI.

In 1548 Cranmer published his *Catechism, or Short Instruction into the Christian Religion*, and in 1550 his *Defence of the True and Catholic Doctrine of the Sacrament*, which was a powerful attack upon transubstantiation. Cranmer's two great Protestant points were the repudiation of the papal supremacy, and the importance of the translation of the Scriptures. Although the suppression of the monasteries must not be laid to his charge, history cannot acquit him of blame in connection with the martyrdom of Firth and Lambert, of John Bocher (1550), and several others. When Mary ascended the throne Cranmer was brought to trial. On Feb. 14, 1556, he was stripped of his episcopal robes, and on March 21 he was brought to the stake. Now, at last, the old man became brave, and, putting his right hand into the fire, held it there, saying, 'This hath offended. Oh, this unworthy hand!'

The *Life* of Cranmer has been written by Strype (1694), Todd (1831), J. M. Norton (1863), Dean Hook, in his *Lives of the Archbishops* (1868), Collette (1887), and Innes (1899). His *Works*, with *Life*, were edited by the Rev. H. Jenkyns (4 vols. 1833), and by the Rev. J. E. Cox for the Parker Society (2 vols. 1844–6).

Crannogs. See PILE DWELLINGS.

Cranston, city, Rhode Island, Providence county, on the west shore of Narragansett Bay, and on the New York, New Haven and Hartford Railroad; 8½ miles southwest of Providence. Cotton and miscellaneous manufactures and market-gardening are carried on. The State Prison, Insane Asylum, Workhouse and Reform Schools are situated here. Pop. (1910) 20,107; (1920) 29,407.

Crape (Fr. crêpe; Lat. *crispus* 'crisp'), a thin gauzy fabric, woven in loose, even threads of of silk, heavily sized or gummed, and crimped in the dyeing. In earlier times it was made in black only, as a sign of mourning. It is now made in colors and white, and of cotton and wool as well as silk.

Crape Myrtle. See LAGERSTRŒMA.

Crap'pie (*Pomoxis annularis*), a fish belonging to the family Centrarchidæ, found from the St. Lawrence and Great Lakes south to Texas and west to the Dakotas and Kansas. It is about a foot long, silvery olive mottled with dark green, and is generally considered a fine panfish. It somewhat resembles the calico bass and is known also as 'bachelor', 'new light', 'bridge perch', and 'John Demon.'

Craps, a game of chance, played by any number of persons with two dice, the stake for each player being agreed upon before the first throw. The first player, chosen by lot, casts the dice. If he throws two, three or twelve, it is a 'crap' and he loses and passes the dice to the next player. If he throws seven or eleven he wins the pot. If he throws any other number he continues throwing until he again makes that number, when he wins the pot; or until he throws a seven, when he loses. If he wins he may leave the whole pot up as a stake, or any part of it, or may add to it, calling upon the other players to contribute an equal amount. A winner throws the next hand and continues doing so until he loses. When the next player takes the dice the game proceeds as before.

Crashaw, krash'ô, RICHARD (?1613–49), English poet. Expelled (1643) from his fellowship of Peterhouse, Cambridge, for refusing to sign the Covenant, he went to Paris, where he entered the Roman Catholic Church. He died a sub-canon in Rome. Crashaw's poetical fame rests chiefly on his *Epigrammatum Sacrorum Liber* (185 in all), published in his twenty-first year, which, though often whimsical, shows maturity and classical taste; and on his 'sacred poems' (of which the best known is his *Steps to the Temple*, 1646), which had a great influence on Milton, Coleridge, Shelley, and other poets. The famous line, descriptive of the turning of the water to wine at Cana, 'The modest water saw its God and blushed,' is his.

Cras'sus, LUCIUS LICINIUS (140–91 B.C.), Roman orator and jurist. He supported the Lex Servilia (106); became curule ædile (103), and consul (95), and passed a law banishing from Rome all residents who had not the franchise—a measure which largely induced the social war. As censor (92) he closed the schools of rhetoricians. Cicero preserves his memory in *De Oratore*.

Crassus, MARCUS LICINIUS, surnamed DIVES (*c.* 105–53 B.C.), one of the members of the first triumvirate. He assisted Sulla in 82 B.C. in overthrowing the Marian party, and was rewarded by him with large grants of confiscated property, thus enabling Crassus to justify the name Dives ('the rich'), a regular surname of his family. He sought wealth in every possible way, such as trafficking in slaves, lending money, working mines, and house building. As prætor he defeated Spartacus (71 B.C.), and put down the slave rebellion. In 70 he was consul with Pompey and in 65 became censor. In 60 the famous triumvirate was formed by Cæser, Pompey, and Crassus. Crassus' position depended on his enormous wealth; his country estates alone are said by Pliny to have been worth £2,000,000. In 55 B.C. he was again consul with Pompey, after his consulship obtaining the province of Syria. Being ambitious of military glory, he entered upon war with the Parthians, who decoyed him into the deserts of Northern Mesopotamia. There his forces were defeated at Carrhæ by the Parthian cavalry (53 B.C.), and two days afterwards Crassus and his officers were treacherously slain.

Cratægus, kra-tē'gus, a genus of the order Rosaceæ, including a large number of shrubs and trees which bear oval or globular fruit enclosing a bony stone. Their long, shining thorns and shrubby habit, their masses of flowers, ofttimes shining foliage, brilliant in autumn, and brightly colored fruit make them conspicuous among the smaller North American trees. The European Hawthorn is *C. oxycantha.* Among other species may be named *C. crusgalli*, the Cockspur Thorn, with white and red flowers; *C. Douglasi*, with white flowers; *C. cocinea*, with bright red fruits; and *C. nigra*, which bears white flowers, followed by black fruit.

Crater. See VOLCANOES.

Crater Lake National Park, a United States government reservation in the heart of the Cascade Mountains, Southwestern Oregon, created by Act of

Congress in 1902. Its area is 249 square miles and its chief point of interest is Crater Lake, which occupies the crater of an extinct volcano. The lake is over 6,000 feet above sea level, about 6 miles long and 4 miles wide, and in some places reaches a depth of 2,000 feet. Its waters are of a marvellous blue and are surrounded by a rim of gray lava. The lake was discovered in 1853 by a party of Californians and Oregonians under the leadership of J. W. Hillman. (For illustration, see Oregon.)

Craterus, krat′*er*-us, (?373–321 B.C.), a Macedonian, one of the most trusted generals of Alexander the Great. At the beginning of Alexander's expedition he commanded the foot guards, and in 324 B.C. was commissioned to lead the veterans back to Macedonia, and to succeed Antipater as regent of Macedonia. Alexander's death caused this arrangement to be altered, and Antipater and Craterus jointly governed Greece and Macedonia, with the Illyrian and the Epirot tribes. It was largely by the aid of Craterus that Antipater defeated the Greeks in the Lamian war. On the outbreak of war between Antipater and Perdiccas (321 B.C.), Craterus engaged the latter's ally, Eumenes, and fell in battle against him in Cappadocia during that year.

Crates, krā′tēz, of Athens, a poet of the old Attic comedy, who flourished between 449 B.C. (when his first victory in comedy was won) and 424 B.C., in which year Aristophanes in his *Knights* speaks of him as a writer of the past, distinguished by the delicacy and refinement of his wit. The fragments of his works which survive are found in Meineke's (5 vols. 1839–57) and Kock's (3 vols. 1880–88) editions of the *Poetarum Comicorum Græcorum Fragmenta.*

Crates, of Mallus in Cilicia, Greek grammarian and critic, especially on the poems of Homer. He opened a school at Pergamos, which became celebrated, and, about 157 B.C., visited Rome, where he delivered a series of lectures on literature.

Crati′nus (519–422 B.C.), an Athenian writer of the old Attic comedy, classed by Horace, along with Aristophanes and Eupolis, as among its chief representatives. We are told that he did not begin to exhibit his plays until about 453 B.C., when sixty-six years of age; his last play, *The Wineflask,* was produced in 423, when he was ninety-six. In the previous year Aristophanes had spoken of him as a drivelling old man, so utterly neglected that he could not even procure enough to quench his thirst. The play mentioned, which won the first prize over Aristophanes' *Clouds,* was his reply. Cratinus was remarkable for the violence and directness of his satire on public characters. According to all authorities, he was notorious also for his excessive drinking. Only a few fragments of his works survive, which will be found in Meineke's (5 vols. 1839–57) and Kock's (3 vols. 1880–8) collections of the *Poetarum Comicorum Græcorum Fragmenta.*

Cratip′pus, a philosopher from Mitylene, of the 1st century B.C., whose lectures at Athens were attended by both Brutus, the assassin of Cæsar, and Marcus, the son of Cicero. Cicero, who in *De Divinatione* explains his philosophy, praises his wisdom in *De Officiis* (I. 1), and his conversational powers in *Ad Familiares* (XVI. 21).

Cra′ven, Alfred (1846–), American civil engineer, was born in Bound Brook, N. J. He was graduated from the U. S. Naval Academy in 1867, and engaged in geological survey and irrigation work, and mining engineering, in California and Nevada from 1871–1884. From 1884 to 1885 he was division engineer for the new Croton Aqueduct, and from 1895 to 1900 was in charge of construction of the Jerome Park Reservoir, both for New York City, and later superintended the building of that section of the subway from 42d Street and Broadway to 104th Street. He was chief engineer in the construction of the dual system of subways for New York City, 1910–1916.

Craven, Alfred Wingate (1810–79), American civil engineer, was born in Washington, D. C., and was graduated (1829) from Columbia. He was admitted to the bar of New York and practised for a few years, taking up civil engineering in 1835. In 1849 he was appointed commissioner and chief engineer of the Croton water board of New York City on its organization. In connection with this work the large reservoir in Central Park was built, and the construction of the vast reservoir at Boyd's Corners undertaken.

Crawfish. See Crayfish.

Crawford, Francis Marion (1854–1909), American author, son of Thomas Crawford, was born in Bagni di Lucca, Italy. After four years at Cambridge University, England, he studied philosophy and the languages at Heidelberg, Carlsruhe, and Rome, then visited India to study Oriental languages and mysteries, and while there edited the *Indian Herald* at Allahabad (1879–80). Returning to the United States, he took a course in Sanskrit and Zend at Harvard. After 1884 he resided in Sorrento, Italy, paying several visits to the United States. His first novel, *Mr. Isaacs,* appeared in 1882 and was immediately successful. It was followed by *Dr. Claudius* (1883), *A Roman Singer* (1884), *Zoroaster* (1885), *Saracinesca* (1887) and its sequels, *Greifenstein* (1889), *A Cigarette-Maker's Romance* (1890), *Katherine Lauderdale* (1894), *Casa Braccio* (1895), *A Rose of Yesterday* (1897), *Via Crucis* (1899), *In the Palace of the King* (1900), *Rulers of the South* (1900), and *The Heart of Rome* (1903). He wrote, also, *Ave, Roma Immortalis* (1898), an exposition of the history and archæology of the Eternal City, and a play, *Francesca da Rimini,* produced in Paris by Sarah Bernhardt in 1902. He was a member of the American Academy of Arts and Letters.

Crawford, Isabella Valancy (1851–87), Canadian poet, was born in Dublin, Ireland, and was brought to Canada by her parents in 1858. The *Athenæum* and other London papers spoke warmly of the only volume of her verse published during her life, *Old Spookses' Pass, Malcolm's Katie, and Other Poems* (1884). A collective edition of her *Poems,* edited by J. W. Garvin, was published in Toronto in 1905.

Crawford, Thomas (1814–57), American sculptor, was born in New York, studied there, and in 1834 went to Rome, Italy, where he was afterward to reside and where he came under the helpful influence of Thorwaldsen. His first master-piece was a group representing *Orpheus and Cerberus* (1839), now in the Boston Athenæum. It was succeeded by many notable pieces, and in 1849 he was commissioned to execute the equestrian statue of *Washington* at Richmond, Va. Subsequently he was principally occupied with work for the capital at Washington, including the bronze statue of *Liberty* above the dome, the bas-relief symbolical of the *Progress of American Civilization,* and the bronze doors.

Crawford, William (1732–82), American soldier, was born in Berkeley county, Va., and served as a surveyor under Washington. He accompanied General Braddock in the expedition against Fort Duquesne as an ensign in the Virginia riflemen, and after some years of military service established himself in Western Pennsylvania. At the opening of the Revolution he led a company of Virginians in Washington's army, performed distinguished services, and was promoted colonel, resigning in 1781. The following year he was persuaded by Washington to lead an expedition against the Wyandot and Delaware Indians, on the Muskingum River, but his force was surrounded and he nently before the nation, and to Gardiner and to Fox Cranmer expressed his conviction that the marriage was actually void, being contrary to the law of God, and that it could be dissolved without an appeal to Rome by taking the opinion of the universities. The commissioners reported this to Henry, who, sending for Cranmer, commanded him to write a treatise in support of his position. He was next sent on two important embassies to the Pope (1530) and the emperor (1532), and while in Germany he married a niece of the reformer Osiander. On the death of Warham (1533), Cranmer was created Archbishop of Canterbury. Cranmer was in a measure Henry's tool, now condemning Catherine's marriage and blessing that with Anne Boleyn; then within three short years banning what he had blessed. In the matter of Henry's marriages with Anne Boleyn, Anne of Cleves, and Catherine Howard, and their dissolution, Cranmer was little better than the royal pander. His appeal in favor of Thomas Cromwell showed courage, and he offered (1539) some opposition to the Six Articles 'for Abolishing Diversity of Opinions'; but his character was essentially timid, at least during Henry's lifetime. He was appointed one of the council to govern during the minority of Edward VI.

In 1548 Cranmer published his *Catechism, or Short Instruction into the Christian Religion*, and in 1550 his *Defence of the True and Catholic Doctrine of the Sacrament*, which was a powerful attack upon transubstantiation. Cranmer's two great Protestant points were the repudiation of the papal supremacy, and the importance of the translation of the Scriptures. Although the suppression of the monasteries must not be laid to his charge, history cannot acquit him of blame in connection with the martyrdom of Frith and Lambert, of John Bocher (1550), and several others. When Mary ascended the throne Cranmer was brought to trial. On Feb. 14, 1556, he was stripped of his episcopal robes, and on March 21 he was brought to the stake. Now, at last, the old man became brave, and, putting his right hand into the fire, held it there, saying, 'This hath offended. Oh, this unworthy hand!'

The *Life* of Cranmer has been written by Strype (1694), Todd (1831), J. M. Norton (1863), Dean Hook, in his *Lives of the Archbishops* (1868), Collette (1887), and Innes (1899). His *Works*, with *Life*, were edited by the Rev. H. Jenkyns (4 vols. 1833), and by the Rev. J. E. Cox for the Parker Society (2 vols. 1844-6).

Crannogs. See PILE-DWELLINGS.

Cranston, tn., Providence co., R. I., on W. shore of Narragansett Bay, 8½ m. s.w. of Providence. It includes Cranston, Pontiac, and Natick villages, largely engaged in cotton manufacture. There are also large breweries, and market-gardening is extensively carried on. The state prison, insane asylum, workhouse and reform schools are situated here. Pop. (1910) 21,107.

Crape (Fr. *crêpe;* Lat. *crispus*, 'crisp'), a thin, transparent, crisp or crumpled silk stuff, usually black, used in mourning. According to Defoe, crape was brought to England by the French refugees who fled after the revocation of the Edict of Nantes (1685). Guicciardini, in 1560, mentions crape as a principal export from Bologna. Early in the 18th century it superseded the manufacture of bombazine in Norwich, where it is now principally produced.

Craps is played by any number of persons with two dice, the stake for each player being agreed upon before the first throw. The first player, chosen by lot, casts the dice upon a table or other level surface. If he throws two or three he puts in another stake and and passes the dice to the next player. If he throws seven or eleven he wins the pot. If he throws any other number he continues throwing until he again makes that number, when he wins the pot; or throws a seven or an eleven when he passes the dice to the next player after contributing a stake to the pot. If he wins he may leave the whole pot up as a stake, or any part of it, or may add to it, calling upon the other players to contribute an equal amount. A winner throws the next hand and continues doing so until he loses. When the next player takes the dice the game proceeds as with the original player.

Crashaw, RICHARD (?1613-49), English poet. Expelled (1643) from his fellowship of Peterhouse, Cambridge, for refusing to sign the Covenant, he went to Paris, where he entered the Roman Catholic Church, and died a subcanon in Rome. Crashaw's poetical fame rests chiefly on his *Epigrammatum Sacrorum Liber* (185 in all), published in his twenty-first year, which, though often whimsical, shows maturity and classical taste; and on his 'sacred poems' (of which the best known is his *Steps to the Temple*, 1646), which exercised great influence on Milton, Coleridge, Shelley, and other poets. See *Crashaw's Poems* (coll. Grosart, 1872), and Gosse's *Seventeenth-Century Studies* (3d ed. 1897).

Crassus, LUCIUS LICINIUS (140-91 B.C.), Roman orator and jurist. He supported the Lex Servilia (106); became curule ædile (103), and consul (95), when he passed a law banishing from Rome all residents who had not the franchise—a measure which largely induced the social war. As censor (92) he closed the schools of rhetoricians. Cicero preserves his memory in *De Oratore*.

Crassus, MARCUS LICINIUS, surnamed DIVES (*c.* 105-53 B.C.), one of the members of the first triumvirate. He assisted Sulla in 82 B.C. in overthrowing the Marian party, and was rewarded by him with large grants of confiscated property, thus enabling Crassus to justify the name Dives ('the rich'), a regular surname of his family. He sought wealth in every possible way, such as trafficking in slaves, lending money, working mines, house-building, etc. As prætor he defeated Spartacus (71 B.C.), and put down the slave rebellion. In 70 he was consul with Pompey, and in 65 became censor. In 60 the famous triumvirate was formed by Cæsar, Pompey, and Crassus. Crassus' position depended on his enormous wealth; his country estates alone are said by Pliny to have been worth £2,000,000. In 55 B.C. he was again consul with Pompey, after his consulship obtaining the province of Syria. Being ambitious of military glory, he entered upon war with the Parthians, who decoyed him into the deserts of N. Mesopotamia, where his forces were defeated at Carrhæ in 53 by the Parthian cavalry, and two days afterwards Crassus and his officers were treacherously slain.

Cratægus, a genus of the order Rosaceæ. including certain shrubs and trees which bear oval or globular fruit enclosing a bony stone. The European hawthorn is *C. Oxycantha*. Among other species may be named *C. crus-galli*, the cockspur thorn, with white and red flowers; *C. Douglasi*, with white flowers; *C. coccinea*, with bright red fruits; and *C. nigra*, which bears white flowers, followed by black fruit. The native species are difficult to determine, but many of them would make quite as interesting trees in cultivation as the hawthorn. Their long, shining thorns and shrubby habit; their masses of pretty flowers; the ofttimes shining foliage, brilliant in autumn; and the masses of brightly colored fruit make the thorns conspicuous among our smaller trees.

Crater. See VOLCANO.

Craterus (?373-321 B.C.), a Macedonian, one of the most trusted generals of Alexander the Great. At the beginning of

Alexander's expedition he commanded the foot guards. In 324 B.C. Alexander commissioned him to lead his veterans back to Macedonia, and to succeed Antipater as regent of Macedonia. Alexander's death causing this arrangement to be altered, Antipater and Craterus jointly governed Greece and Macedonia, with the Illyrian and the Epirot tribes. It was largely by the aid of Craterus that Antipater defeated the Greeks in the Lamian war. On war breaking out between Antipater and Perdiccas (321 B.C.), Craterus engaged the latter's ally, Eumenes, and fell in battle against him in Cappadocia during that year.

Crates, of Athens, a poet of the old Attic comedy, who flourished between 449 B.C. (when his first victory in comedy was won) and 424 B.C., in which year Aristophanes in his *Knights* speaks of him as a writer of the past, distinguished by the delicacy and refinement of his wit. Only fragments of his works survive, which will be found in Meineke's (5 vols. 1839–57) and Kock's (3 vols. 1880–88) editions of the *Poetarum Comicorum Græcorum Fragmenta.*

Crates, of Mallus in Cilicia, Greek grammarian and critic, especially on the poems of Homer. He opened a school at Pergamos, which became celebrated, and visited Rome about 157 B.C., and there held a series of lectures on literature.

Cratinus (519–422 B.C.), an Athenian writer of the old Attic comedy, classed by Horace along with Aristophanes and Eupolis as among its chief representatives. We are told that he did not begin to exhibit his plays until about 453 B.C., when sixty-six years of age; his last play, *The Wine-flask,* was produced in 423, when he was ninety-six. In the previous year Aristophanes had spoke of him as a drivelling old man, so utterly neglected that he could not even procure enough to quench his thirst. The play mentioned, which won the first prize over Aristophanes's *Clouds,* was his reply. Cratinus was remarkable for the violence and directness of his satire on public characters. He was to comedy what Æschylus had been to tragedy. According to all our authorities, he was also notorious for his excessive drinking. Only a few fragments survive, which will be found in Meineke's (5 vols. 1839–57) and Kock's (3 vols. 1880–8) collections of the *Poetarum Comicorum Græcorum Fragmenta.*

Cratippus, a philosopher from Mitylene, of the 1st century B.C., whose lectures at Athens both Brutus, the assassin of Cæsar, and Marcus, the son of Cicero, attended. Cicero, who in *De Divinatione* explains his philosophy, praises his wisdom in *De Officiis* (i. 1), and his conversational powers in *Ad Familiares* (xvi. 21).

Craven, Alfred Wingate (1810–79), American civil engineer, was born in Washington, D. C., and graduated (1829) at Columbia. He was admitted to the bar of New York and practised for a few years, taking up civil engineering in 1835. In 1849 he was appointed commissioner and chief engineer of the Croton water board of New York city on its organization. In connection with this work the large reservoir in Central Park was built, and the construction of the vast reservoir at Boyd's Corners undertaken.

Craven, Mrs. Augustus, *née* Pauline de la Ferronays (1820–91), daughter of the Comte de la Ferronays, was born in Paris. She is best known for her description of her father's life after his retirement from diplomatic service of France; the book, *Récit d'une Sœur* (1866), soon achieved marked success.

Crawfish. See Crayfish.

Crawford, Coe Isaac (1858), American legislator born in Volney, Ia. He was graduated in law at the Univ. of Iowa and admitted to the bar in 1882, practising at Pierre, S. Dak., in 1884–97. He was a member of the territorial legislative council in 1889, the South Dakota Senate in 1890, attorney-general of South Dakota in 1892–6, local attorney for the Chicago and Northwestern R. R. in 1897–1905, governor of the State in 1907–9, and U. S. Senator (Rep.) for the term 1909–1915.

Crawford, Francis Marion (1854–1909), American author, son of Thomas Crawford, born at Bagni di Lucca, Italy, and after four years at Cambridge University, England, studied philosophy and the languages at Heidelberg, Carlsruhe, and Rome. He visited India to study Oriental languages and mysteries, and there edited the *Indian Herald* at Allahabad, 1879–80. Returning to the U. S., he took a course in Sanskrit and Zend at Harvard. Mr. Crawford wrote a novel, *Mr. Isaacs* (1882), which was immediately successful. After 1884 he resided at Sorrento, Italy, continuously, paying occasional visits to the U. S. His works include *Dr. Claudius* (1883), *A Roman Singer* (1884), *Zoroaster* (1885), *Saracinesca* (1887) and sequels, *Greifenstein* (1889), *A Cigarette-Maker's Romance* (1890), *Katherine Lauderdale* (1894), *Casa Braccio* (1895), *A Rose of Yesterday* (1897), *Via Crucis* (1899), *In the Palace of the King* (1900), and *The Heart of Rome* (1903). His *Ave, Roma Immortalis* (1898), is an exposition of the history and archæology of the Eternal City. His play, *Francesca da Rimini,* was produced in Paris by Sarah Bernhardt in 1902. Of Mr. Crawford's novels the *Saracinesca* series is the most individual, showing an intimate understanding of the character of the old Patrician society of Rome.

Crawford, Isabella Valancy (1851–87), Canadian poet, was born in Dublin, Ireland, and was brought to Canada by her parents in 1858. In addition to a hard struggle with poverty, which she was at pains to conceal, she suffered much disappointment through non-recognition of her poetic talent at home. The *Athenæum* and other London papers, however, spoke warmly of the only volume of her verse published during her life, *Old Spookses' Pass, Malcolm's Katie, and Other Poems* (1884). A collective edition of her *Poems,* edited by J. W. Garvin, was published in Toronto in 1905, with an appreciation by her fellow-poet, Miss Ethelwyn Wetherald.

Crawford, Thomas (1814–57), American sculptor, was born in New York, in which city he began his studies, removing to Rome, Italy, in 1834, where he was afterward to reside and where he came under the helpful influence of Thorwaldsen. His first masterpiece was a group representing *Orpheus and Cerberus* (1839), now in the Boston Athenæum. It was succeeded by many notable pieces until 1849, when he was commissioned to execute the equestrian statue of *Washington* at Richmond, Va. Subsequently he was principally occupied with work for the capitol at Washington, including the bronze statue of *Liberty* above the dome, the bas-relief symbolical of the *Progress of American Civilization,* and the bronze doors. Mr. Crawford became blind the year before his death.

Crawford, William (1732–82), American soldier, was born in Berkeley co., Va., and served as a surveyor under Washington. He accompanied Gen. Braddock in the expedition against Fort Duquesne as an ensign in the Virginia riflemen, and after some years of military service established himself in western Pennsylvania. At the opening of the Revolution he led a company of Virginians in Washington's army, performed distinguished services, and was promoted colonel, resigning in 1781. The following year he was persuaded by Washington to take command of an expedition against the Wyandot and Delaware Indians, on the Muskingum R., but his force was surrounded, and he himself was captured and burned to death after several days of torture.

Crawford, William Harris (1772–1834), American political leader, born in Amherst co., Va. He was taken by his parents to S. C. in 1779 and to Ga. in 1783, taught school for several years after 1788, studied law, and in 1798 was admitted to the bar. His chief interest, however, was in politics, and as a political leader he soon won national prominence. He was a member of the Ga. Senate (1803–7), and was a Democratic member of the U. S. Senate from Ga. (1807–13), serving as president *pro tempore* of that body in 1812–13. In 1813–15 he was U.S. minister to France; in 1815–16 he was Secretary of War, and in 1816–25 was Secretary of the Treasury.

In 1824 he was the caucus nominee of the Democrats for the presidency, but the caucus had then lost its influence, and in the ensuing election he ranked third among the four Democratic candidates—Jackson, Adams, Crawford, and Clay, the electoral votes being respectively 99, 84, 41, and 37. No candidate having received a majority of the electoral votes, the election was thrown into the House of Representatives, which was called upon to choose between Jackson, Adams, and Crawford, and Adams was finally elected. From 1827 until his death Crawford was judge of the northern circuit court of Ga. Crawford was a political leader whose reputation was great among his contemporaries, who had a large personal following, and who, during his lifetime, was ranked by many with such leaders as John Quincy Adams, Jackson, Clay, and Calhoun, but who connected his name with no measure of great and lasting importance, and who is now almost forgotten. He was unquestionably a shrewd political manager, but he had an unhappy talent for making enemies among the leaders of his party, who charged him with being a self-seeking intriguer.

Crawford and Balcarres, Earls of. The Scottish Earls of Crawford represent the senior branch of the Lindsay family, originally from England, and supposed to be descended from the Norman house of Limesay. The Balcarres line was descended from Sir David Lindsay, ninth earl of Crawford. See Lord Crawford's *Lives of the Lindsays* (1840) and Jervise's *Land of the Lindsays* (1853).

Crawford, or **White Mountain, Notch,** a rugged pass in the White Mts., N. H., between Mt. Webster (3,286 ft.) on the E. and Mt. Willey (4,260) on the W. It is between 3 and 4 m. in length and 1,890 ft. in alt. at the upper end. The sides are precipitous, and the bottom for some distance is so narrow as to admit only of the carriage road and river bed, 100–350 ft. above which the Me. C. R. R. runs along on the side of Mt. Willey. The source of the Saco R. is just inside the Notch, close to that of the Amonoosuc.

Crawfordsville, city, Ind., co. seat of Montgomery co., 44 m. N.W. of Indianapolis, on Sugar Creek, and on the Cle., Cin., Chi. and St. L. and the Chi., Ind. and Louis. R. Rs. It is the seat of Wabash College (Presbyterian), founded in 1832. Its manufactures include carriages, coffins, lumber, flour, wire fencing, and foundry products. Pop. (1910) 9,371.

Crawford Notch, White Mountains, from Elephant's Head.
(*Copyright*, 1900, *by Detroit Photo. Co.*)

Crawfurd, John (1783–1868), Scottish Orientalist, was born in the island of Islay, Scotland, and educated at Bowmore and Edinburgh. He was an army doctor in N.W. Provinces of India, and held appointments under Lord Minto in Java (1811); governor of Singapore (1823). He published a *History of the Indian Archipelago* (1820), and a valuable *Grammar and Dictionary of the Malay Language* (1852).

Crawshaw, William Henry (1861), American educator, was born at Newburgh, N. Y., and graduated (1887) at Colgate (then Madison) University. The same year he was elected professor of English literature at Colgate, and he became dean of the university in 1897. He published *The Interpretation of Literature* (1896) and *Literary Interpretation of Life* (1900), and edited an edition of Dryden's *Palamon and Arcite* (1898). died July 2 1940

Crayer, Gaspar de (1584–1669), Flemish painter of Scriptural subjects, who was cotemporary with Rubens and influenced by him. He was born at Antwerp. Crayer's work was thoughtful, correct, always dignified, and tender in color. From the age of twenty-two he lived in Brussels, and was appointed painter to the Spanish court. In 1664 he removed to Ghent. His works, very numerous, are mostly at Brussels, Ghent, Antwerp, and the Louvre. See A. J. Wauters's *Flemish School of Painting* (1884).

Crayfish, or Crawfish, a fresh-water crustacean of the family Astacidæ or some closely related group, which is nearly allied to the lobster, and has a similar form. Crayfish inhabit

Crayfish.

rivers and ponds and low, wet grounds, where they dwell in burrows, above the mouth of which is often built by them a turret-like curbing of pellets of mud. They appear mainly at night; some do not burrow, but dwell under stones or hide in weedy streams. They feed mainly on dead matter, but some capture living prey, and occasionally eat plants. The crayfishes of the United States east of the Rocky Mts. are of the genus Cambarus, but those of the Pacific Slope belong to Astacus—the genus of the common European edible crayfish. They are little eaten in America, though good food and to be found in the markets of New York and New Orleans. See Mayer's *Sea-shore Life* (1905), Huxley's *The Crayfish* (1880).

Crayon, a pencil of chalk, colored or otherwise, used for drawing. It is prepared by mixing mineral or metallic pigments (as vermillion, orpiment, ochres, and ferric oxide) with pipe or China clay. A crayon drawing has a delicate softness, with less detail than that of a pencil sketch.

Cream of Tartar, or ACID POTASSIUM TARTRATE, $(CHOH)_2$ CO OH CO OK, is obtained from grape-juice, from which it is deposited in a crude form called argol during fermentation. It is purified by filtration of its solution through animal charcoal and crystallization. Cream of tartar is a white crystalline solid with a pleasant acid taste, and in small doses acts as a refrigerant and diuretic, and in larger as a purgative. It is also used as a constituent of baking-powder, supplying the acid to act on sodium bicarbonate and to set free carbon dioxide to aerate or 'raise' the bread.

Creasy, SIR EDWARD SHEPHERD (1812–78), English historian, was born at Bexley, Kent, and educated at Eton. He was called to the bar (1837), became assistant judge at Westminster sessions court, professor of history (1840) in London University, and chief-justice of Ceylon (1860). As a writer, Creasy, along with others, contributed to *Bentley's Miscellany* the political squibs in verse known as *Tipperary Papers*, and is remembered for his *Fifteen Decisive Battles of the World* (1852; 33d ed. 1893), and his standard *Rise and Progress of the English Constitution* (1853; 15th ed. 1886).

Creatine, $C_4H_9N_3O_2$ is an acetic acid derivative of methyl guanidine that occurs in muscle juices. It can be prepared synthetically, but is usually obtained from extract of meat by removing the albumen and phosphoric acid and evaporating the solution left to crystallization. It is a colorless solid that crystallizes in prisms, has a faint bitter taste, and is easily soluble in water. It acts as a base, forming crystalline salts with acids.

Creation. The early literatures of many peoples contain cosmogonies which, though often crude and grotesque, indicate that the question has been for ages a subject of the deepest interest. As the idea of creation was naturally connected with primitive speculation about the Godhead, the solution of the problem has always been more or less colored by religious or theological presuppositions. Thus creation forms an important section of both Jewish and Christian theology, and until recent times men's thoughts about it lay under the domination of the supposed doctrinal statements in Gen. 1 and 2. But in the light of geological discoveries, and especially of the accumulations of facts that support the theory of evolution, the traditional notion of an immediate creation has given place to the theory of a gradual development. During the latter half of the 19th century many attempts were made to reconcile the facts and theories of science with the creation narrative of Genesis, but such adjustments are being recognized more and more as impossible and unnecessary. This result has been brought about not only by the advance of physical and biological science, but to a certain extent by the literary and historical investigation of the Old Testament, particularly of the so-called books of Moses. First of all it was made clear that Gen. 1–2 contains, not a single self-consistent account of creation, but two descriptions, differing considerably in both language and substance. The first, ch. 1–2:4*a*, coming from the writer (or school of writers) designated P, gives an orderly and comprehensive survey of the process of creation as conceived in the post-exilic age, or the period after the Jewish captivity in Babylon: six days are occupied with the several acts of creation, the seventh being the Sabbath of the divine rest. The second narrative, Gen. 2:4*b*–25, is the work of J, and contains a much more succinct account, probably incomplete. But a further and even more significant stage of critical inquiry was reached when it was discovered that these creation narratives had points of contact with the cosmogonies of other early races, especially with the Babylonian. The Babylonian cosmogony comes to us in a fragmentary form, through Eusebius, from Berosus (*c.* 300 B.C.), and is too disconnected and inconsequent to permit of any instructive comparison with the Hebrew story of creation. But it is much more fully set forth in the original cuneiform texts in the tablet library of Assurbanipal, discovered by the late George Smith about 1875. True, its grotesque and fantastic mythology contrasts sadly enough with the calm and sober Biblical narrative; but the following parallels cannot be ignored:—(1) Both accounts begin with a chaos of darkness and waters, and the Babylonian Tiamat is manifestly identical with the Hebrew Tehom ('the deep,' Gen. 1:2); (2) each records the division of the chaos of waters into two parts by a firmament (1:6, 7); (3) each speaks of light as existing before the sun, moon, and stars (1:4), and makes the latter control the times and seasons (1:14). Then the Eden, the sacred tree, and the cherubs in the appendix to the second narrative all have their analogues in Babylonian mythology. It cannot be exactly determined when or how this Babylonian tradition reached the Israelites, but its influence upon Hebrew speculation is admitted. Interesting parallels to the Biblical story are also found in the Phœnician, Egyptian, Indian, Persian, Greek, and Etruscan cosmogonies, an account of which will be found in Dillmann's *Genesis*, ch. 1 (Stevenson's trans. 1881); cf. Smith's *Chaldæan Genesis* (1880); Tylor, *Primitive Culture*, i. 322 ff. (1891).

As to the value of the story of Gen. 1–2, to admit its inconsistency and its derivative character, and above all its irreconcilable differences from the conclusions of physical science, is not necessarily to impugn the inspiration of Scripture. The worth and the prerogative of the Bible do not lie in its capacity to teach science, but in its moral and spiritual influence. We have no more right to expect that Scripture will anticipate a scientifically accurate discovery of the method of creation than we have to demand that it should have contained a statement of the Copernican system or the Newtonian law of gravitation. Science may yet make undreamed-of discoveries as to the origin and nature of matter; it may even fill up the gaps in the evolutionary process, such as that between the inorganic and the organic; but it is inconceivable that it should ever make any discovery that will disprove the simple and majestic truth, first revealed to the chosen people, that the world was made by the one living and true God. See, besides the articles and literature quoted above, Driver, 'The Cosmogony of Genesis,' *Expositor* (Jan., 1886); Sayce in *Expos. Times* (March, 1896); Gunkel's *Schöpfung und Chaos*, in '*Urzeit und Endzeit*' (1894).

Creationism, Pre-existentianism, and Traducianism, three famous theological theories, regarding the origin of individual human souls. According to pre-existentianism, each soul has been in existence either from all eternity or from the creating of the world, the birth of the individual being viewed as the conjoining of the soul and the body in one person. The theory was held by Origen, and seems to have been adopted from the speculations of Plato and the Pythagoreans (see Transmigration); it has re-emerged occasionally in modern theology—*e.g.*, in Julius Müller's *Doctrine of Sin* (trans. by W. Urwick, 1868). Traducianism supposes that the distinct souls have developed from the soul of Adam by a kind of division of the soul-substance, as, for example, shoots (Lat. *traduces*) from a tree; this theory may be regarded as the psychical parallel of Weismann's hypothesis of the continuity of the germ-plasm. According to creationism, God creates the individual soul on the occasion of the generation of the body. This is the orthodox theory, but it is held by some modern theologians that the whole truth can only be expressed by a combination of all the three. Each human soul is a distinct and responsible entity (creationism), but is at the same time intimately connected with the spirit of the race (traducianism), and derived from the eternal being of God himself (pre-existentianism). See Dorner's *System of Christian Ethics* (1887), ii. p. 93 *ff.*; Hodge's *Theology*, ii. 70–72.

Crébillon, Prosper Jolyot de (1674–1762), French dramatist, born at Dijon. In 1705 he produced his tragedy of *Idomenée*, which gave him a reputation; *Atrée et Thyeste* succeeded (1707), with *Electre* in 1709, and *Rhadamiste et Zénobie* in 1711. It is upon the last-named play that Crébillon's fame chiefly rests. *Xerxès* was produced in 1714, *Sémiramis* in 1717, and *Pyrrhus* in 1726, but none of them reached a high level. Then for twenty-two years he wrote nothing, and it was not until he was more than seventy years of age that Madame de Pompadour resolved to pit him against the ruling monarch in literature, Voltaire. The king granted him a pension of 1,000 francs, and furnished splendid properties for his new tragedy *Catilina*, which was produced in 1748. Crébillon was from 1731 a member of the French Academy, and for a time acted as royal censor. Though inferior to Voltaire as a tragic dramatist, Crébillon frequently rises to dignity and grandeur in his verse. His *Œuvres Complètes* were published in 1875, and a new edition in 1885. See La Harpe's *Cours de la Littérature* (new. ed. 3 vols. 1840); also Dutrait's *Etude sur Crébillon* (1895).

Claude Prosper Jolyot de Crébillon (1707–77), son of the preceding, born at Paris, married (1748) an Englishwoman, Lady Stafford. He also wrote for the stage, and produced a number of novels, which, like *Le Sopha* (1745; Eng. trans. 1781; 18th ed. 1801), *The Wanderings of the Heart and Mind* (1738; Eng. trans. 1851), and *Letters from the Marchioness de M——* (1732; Eng. trans. 1737), though not destitute of merit, were more remarkable for their licentiousness and morbidity.

Creche (Fr. 'cradle'), a public nursery, where children of the poorer classes are cared for while their mothers are at work or ill.

Crécy-en-Ponthieu, or Cressy, vil., dep. Somme, France, 14 m. N. of Abbeville, the scene of Edward III.'s victory over Philip VI. of France (Aug. 26, 1346). The English army numbered 36,800; the French, about 130,000. The English loss was trifling, but that of the French has been estimated at about 30,000, including many of the nobility, blind King John of Bohemia, James, king of Majorca, and Ralph, duke of Lorraine. In this battle Edward the Black Prince 'won his spurs.' He afterwards adopted as his crest the three ostrich plumes and motto, *Ich Dien*, of the Bohemian king.

Credence. The credence table of a church is the side-table placed within the chancel rails, at the side of the altar, for the reception of the elements and also of the vessels which are used at a celebration of the holy communion. The rubric of the Communion Office in the Book of Common Prayer enjoins that 'the Priest shall then' (after the reception of the alms and their presentation upon the holy table) 'place upon the Table so much Bread and Wine as he shall think sufficient.' Until then the elements rest upon the credence table. The term was also employed formerly in social life to signify a side table on which dishes were placed and tasted (as a precaution against poison) before being served at the principal table. This was introduced into Italy, France, and Germany after the 15th century.

Credi, Lorenzo di, properly Sciarpelloni (1459–1537?), Italian painter of the Tuscan school, born at Florence, a pupil of Andrea Verrocchio, and much influenced by his fellow-pupil Leonardo da Vinci. Extremely persevering, his constant aim was to master the difficulties of perspective. He had not the highest gifts, and his male figures are sometimes spoilt by a nervous, unnatural air; but he showed a delicate feeling for beauty, though occasionally falling into a Peruginesque sentimentalism. His most notable characteristics are elaborate finish and a predilection for painting children. Among his chief works are *Madonna with Saints* (Pistoja cathedral), *Baptism of Christ* (S. Domenico, Fiesole), a *Madonna* (Louvre), a *Birth of Christ* (Florence Academy), two *Virgins* (in the National Gallery, London), and a *Holy Family* (at Edinburgh). See E. J. Poynter's *Classic and Italian Painting* (1880).

Credit implies the transfer of the wealth of one individual to another for a period, after which it is returned to the original owner; and thus involves two distinct notions—confidence and time, the latter of which is in modern business the more important. An unlimited expansion of credit is impossible, because confidence or trust, sooner or later, requires some visible evidence that the trust or confidence is rational and justifiable. But credit is not capital. It is an agency for increasing the efficiency of capital by placing it in the hands of those who know how to use it. An individual producer no doubt includes his credit as part of his production capital; but, from a social point of view, credit acts only to make capital more efficient, though the efficiency of capital is for all practical purposes as important as its amount, and a well-organized credit system, particularly a banking system, is a national asset of great importance. Credit is organized chiefly in banks with their credit instruments of checks, bank notes, discounts, etc., and becomes a powerful agent in the determination of prices. See H. D. MacLeod's *Theory of Credit* (1889; new ed. 1894); C. A. Conant's *Principles of Money and Banking* (1905).

Credit, Letter of, is a letter addressed to a banker containing a request to make advances and payments to a third person on account of the writer of the letter. It may be addressed, not to one, but to a number of bankers; and in that case each payment, as it is made, has to be endorsed on the back of the letter by the firm or person making payment, so as to indicate how much of the credit has been used. In this case it is called a circular letter of credit or a circular note. These circular notes have proved of great advantage to travellers, being a safer means of carrying money than either notes or gold.

Crédit Foncier of France was founded in 1852 by the economist

Wolowski, under governmental patronage, as a kind of mortgage bank, to enable landowners to raise money at a low rate of interest, capital and interest being repayable in the form of a terminable annuity. Its original capital was 25,000,000 francs. This was subsequently increased, until it is now 170,500,000 francs, divided into 341,000 shares of 500 francs each. At first it made advances only on houses and real estate, but in 1860 it was authorized to make advances to towns and local authorities for the construction of improvements. At its foundation it was granted a monopoly for twenty-five years, and by absorbing a rival foundation in 1882 has since maintained a virtual monopoly; but the government appoints the governor and two deputy-governors. It lends only on first mortgage to the amount of 50 per cent. of the value of the property and the interest charged is four and a half per cent. when repayment of capital is not demanded. Several other countries have created institutions of a similar character, modifications being of course introduced to adapt them to local requirements—*e.g.* Austria (1861), Sweden (1861), Spain (1862), and Egypt (1880). In Italy there are eight such societies, each exercising a monopoly in a certain number of provinces.

Crédit Mobilier, founded in 1852 to correspond with the Crédit Foncier and make advances on movable property, as the Crédit Foncier did on immovable property. During its early years it paid high dividends (40 per cent. in 1855); but a proposal to issue a large amount of bonds, which it was entitled to do by its charter, so alarmed the public that the government, in 1856, forbade the issue, and the credit of the institution received so severe a shock that it has never recovered its early prosperity, though it still continues operations. A similar company, formed in London in 1864 became fused with the Crédit Foncier of London, and two years later was completely merged in it.

Crédit Mobilier of America, a corporation chartered (originally as the Pennsylvania Fiscal Agency) by the state of Penn. (1859), and subsequently reorganized (1867) by Oakes Ames and others for the purpose of aiding in the construction of the Union Pacific Railroad, the stockholders in the railroad company and the Crédit Mobilier being in large part identical, and Oakes Ames being at the head of both. The construction company raised necessary funds, carried out its contract to build 637 m. of the road, and made a large profit. In 1868 Oakes Ames, then a member of Congress, sold to certain of his fellow-congressmen Crédit Mobilier stock at a price, it was alleged, much below its true value. In some cases the purchasers made no actual cash payments, but received dividends on their nominal investment. These facts, becoming known (1872), gave rise to what is probably the greatest scandal in American political history, the charge being made that Ames, expecting the affairs of the Union Pacific to come before Congress, had virtually bribed Congressmen with a view to securing favorable legislation. Among the Congressmen accused of corruption were James G. Blaine, James A. Garfield, and James Brooks. A committee of investigation appointed by the House of Representatives recommended the expulsion of Ames and Brooks; and, though the recommendation was not adopted as given, the House formally censured these two members. The affair caused great excitement throughout the country, but it is now probably generally believed that there was in reality no bribery or corruption, and that, moreover, the Union Pacific had then no favors to ask of Congress. Consult Crawford, *The Crédit Mobilier of America* (1880), and Hazard, *The Crédit Mobilier of America* (1881).

Creech, Thomas (1659–1700), English translator, was born at Blandford, Dorsetshire; elected fellow of All Souls, Oxford (1683). Creech's classical learning was shown in his translations of Horace, Ovid, Theocritus, but most of all in his verse translation of Lucretius, which is inferior only to Dryden's *Virgil* and Pope's *Homer.*

Creech, William (1745–1815), Edinburgh publisher and lord provost, made his shop and breakfast-room the resort of the celebrities of the day. Creech is remembered chiefly as the publisher of the works of Cullen, Gregory, Henry Mackenzie, and especially of the second edition of the poems of Robert Burns, who latterly lost much of the esteem he expressed for Creech, as a social companion, in his poem *Willie's Awa'*, on account of Creech's avarice and delay in settling accounts. See Memoir prefixed to Creech's *Fugitive Pieces* (1791), a series of essays and character sketches.

Creede, city, Colo., co. seat of Mineral co., in the S.W. part of the state, on the Den. and R. Gr. R. R. Its mines are of diminishing importance, but in 1892 $4,000,000 of silver was produced here. Pop. (1910) 741.

Creedmoor, vil., borough of Queens (Long I.), N. Y. city, 12 m. E. of the City Hall. It has an extensive rifle-range.

Creeds. Creeds do not in essence differ from confessions. Both are authorized formulas of a church; but whereas confessions are not generally used liturgically, creeds are. Being earlier in time creeds are also shorter, many of the questions dealt with in confessions not having been raised. Another consequence of their date is that the history of their origin is more obscure. Of two out of the three Christian documents called creeds, we cannot tell with any exactness how they were formulated into being.

The *Apostles' Creed* seems to have gained its present shape by a process of accretion. Acts 8:37 and Matt. 28:19 show that a short confession was used in baptism in early times. As the arrangements for catechizing candidates for baptism were gradually organized, the creed would naturally expand. When Marcion was baptized (before 150 A.D.), a statement regarding the 'holy church' was in the formula. Some find traces of further growth in Justin Martyr, Irenæus, etc. The early form of the Apostles' Creed used to be regarded as distinctively Western; some now suppose that a common nucleus existed both in West and East. The expressions, 'He descended to hell' and 'the communion of saints,' absent from the early form, are found in Gallican confessions of the 5th century. The phrase, 'Maker of heaven and earth,' occurs in a Dacian creed (*c.*400). The present form is found first (*c.* 500) in a mixed collection of Gallican and Roman authorship; afterward, in a treatise of Firminius (eighth century), a Benedictine monk who labored in France and Germany. All this seems to favor the idea of free interchange and borrowing between churches.

The *Nicene Creed,* in its first form, was drawn up at the Council of Nicæa (325). It sprung from controversies, in which Arius and Athanasius took a leading part, regarding the person of Christ. Besides the two directly hostile camps, there was a middle body, larger than either, led by Eusebius of Cæsarea. In the council, the point round which discussion chiefly turned was whether Christ was of the same essence with the Father (homoousios), or only of like essence (homoi-ousios). Constantine favored the Homo-ousians, who prevailed, and passed anathemas upon the opposite opinion and its teachers. Additions and abridgments were afterward made, the history of which is obscure. The additions relate to the person of the Spirit, and are sometimes ascribed to the Council of Constantinople (381). The Western churches in the sixth century added a phrase (*filioque*) to denote that the spirit proceeds not from the Father only, but also from the Son. This led to the secession in the East, from which the Greek Church was formed. The creed in the liturgies differs somewhat from that of the councils.

The *Athanasian Creed* is not the work of Athanasius. It was formerly attributed to the end of the eighth century, but is now assigned, on the strength of quotations in commentaries, of councils, and of other references to the fifth century. Consult Green, *The Christian Creed and the Creeds of Christendom.*

Creek, etymologically cognate with *crook,* denotes any deflection from the straight line, and specifically, in physical geography, an inlet of any large sheet of water. In North America and Australia small rivers are frequently called creeks.

Creeks. See Muskhogeans.

Creeper. See Climbing Plants.

Creepers (Certhiidæ), a family of passerine birds, who spend most of their lives creeping up and around the trunks of trees and over rocks. The bill is long and decurved; the plumage usually a soft inconspicuous brown; the tail short and square, in some species; long and pointed, with stiff feathers, in others. The familiar brown creeper (*Certhia familiaris americana*) of the United States and Canada, is a small brown-streaked bird which obtains its food from the bark of trees, about which it scrambles like a woodpecker. It nests in holes in trees, laying five to eight pink-spotted eggs.

Crees, North American Indians of Algonquin stock and speech, numbering altogether about 15,000. They live chiefly in Manitoba and in Northwest Territory. They are closely related to the Chippewa in language and customs and are expert in the use of the canoe.

Crefeld. See Krefeld.

Creighton, krā'tun, Mandell (1843–1901), English clergyman and historian, was born in Carlisle. He was educated at Oxford, became a priest in 1873, and in 1884 was appointed Dixie professor of ecclesiastical history at Cambridge. He founded (1886) the *English Historical Review,* which he edited for five years. In 1891 he became bishop of Peterborough and in 1877 was transferred to the see of London. He visited the United States in 1886, where he represented Emmanuel College, Cambridge, at the two hundred-fiftieth anniversary celebration of Harvard University. His writings include *Simon de Montfort* (1876); *Age of Elizabeth* (1876); *Cardinal Wolsey* (1888); *History of the Papacy* (6 vols. 1882–1894); *Queen Elizabeth* (1896); *Thoughts on Education* (1902).

Creighton University, a Roman Catholic institution of learning at Omaha, Neb., chartered in 1878 and named for its founder. It consists of Creighton College of Arts and Sciences, the colleges of Commerce and Pharmacy, the schools of Medicine, Dentistry, Law, Nursing, and Journalism, and the Graduate School. It is governed by a board of five trustees of the Society of Jesus.

Crelinger, krā'ling-er, Auguste (1795–1865), German actress, was born in Berlin. She made her début in 1812, and became one of the leading tragediennes of the day.

Cremation, the process of disposing of the bodies of the dead by reducing them to ashes. This method has probably prevailed as long as the more common method of burial in the earth and in early times was far more generally employed than was simple interment. It seems to have been the usual method among the prehistoric Indo-European races, for the graves of north Europe contain, instead of skeletons, only receptacles for ashes. Many of the American Indian tribes burned their dead. Cremation was the general practice of the civilized world previous to the time of Christ. Egypt, China, and Judæa were exceptions to this rule, and, in the case of each, the belief in the resurrection of the body was undoubtedly the cause of their resorting to embalming and burial instead of burning. In Greece only suicides, people struck by lightning and infants were denied the right of cremation. In Rome the practice persisted through four centuries of the empire. In the United States, as in England and among the Gallic and Germanic nations, with the spread of Christianity, it was slowly supplanted by the Christian rite of burial. It is said that Charlemagne, in order to stamp out cremation, punished the act with death. It is still practised in India and among some other Oriental nations.

Cremation in Modern Times.—In Great Britain cremation was discussed as early as 1658, when Sir Thomas Browne published his quaint treatise, entitled *Hydriotaphia or Urn Burial.* Effective agitation, however, was not begun until 1874, when Sir Henry Thompson, the father of the movement in England, put forward in the *Contemporary Review* for January a strong argument for cremation, on the ground that it was a necessary sanitary precaution against the propagation of disease. The outcome of this article was the formation of the Cremation Society of England, which promptly erected a furnace at Woking. But, on account of legal obstacles, no cremation was carried out until 1885. Since that date the annual number of cremations at Woking has regularly increased.

In Italy as early as 1852 the subject was discussed in the national scientific congresses, and it was through its efforts that cremation was authorized in the National Sanitary Code. The process has rapidly grown in popular favor, and there are now crematories in most of the larger cities. In Germany the first cremation was performed in 1874, but for many years thereafter the only place where it was legal was in the Duchy of Gotha. In France a law legalizing the practice was passed in 1887, and soon after a crematory was built in Paris for the disposal of unclaimed dead. Others have since been erected.

Cremation is also gaining ground in other European countries and there are now some 226 crematories on the Continent.

In the United States the first crematory was built at Washington, Pa., in 1876, and here, during the next seven years, 25 cremations were performed. In 1881 another and much more pretentious crematory was built in what is now a part of New York City. The movement grew steadily and there are now more than 100 crematories in operation in various cities. The years of the twentieth century saw a rapid growth in favor of cremation. The greatest number are found on the Pacific coast.

Modern cremation is an altogether different process from that which existed among the ancients and still persists in India and parts of Japan. The slow-burning pile of wood in the open air has been superseded by the rapidly acting furnace of high temperature. The casket, from which the metal handles and name plate have been removed, is lowered into the retort, which is of fireclay and asbestos to endure intense heat. Crude oil is forced into the retort through air and oil atomizers and a fine spray is produced which attains an intense heat. There is no flame, no smoke, no odor; only from 4 to 6 pounds of white mineral residue of the body remains. The time required for incineration is from 50 to 80 minutes. The residue is then placed in a metal receptacle, sealed and labelled and given to friends for disposition. A chapel is connected with most crematories, where service may be held if desired.

Advocates of cremation contend that it is a sanitary and an economic measure which the increasing size of great centers of population makes necessary. To find sufficient land for burial purposes is an increasingly difficult problem and the proximity of crowded graveyards offers a peril to life and health. In cases of epidemics, when death is due to such contagious diseases as diphtheria, typhoid fever and others, it is urged that cremation is almost a sanitary necessity.

Objections to cremation on the other hand are largely of a sentimental nature, as not hallowed by custom, and as contrary to religious teaching in the minds of some. In the case of violent death it is urged that cremation, by obliterating all traces of the body, may also remove all traces of possible crime.

Consult Freeman, *Crematoria in Great Britain and Abroad;* Dowd, *Funeral Management and Costs* (1921); Fidler, *Cremation* (1930); Wilson and Levy, *Burial Reform and Funeral Costs* (1938).

Crême de Menthe. See Menthe.

Cremer, krā'mer, Hermann (1834–1903), German Protestant theologian, was born in Unna, Westphalia. He was educated at Halle and Tübingen and became pastor near Soest in 1859. From 1870 until his death he was professor of theology at Greifswald. Among his many works are *Biblisch-Theologisches Wörterbuch der neu-testamentlichen Gräzität* (1866; 9th ed. 1902); *Ueber den Zustand nach dem Tode* (6th ed. 1900); and *Das Wesen des Christenthums* (2d ed. 1902).

Cremer, Jakobus Jan (1827–80), Dutch novelist, was born in Arnheim, Gelderland. The scenes of his earlier novels are laid in the adjoining region of the 'Betuwe,' whose rustic life he portrayed in local dialect. Among his chief novels are *Anna Rooze* (1867; Eng. trans. as *An Everyday Heroine,* 1873), *Dokter Helmond* (1870), and *Hanna de Freule* (1873). He also wrote dramatic pieces, such as *Boer en Edelman* (1864) and *Emma Bertholt* (1865). A collection of his novels appeared as *Romantische Werken* (12 vols., 1887–8).

Cremer, William Randal (1838–1908), British advocate of international peace, was born in Fareham. After being prominent in Labor circles and trade unions he entered the House of Commons as a Liberal in 1885 and was returned in 1886, 1892, 1900, and 1906. In 1887 he founded the Inter-Parliamentary Conferences to further the cause of peace and was editor of the *Arbitrator,* a publication devoted to the same cause. In 1903 he was awarded the Nobel peace prize which he used as an endowment for the International Arbitration League.

Crémieux, krā'myē', Isaac Moïse, commonly called Adolphe (1796–1880), French lawyer and statesman, was born in Nîmes of Jewish family. He studied law and as an advocate became widely known through his defense of *Le National, La Tribune,* and other journals, in connection with the Orient question (1840). He also eloquently defended his Hebraic co-religionists, and was one of the founders (1860) of the Alliance Israélite Universelle, of which he was president from 1863 to 1866, and from 1868 to 1880. Entering the Chamber of Deputies (1842), he warmly advocated free trade and political reforms, and opposed the game laws. Nominated minister of justice on the formation of the provisional government (1848), after the *coup d'état* of Napoleon III (1851), he was arrested and imprisoned at Mazas. In 1869 he came forward to defend the right of public meeting. In the government of National Defense, formed in September, 1870, he again became minister of justice, was subsequently one of the ministers composing the government delegations of Tours and Bordeaux, and in 1870 issued the decree which conferred French citizenship upon the Jews of Algeria. Resigning office (1871), he was elected senator for life of the National Assembly (1875).

Crémieux Decree, a decree, conferring French citizenship upon the Jews of Algeria, was issued in 1870 by Adolphe Crémieux (q. v.), minister of justice in the French Government. In the midst of the Second World War and after the fall of France (1940), the decree was revoked (March, 1943) by Gen. Henri Honoré Giraud, then head of the French provisional government in Algeria. The revocation raised a storm of protest in Jewish circles throughout the democratic world. The reasons for the revocation were not entirely clear but it was supposed to have been motivated by the military situation at the time which seemed to require the placating of the Moslem population (8,000,000) of Algeria. The Jewish population was 144,000. After several months, however, it was recognized that the Giraud action was a mistake, and the decree was restored by the French Committee of Liberation on Oct. 21, 1943.

Cremona, province, Italy, belonging to Lombardy; stretching northwest from the River Po, between the Adda and the Oglio; area, 685 square miles. It is a well drained, well cultivated region, producing wheat, rice, maize, flax, and wine. Pop. (1936) 369,483.

Cremona, town and episcopal see, Italy, capital of Cremona province, on the left bank of the Po; 52 miles S.E. of Milan. It is still surrounded by its mediæval walls, and is irregularly built. Its chief ornament is the cathedral (1107–90), with frescoes by Pordenone and other artists. Close beside it stands the detached spire of the Torrazzo (1283–8), 397 feet high, and the baptistery (rebuilt in 1167). There are several other interesting churches, as St. Sigismund (1463), St. Peter (1549), Sant' Agostino (1309), and St. Margaret (16th century), all adorned with paintings by artists of the Cremona school (16th century). There are also several old palaces, some of them restored in the 19th century. The chief industries are the manufacture of silk, cotton, cloth, stringed instruments, and sweetmeats. It was formerly famous for its violins, the chief makers of the Cremona school being the Amati, Guarneri, and Stradivarius. The town was founded by the Romans in 219 B.C., to command Cisalpine Gaul, but was razed to the ground by the troops of Vespasian in 70 A.D., and again by the Goths in 540. Pop. (1936) 64,019.

Cremona, Luigi (1830–1903), Italian mathematician, was born in Pavia. Appointed professor of higher mathematics in the University of Bologna (1860), six years later he obtained a similar appointment in the college of Milan. In 1873 he was called to the chair of higher mathematics in the University of Rome, and in 1878 he was further appointed rector of the school of engineers. In 1897 he was vice-president of the senate, and in 1898 minister of education. It is to him that mathematical education in Italy owes its complete reorganization. His more important works are *Le figure reciproche nella statica graphica* (3d ed. 1879); *Elementi di geometria proiettiva* (1873)—both tranlated into English and published by the Clarendon Press; *Introduzione ad una teoria geometrica sulle curve pinae* (1862).

Cre'ole, a name given to people born and naturalized in the West Indies or the tropical countries of America but of European (usually Spanish or French) origin, as distinguished from the offspring of mixed blood, as mulattoes and quadroons, from Negroes and from aborigines. The name has no connotation of color, but is sometimes incorrectly used for people, even Negroes, born in the West Indies whose descent is not entirely European.

Creole Case, an incident occurring in American history which was the occasion of a diplomatic difficulty between the United States and Great Britain and of a vigorous debate in the United States Congress between the pro-slavery and the anti-slavery members. The brig *Creole,* engaged in the coastwise slave trade (sanctioned by an Act of Congress of March 2, 1807), started Oct. 27, 1841, from Hampton Roads, Va., to New Orleans, La., with a cargo of about 130 slaves. On Nov. 7, 1841, seventeen of the slaves mutinied and, killing one of the owners of the vessel, carried the *Creole* into the British port Nassau. The British authorities immediately freed all of the slaves except those immediately concerned in the mutiny, who were held on a charge of murder, and the British government refused to accede to the demand of the United States that all the slaves be surrendered, the contention of the United States (made through Secretary of State Webster) being that according to international law property on vessels carried by unlawful force or by stress of weather into a foreign port was exempt from interference, while Great Britain contended that slavery was unrecognized by British law, and that 'air makes free'—*i.e.,* that slaves coming within British jurisdiction immediately and *ipso facto* became freemen. The case was the subject of an exciting debate in Congress, and on March 21, 1842, Joshua R. Giddings introduced in the House of Representatives a series of resolutions which were intended to combat the position assumed by Webster in his correspondence with the British government. He asserted that slavery was a State and not in any sense a national institution, that slavery can exist only by positive municipal law, that it cannot exist outside the jurisdiction of such law, that 'when a ship belonging to the citizens of any State of this Union leaves the waters and territory of such State and enters upon the high seas, the persons on board cease to be subject to the slave laws of such State, and therefore are governed in their relations to each other by, and are amenable to, the laws of the United States,' that the slaves on the *Creole* 'violated no law of the United States, incurred no legal responsibility, and are justly liable to no punishment,' that all attempts to regain possession of these slaves or to re-enslave them 'are unauthorized by the Constitution or laws of the United States, and are incompatible with our national honor,' and that 'all attempts to exert our national influence in favor of the coastwise slave trade, or to place this nation in an attitude of maintaining a "commerce in human beings" are subversive of the rights and injurious to the feelings of the free States, are unauthorized by the Constitution, and prejudicial to our national character.' The resolutions were not adopted, and the House on March 22 formally censured Giddings for presenting them. Giddings immediately resigned, but on April 26 was re-elected by his constituents by a large majority.

Creole State, a popular name for LOUISIANA (q. v.).

Creon, crē'on, in Greek legend, brother of Jocasta, mother of Œdipus. He governed Thebes until Œdipus was called to the throne; and later, after Eteocles and Polynices, sons of Œdipus, had fallen, he ruled the city again, and executed Antigone for burying Polynices contrary to his orders.

Cre'osote, the name applied to wood-tar and coal-tar distillations extensively used in medicine and in the industrial arts.

Wood-tar creosote is derived from the distillation of beechwood. It is an oily, colorless, transparent liquid composed of a mixture of phenoloid compounds and has a penetrating odor resembling that of wood smoke. It is powerfully antiseptic and preserves animal substances as effectively as carbolic acid and is less caustic and nonpoisonous. Medicinally it is used externally in skin affections; internally to arrest vomiting; and internally, hypodermically, and by inhalation in bronchitis and pulmonary tuberculosis.

Coal-tar creosote is a mixture consisting principally of hydrocarbons and naphthaline distilled from coal-tar. It is of greater commercial value than wood-tar creosote and finds its largest application in the treatment of wood, especially railway sleepers, piles, and telegraph poles. It is also employed as a fuel, particularly for Diesel engines, which use is being rapidly extended; in the preparation of disinfectants and sheepdips; and in generating artificial light in specially designed lamps.

Crepus'cular Rays, rays not unfrequently seen when the sun is near the western horizon and detached clouds are gathered around the solar disc. On such occasions the floating dust and aqueous vapors assume the form of beams emanating from the center, known as crepuscular rays, or diverging beams.

Crescendo, krē-sen'dō, a musical term denoting a gradual increasing from piano to forte and fortissimo. It is marked thus ∧, or with the abbreviation *cres.* The converse is *decrescendo.*

Crescent, the increasing or new moon, which shows a curving rim of light, terminating in points or horns. The crescent is the symbol of the Ottoman Turks and the word is applied to the Turkish standard, on which a crescent is depicted; and, figuratively, to the Turkish power, or the empire of the Crescent.

In heraldry the crescent is an honorable ordinary, often used as a mark of distinction for the second sons of families, or those descended from them.

The name has also been adopted for three orders of knighthood: one founded by Charles I of Naples in 1268, but of very short duration; a second by René of Anjou in 1448, which lasted only until 1480; and a third by the Sultan Selim III in 1799, the first recipient being Lord Nelson in 1801. This last order was abolished in 1831.

Crescent City, New Orleans (q. v.).

Crescentia. See CALABASH.

Crescimbeni, krā-shēm-bā'nē, GIOVANNI MARIO (1663–1728), Italian literary historian, was born at Macerata, and went (1680) to Rome, where he devoted himself to the Italian poets. In 1690, together with Gravina and others, he founded the Academy of the Arcadia, of which he was long the custodian. Pope Clement XI appointed him to the canonry of Santa Maria in Cosmedin, which he held till his death. His principal work is the *Istoria e Commentari della volgar Poesia* (1698).

Cresco, city, Iowa, county seat of Howard county, on the Chicago, Milwaukee, St. Paul and Pacific Railroad; 120 miles N.W. of Dubuque. Sheet metal products and electrical supplies are manufactured. Live stock and agricultural produce are shipped. Pop. (1930) 3,069; (1940) 3,530.

Cresol, krē'sōl, any of the three isomeric methyl phenols, $C_6H_4(OH)(CH_3)$, obtained in the distillation of wood or coal. They are oily liquids, resembling carbolic acid, and are used as antiseptics, and in the preparation of some coloring matters.

Crespi, kres'pē, DANIELE (1590–1630), Italian painter, of Milan. An able artist, he also possessed an accurate observation, a facile hand, and excellent judgment. His coloring in oil and fresco is beautiful, occasionally recalling Titian. His most remarkable works are *Pictures of the Life of St. Bruno* (Certosa Milan), and the *Descent from the Cross* (Chiesa della Passione, Milan). His father, Giovanni Battista, called Cerano (1557–1633), has a fine symmetrical picture, *Madonna del Rosario,* in the Brera Gallery, Milan.

Cress, a name given to several species of the Cruciferæ, the leaves of which have a pungent taste and are used as salads and condiments, and for garnishing. The Common or Garden Cress (*Lepidium sativum*) is easily grown. The seed sprouts rapidly, and often the plant shows above ground the third day after planting. It thrives in any good soil, either out of doors or under glass, but its liability to attack by flea-beetles, makes it unpopular in the average home garden. Watercress (*Nasturtium officinale*) is the most favored species for use as salad. It is a hardy perennial growing in running streams and shallow pools, the best variety being obtained where the water is clear and free from mud. Other varieties of cress are the Upland Cress (*Barbarea præcox*), a hardy biennial cultivated in Europe and North America; the common Winter Cress (*Barbarea vulgaris*), rather bitter as well as pungent; and the Cuckooflower (*Cardamine pratensis*), known also as Bitter Cress, and as Lady's Smock. See CARDAMINE.

Cresset. See BEACON.

Cresson, borough, Pennsylvania, Cambria county, on the Pennsylvania Railroad; 17 miles from Altoona. It is situated at an elevation of over 2,000 feet and is noted for its picturesque scenery. Mining and agriculture are important industries. Pop. (1930) 2,317; (1940) 2,500.

Cressy. See CRÉCY-EN-PONTHIEU.

Crest, the heraldic figure surmounting the helmet. Although crests were used to adorn helmets, and probably even as personal cognizances, in pre-heraldic ages, just as plumes are still used to distinguish regiments, it is on their heraldic significance that they are now generally regarded. By a popular misconception the crest is often supposed to be the most important item in an armorial achievement. This is not so; the coat of arms is complete without it, and in many cases it is absent altogether. Its adoption and its form, even since heraldry became systematized and hereditary, have been more subject to the caprices of the wearer than the bearings of the shield, which can be modified only with the sanction of the heraldic authorities. The crest, when actually worn, occupied the summit of the helmet, to which it was supposed to be bound by the wreath. It was made of leather or other light material, gilt or painted. One of the devices on the shield is frequently used as a crest, but not necessarily so, and its forms are infinitely various. Since arms ceased to be personally worn, and heraldry became practically pictorial, many very incongruous devices, which could not have been attached securely to a helmet, have been adopted as crests. Whatever their form, they should always be set on a wreath or a crest coronet, even when represented without the helmet. See HERALDRY.

Crest.

Crest, in Gothic architecture, a floriated ornament finishing the gable or roof of a building, prevalent during the thirteenth and following centuries. It consisted of a low screen of stone of beautiful workmanship, usually foliage, conventionally treated. Tiles were used for this purpose, also, and later metal, brass, gilded iron, and bronze.

Crest'line, village, Ohio, Crawford county, on the Cleveland, Cincinnati, Chicago, and St. Louis, and the Pennsylvania railroads; 63 miles N.E. of Columbus. It has car and engine works and manufactures farm implements and stoves. Pop. (1930) 4,425; (1940) 4,337.

Creston, city, Iowa, county seat of Union county, on the Chicago, Burlington and Quincy Railroad; 74 miles S.W. of Des Moines. It has railroad car works and machine shops, and is a shipping point for live stock. Pop. (1930) 8,615; (1940) 8,033.

Cres'wick, THOMAS (1811–69), English landscape painter, was born in Sheffield. In 1828 he went to London, and exhibited at the British Institution and at the Royal Academy, being elected A.R.A. (1842) and R.A. (1851). He etched plates for Gray's *Elegy,* Milton's *L'Allegro,* and Goldsmith's *Deserted Village.* His painting of atmosphere and his knowledge of color-effects sometimes recall Turner.

Cretaceous System, krē-tā'shus, a geological system so called from the white chalk, which is its best known and most characteristic rock in its European development. The Cretaceous in North America covers an immense area. The time includes (1) a period of warping of the continental surface with heavy sedimentation, especially in Texas and Mexico; (2) an interval of erosion; (3) a period of widespread submergence of the land and encroachment of the sea from all sides, especially from the Gulf of Mexico, which in this period extended the full length of the continent to the Arctic Ocean. This was one of the most profound geographic revolutions that the continent of North America has undergone.

The sediments belonging to the first period of submergence are usually known as Lower Cretaceous, and those above the unconformity belonging to the later submergence are known as Upper Cretaceous. Some geologists consider these two divisions of sufficient importance and individuality to rank as independent systems. In this case the earlier is known as the *Comanchean,* and the later, the *Cretaceous.* The classification varies much for different regions, but the following gives the typical formations.

Upper Cretaceous.

(Western interior region.)
4 Laramie.
3 Montana Series.
Fox Hills.
Fort Pierre.
2 Colorado Series.
Niobrara.
Benton.
1 Dakota.

Lower Cretaceous.

(Western Gulf region.)
3 Washita.
2 Fredericksburg.
1 Trinity.

They are shales, sandstones, limestones, and marls, with many coal beds, especially in the Laramie formation.

In Mexico the Lower Cretaceous, or Comanchean, is estimated to reach the extraordinary thickness of 20,000 feet. The Upper Cretaceous in the Western interior region reaches 1,300 feet as the known maximum at any one locality.

In the north of England, in France, Denmark, Sweden, Germany, Poland, and Russia, the Cretaceous system is spread over immense areas, and indicates the existence of an ocean which was deepest towards the west, and shallowed gradually as it was traced eastward. In East Germany the lower Cretaceous consists very largely of arenaceous rocks (the Quader-Sandstein), and in the Austrian Alps nearly the whole series is represented by a thick mass of almost unfossiliferous sandstones (the Flysch).

A quite distinct facies of the Cretaceous is that developed in South Europe—in Spain, Southern France—North Africa, the Caucasus, and the Himalayas. Here massive limestones, consisting mostly of lamellibranch shells—the hippuritid limestones—are the principal members of the formation. They are the deposits of a great Cretaceous Mediterranean, broader than the present, which extended eastward into North India, and was apparently in open communication with the Atlantic.

In South Africa, India, Australia, Japan, and South America, Cretaceous rocks are known.

The fauna and flora of Cretaceous times were rich and varied. Of the larger vertebrates, the most important were the reptiles, of which there were many groups now no longer in existence. Huge land reptiles (dinosaurs), sea snakes (mosasaurs), winged reptiles (pterodactyls), and many other types, inhabited the land or sea. Remains of toothed birds (Hesperornis, Ichthyornis) are also known, but the mammals, now the dominant race, were small and unimportant. Fishes are numerous, and in this epoch the bony fishes of the present day (Teleostei) first became abundant. Of the invertebrates, perhaps the most characteristic were the hippuritids and the coiled ammonitis, which towards the close of the period developed many exceptional forms. Belemnites, echinoderms, corals, crinoids, many kinds of mollusks, foraminifera, radiolaria, and sponges are all known in rich variety of species from Cretaceous rocks.

Many of the existing genera of trees are already represented in the Laramie in America; and the flora as a whole has quite a modern aspect, while the animals are of characteristic Mesozoic forms.

Over much of Europe and America the Cretaceous has been little disturbed, but in the Alps, the Himalayas, the Caucasus, and the Andes it has been raised to thousands of feet above the sea-level. The close of the Cretaceous was one of the most extensive mountain-making periods in geologic history. As a rule, its economic importance is not great; but in America and England Cretaceous rocks furnish chalk, flint, clay, cement, coprolites, fertilizer marl, lignite, bituminous coal, and asphaltum.

Nearly all of the coal west of the Mississippi valley is of Upper Cretaceous age. It is estimated that there are more than 100,000 square miles of coal-bearing lands lying along the base of the Rocky Mountains belonging to this system.

Consult *Reports* of the State and National geological surveys.

Crete (Ital. *Candia,* from Ar. *Khandah;* Turk. *Kirid Adasi*), is the principal island of the chain which divides the Greek Archipelago from the eastern basin of the Mediterranean Sea. It lies between lat. 34° 55′ and 35° 42′ N. and has an area of about 3,235 square miles. Its greatest length is 160 miles and its breadth varies from 30 to 7 miles.

The surface consists of a series of four main mountain masses from west to east as follows: (1) The White Mountains (highest peak 8,145 feet); (2) Psiloritis (anc. *Ida;* single peak 8,190 feet); (3) Lasithi (anc. *Dikta;* peak of 7,065 feet); (4) the mountains of Sitia (Effendi Vuno 4,825 feet). These masses consist of compact Cretaceous limestones, forested in antiquity, but now mainly treeless. The south coast is rugged, and difficult of access; the north coast has extensive alluvial plains, very fertile under irrigation; long stretches of beach, small sandlocked ports at Spina Longa, Candia, Tetimo (*Heracleion*), and Canea; and one great natural harbor at Suda Bay, one of the finest of the Mediterranean harbors. The rivers, none of which are navigable, are usually perennial. The rainfall (26½ in.) would be ample if husbanded with care, but it occurs almost wholly between November and May, and rocky surfaces and steep declivities cause most of it to run to waste. Only in the Messara, Pediada, and Mylopotamo basins is there systematic irrigation. Snow lies all the year round on the higher peaks, but seldom falls in the lowlands. The temperature range is from 40° to 98°, and the great heats of summer are tempered by persistent north winds. Violent south and southeast winds do some damage in springtime. Malaria is troublesome locally, but otherwise the island is healthy. The agrimi (*Capra ægagrus cretensis*), a wild goat, practically confined to Crete, survives among the mountains. Other animals are the moufflon, and the porcupine. There are no venomous snakes in the island; according to the legend they have been exterminated by Saint Titus, the first bishop of Crete. The mules of Crete are considered to be among the best in the world.

The mineral wealth of the island is of small importance. It comprises plaster, salt, and lignite. The staple produce is olive table-oil. Wine was made extensively in mediæval times—the vines of Madeira were of Cretan origin—and a sort of Malmsey (Malvoisie) is still made in Malavisi province. Soap (from oil refuse), drugs, agricultural produce, cheese (mostly from goats' milk), licorice, tobacco and fruit (oranges and lemons) are also exported. Carob thrives in Sitia, valonia around Retimo, mulberries (for alcohol and silk) and chestnuts in the west; and there is considerable trade in leather, particularly for the native boots. The more accessible sections of the island are covered with a network of important highways, while in the remote districts there are only rocks paths. Intercourse between the towns is almost wholly by water.

The population in historic times has remained essentially Greek. The highlanders of Sphakia, southeast of the White Mountains, have always held aloof from the rest of the islanders, and present peculiarities of aspect and customs which have been thought to indicate the survival of a pre-Hellenic stock. At the Turkish conquest (1645 A.D.) a large proportion of the Cretans embraced Islam; but they retained the Greek language and many Greek customs, and even their family names, so that there were many families, having members both Christian and Moslem. A number of Cretan Moslems (the *Courmoulis*) returned to the Christian faith at the time of the Greek revolution of 1821 and they aided the other Cretans in their struggle against the Sultan, but the others remained faithful to Islam until the last. When after the revolution of 1897, Crete was granted an administration establishing the preponderance of the Christian element, the greater number of the Moslems left the island; the remainder departed in 1923, after the treaty concluded between Greece and Turkey for the exchange of the religious minorities, so that no Moslems remain in the island. The picturesque Levantine dress—soft red cap with tassel, short jackets, wide trousers, and high top-boots—is still commonly worn, even in the towns. The population (1939) of 441,687 is Christian Greek, with the exception of some Jews and western Greek refugees from Asia Minor.

History.—Greek tradition ascribed to 'hundred-citied' Crete a predominant place in prehistoric times, and the legends of the 'sea power of Minos' are amply confirmed by the discovery at Knossos and elsewhere of the relics of an advanced civilization which culminated in the later bronze age (1500–1300 B.C.), and collapsed shortly after, at the moment of the introduction of iron. (For this period see below, *Excavations*). The legend runs that the highest god of the Greeks, Zeus (Jupiter), was born in Crete and that Minos, the King, was his son. It was while one of his heirs reigned in the island that the Greeks (Hellenese) made their invasion and took possession of Crete, by subduing and absorbing the former inhabitants, who were of the pre-Hellenic stock. The Cretan King Idomeneus took part in the Trojan war with the other Greeks, but the Cretans remained neutral in the national struggle with Persia (500–480 B.C.). Crete became proverbial for its internal quarrels, and in Hellenistic times (300–70 B.C.) was a dangerous nest of adventurers and pirates, with an important Jewish colony. Annexed by Rome in 68 B.C., and already the seat of a Christian community within the lifetime of St. Paul (who notices the Cretan character unfavorably, Titus I. 5–16), it became, after the partition of the Roman empire a province (*theme*) of its eastern part, the Byzantine empire. It was conquered by the Saracens in 823 A.D. Reconquered by Byzantium in 961, it was granted, in 1204, after the Latin conquest of Orient, to Boniface, Marquis of Montferrat, who sold it to the republic of Venice. Venetian oppression and the quarrels of the Greek and Latin Churches made a Turkish conquest easy in 1645; Candia, however, stood a twenty-four years' intermittent siege, and surrendered honorably in 1669. Sphakia, meanwhile, never acknowledged Turkish dominion, and persistent revolts of the whole island, notably in 1821, (the island was held by Mehemet Ali of Egypt, 1831–40), 1866, 1878, and 1897 (the latter being the cause of a Greco-Turkish war) culminated in 1898 in the establishment of Prince George of Greece as high commissioner under the protectorate of Great Britain, France, and Russia, with a National Assembly, popularly elected, and an administration of European type; the Sultan retaining nominal suzerainty only and Greece being put in almost complete control. In 1908, the Cretans again asked for a reunion with Greece and, though this state made no attempt to occupy the island, the Cretan government, notwithstanding the Turkish representatives, administered the island in the name of the King of Greece until 1912. The first Balkan War (q. v.) had been declared (October of that year); Greece accepted the *fait accompli*. The Cretans were then mobilized and fought side by side with the other Greeks in this and the second Balkan War. By the Treaty of London, Turkey renounced sovereignty over the island, and by the Treaty of Bucharest (1913) Greece's sovereignty was recognized. In the Second World War British forces occupied (Oct. 31, 1940) Crete and fortified it. Early in 1941 King George II transferred the Greek Government to the island but in May the Germans captured Crete and the King fled to Egypt, establishing a government-in-exile there and subsequently in London. The capital is Canea, pop. 26,604.

Excavations.—Crete is archæologically important owing to its prehistoric remains which have been the subject of systematic exploration since 1894. In 1900 the American Archæological School of Athens excavated Cavoussi of Hierapetra, where several tombs of the geometrical period were discovered. Seager, an American archæologist, excavated Vassiliki of Hierapetra and the small islands of Pseira and Mochlos; an American woman, E. H. Hall, found a prehistoric town at Vrokastro. In 1906 Dr. Arthur Evans published the report of his excavations at Knossos and his discovery of the palace of King Minos. This palace is spacious and luxurious, with many chambers decorated with fresco paintings. The symbol of the double axe (labrys) on its stones, makes certain that the kings worshipped the great deity, whose symbol it was. It is supposed that this palace with its great number of chambers and corridors, was the mythical Labyrinth (the name of which is of the same root with labrys) in which Minos enclosed the Minotaur, a bull-headed monster. Many wall paintings representing scenes of peace and war have survived. Hundreds of written documents were also found which are probably the accounts relating to the stores, which were in a series of rooms containing stone chests and large jars. Until the Second World War exploration went on steadily and many valuable remains throwing light on an ancient civilization were unearthed. Consult Freese, *A Short History of Crete;* Burrows, *Discoveries in Crete;* Evans, *Scripta Minoa* and *The Palace of Minos at Knossos* (1921); Seager, *Excavations in the Island of Pseira and Excavations in the Island of Mochlos* (1912); Hall, *Excavations in Eastern Crete, Vrokastro* (1914); Baikie, *Ancient Crete* (1924); Burn, *Minoans, Philistines, and Greeks* (1930); Elliadi, *Crete: Past and Present* (1933); Pendlebury, *Handbook to the Palace of Minos at Knossos, with Its Dependencies* (1933); Evans, *Palace of Minos* (1936).

Crete, city, Nebraska, in Saline county, on the Blue River, and on the Chicago, Burlington and Quincy and the Missouri Pacific railroads; 26 miles S.W. of Lincoln. It is the seat of Doane College (Cong.). It has nurseries, dairies and flour mills. Pop. (1940) 3,038.

Crétineau-Joly, krā-tē-nō'-zhō-lē', JACQUES (1803–75), French historian was born in Fontenay (Vendée). He was educated at Saint-Sulpice in Paris and in 1823 was appointed professor of philosophy in Fontenay, but eventually turned his attention to history and wrote works on the history of Vendée, and on the relations between the Roman Catholic Church and the first French Empire. The more important of them are *Histoire de la Vendée* (1840–2; new ed. 1896–97); *Histoire religieuse, politique, et littéraire de la Compagnie de Jésus* (6 vols. 1844–6), for which he utilized authentic and hitherto unpublished documents, but which is nevertheless somewhat biased. A part of it was translated into English, under the title *The Poor Gentlemen of Liége; being the History of the Jesuits in England and Ireland for the Last Sixty Years* (1863).

Cre'tinism, a disease, generally congenital, associated with absence, atrophy, or disease of the thyroid gland, and characterized by imperfect bodily and mental development. It is also called congenital myxœdema. Cretinism is a frequent concomitant of goiter, which is characterized by a hypertrophy of the thyroid gland. The cause is believed to be due to a deficiency in the thyroid activity. Cretinism is found in all parts of the world, and in all ranks of society, but is most common in certain deeply sunk valleys of the Alps, in Italy, France, and Austria. It is also prevalent in the Pyrenees, in Bohemia, Salzburg, Thuringia, and other mountainous parts of Europe. In Great Britain it occurs sporadically, mostly in the Lancashire and Yorkshire dales, there generally due to absence or atrophy of the gland affected. In the United States there is no locality in which cretinism is common. A few sporadic cases appear at long intervals. The cretin shows signs of the disease at an early age, but often the parents fail to notice anything until after the period when a healthy child would have begun to 'take notice.' In a cretin the fontanel tends to remain open, and there is often early ankylosis of the basi-sphenoid and basi-occipital sutures. Even from birth the mouth tends to be continually open, and the tongue to protrude. The child is altogether dull and unobservant. From birth it tends to be extremely constipated, and the skin all over the body becomes very early thick, dry, and loose, and shows wrinkles on the forehead. As age increases, the backwardness of bodily and mental development becomes more recognizable. The child is, in fact, a dwarf imbecile, with stunted limbs, scanty gray hair, a waddling gait (when it walks at all, which it does later than other children of its age), and with a prominent abdomen. The temperature is always subnormal. The head is markedly large in proportion to the body, and the teeth are late in appearing. Fatty tumors often form above the clavicles. Success in treatment depends upon the age at which it is begun.

The most effective treatment for cretinism seems to be the administration of thyroid extract, carefully regulated, or unpleasant symptoms will follow. Important also is prenatal treatment, including the administration of an aqueous solution of iodine to the mother for the purpose of preventing cretinism. Treatment begun in infancy and persevered with can achieve satisfactory results; while improvement may be hoped for even when treatment begins at an adult period, perhaps more physical than mental, though both may benefit.

Cretonne, a name, said to be that of its inventor, originally applied to a strong white cloth made of hemp and flax, but since 1860 to a woven material of fine wool or cotton, printed in colors with flowers or patterns, and chiefly used for curtains and for covering furniture. See Chintz.

Creusa. **(1.)** Daughter of Priam and Hecuba, the wife of Æneas and the mother of Ascanius. When Troy was taken, she became separated from her husband, and perished in the sack of the city. See Virgil's *Æneid,* bk. 2. **(2.)** Daughter of Creon, king of Corinth, and wife of Jason after he deserted Medea. The latter sent her as wedding present a dress which, when she put it on, took fire and consumed her and the palace.

Creuse. **(1.)** Department of Central France, divided into two nearly symmetrical parts by the valley of the north-west flowing Creuse. The surface is mountainous, being covered with spurs from the Auvergne and Limousin Mts. The area is 2,164 sq. m., and the pop. (1931) 207,882. The climate is wet, except in autumn; the winters are long and severe. The soil is granitic, and the crops of cereals are meagre. Most of the male population leave during summer and autumn to work in Paris, Lyons, etc. There are two coal fields. Hemp, potatoes, and chestnuts are the chief natural products, and sheep, cattle, pigs, and goats are reared. **(2.)** River of Central France; rises between the departments of Corrèze and Creuse, and flows in a N.W. direction through the latter, to join the Vienne (r. bk.) beyond La Haye-Descartes. Length, about 150 m.

Creusot, or Creuzot, Le, tn., dep. Saône-et-Loire, France, 12 m. S.E. of Autun; owes its importance and rise to the establishment of iron works in 1837 by Messrs. Schneider. Pop. (1931) 32,034.

Creutz, Gustaf Philip, Count (1731–85), Swedish poet and diplomatist. He was ambassador to Madrid (1763), in 1766 to Paris, where he remained till 1783, the idol of French society, when Gustavus III recalled and made him chancellor—the last Swedish chancellor. While in Paris he formed a friendship with Benjamin Franklin.

Creuzer, Georg Friedrich (1771–1858), German philologist. He held the chair of ancient literature and eloquence at Heidelberg from 1804 to 1848. His most famous work was *Symbolik und Mythologie der alten Völker* (1810–12), and an edition of Plotinus (3 vols., 1835) in conjunction with Moser. See his *Life* by Starck (1875), and autobiography.

Crevaux, crā-vo', Jules Nicolas (1847–1882), French explorer, who made four journeys through South America in 1877–82. He was the first European to penetrate the interior of Guiana to the Tumuchumac Mountains. He explored the valley of the Rio Oyapok and the Amazon region. To investigate the left affluents of the Orinoco he journeyed from Bogotá via the upper Rio Negro to the Rio Guaviare. On his last expedition, while ascending the Pilcomayo he was killed by Indians with 19 companions. Two Bolivians escaped to report the tragedy. Consult *Voyages dans l'Amérique du Sud* and *Fleuves de l'Amérique du Sud* (1883).

Crèvecoeur, crâv-kûr', Jean Hector Saint John de (1735–1813), French farmer, consul and author. He came to America is 1754, settled near New York and married an American woman. In idyllic language he drew the simple, 'back to nature' life of American farmers and fishermen. On suspicion of espionage he was arrested during the Revolution, taken to England and released by exchange of prisoners. He returned as French consul to New York in 1783, found his home burned, his wife dead and children lost for the time being. He returned to France in 1790. His writings give a charming picture of life in the New World, for which he was an enthusiastic 'publicity agent.'

Crew, Henry (1859), American physicist and educator, was born at Richmond, O. He was instructor in physics at Haverford College 1888–91, and astronomer of the Lick Observatory 1891–1892. He held the chair of physics at Northwestern University, Ill. (1892–1930). He published *Elements of Physics* (1899), *A Laboratory Manual of Physics* (1902), *Principles of Mechanics and General Physics* (1908), *Rise of Modern Physics* (1928) and, with K. K. Smith, *Mechanics of Physics and Engineering* (1930).

Crewe, munic, bor, and railway centre in Cheshire, England, about 21 m. E.S.E. of Chester. The town is quite modern, having grown up around the Grand Junction Station (now London, Midland and Scottish Railway) works established here in 1843. The company owns baths and wash-houses, library, gas and water supply. For Parliamentary purposes the town is in the Crewe Division of Cheshire. Pop. (1921) 46,497; (1931) 46,061.

Cribbage, a game of cards apparently of English origin. The requirements for this game are a complete pack of fifty-two cards, which rank king (highest), queen, knave, ten (which all count as 10 in scoring), down to the ace (lowest), and a cribbage-board with four pegs, two to each player, to score with. The game is 61 up. The players cut for deal, and the non-dealer is entitled to score three holes, called 'three for non-crib.' Five cards are dealt to each player, the remainder of the pack being placed face downward on the table. The players then put two cards each on the table, face downwards—'laying out' or 'discarding' this is called; these four cards form the 'crib.' A variation is to deal six cards, in which case the non-dealer does not take three at the start, and there are four cards in the hand and four in the crib, and play does not cease with 31 or a go. After this the non-dealer cuts the pack, and the dealer turns up the top card of the lower portion. This top card is called the 'start' or 'turn up' or 'crib card,' and if it be a knave the dealer scores 'two for his heels,' as it is called. In playing, the cards are held in the player's hand, and successively laid upon the table, face upwards, each hand in front of the owner. The non-dealer begins, and calls out the number of pips on the card he plays, if it be a picture card, he calls 'ten.' The next player calls out the sum of the pips on the two cards played, and so on, until each has exhausted his hand, or until neither can play without passing 31, in which case the play of those hands is at an end. The object of the play is to make pairs, fifteens, sequences, or the go. 'Pairs' are two cards of the same denomination, and count two in playing or in hand. 'Pairs-royal' are three similar cards, and count 6. 'Double pairs-royal' are four similar cards, and count 12. 'Fifteens' accrue when any combination of two or more cards, in play or in hand, makes 15: and 8 and a 7, or a 2 and 5 and a 3 and an ace and a 4, count two points. 'Sequences' are three or more successive cards—such as a 5, an ace, a 4, a 3, a 2—and score as many points as there are cards in the sequence. The 'go' counts one, and is scored by the player who comes nearest to 31 during the play. It counts two when 31 is exactly reached. After play hands are shown and counted. The combinations in hands or crib, which belongs to the dealer, are, besides fifteens, pairs, and sequences, flushes and nobs. 'Flushes' arise when all the cards in hand are of the same suit, one being reckoned for each card, and another added when the 'start' is also of that suit. 'Nobs' accrue to the player who holds the knave of the suit turned up, for which he scores one for his nob. When three persons play, each plays for himself; when four, they take sides, and the number of points to a game is 121: further, each player discards one card only, thus holding in hand four as against three or four in the crib. The three points for the non-dealer is not taken except in 5-card two-handed cribbage. Play continues until each player has exhausted his hand, and does not cease with 31 or a go as in 5-card two-handed cribbage.

Crichton, James (1560–85), known as the 'Admirable,' born at Eliock, Dumfries; educated at St. Andrews under George Buchanan, thereafter leaving Scotland for the Continent (1577). After two years in the army of Henry III. of France, Crichton proceeded to Italy, and at Genoa (1579) delivered before the senate an elaborate Latin oration, printed by order of the authorities. Going on to Venice (1580), he was befriended by Aldus Manutius (grandson of the great Aldus of the Aldine press), and there Crichton challenged all scholars to learned disputations, the challenger claiming to be not only a scholar, poet, and linguist, but an expert swordsman. Crichton was at Milan (1584), publishing there an elegy on the death of the archbishop, Cardinal Borromeo, and laudatory odes to the cardinal's successor and to the Duke of Savoy. He also published a collection of Latin poems (March, 1585). Tradition has it that he met his death at Mantua (1585), treacherously slain by the son of the duke. Popular Italian superstition urged that the calamities befalling the house of Gonzaga were divine judgments for this foul murder. The epithet 'Admirable' was first applied to Crichton by John Johnston in his *Heroes Scoti* (1603), but Sir Thomas Urquhart of Cromarty gave wider publicity to it in his *Discovery of a Most Exquisite Jewel* (1652). See *Life of the Admirable Crichton*, by P. F. Tytler (1819); the article on Crichton in the *Dict. of Nat. Biog.;* Harrison Ainsworth's novel, *Crichton* (1837); and *Lives* by Urquhart, Douglas, Mackenzie, and Irving.

Cricket. Modern cricket has been developed from an ancient game of which rude pictorial delineations have been handed down from the 12th and 13th centuries. In the 18th century cricket became the subject of wagers, so that in 1748 it was sought to put it down under 9 Anne, c. 19; but the Court of King's Bench decided in its favor. Wagering continued to increase until the first quarter of the 19th century, when matches were played for stakes of 500 and 1,000 guineas a side.

Clubs.—The first established club was the Hambledon, which flourished from 1750 to 1791. It was followed, in 1787, by the Marylebone Cricket Club, which forty years later took up its present headquarters at Lord's, in St. John's Wood, London, and published the first code of laws for the game. From that day to the present the M.C.C. has been the ruling and arbitrary authority in cricket affairs.

The *game* is contested on double wickets by two sides, each containing eleven members. Upon a level sward of turf two wickets are pitched, opposite and parallel to each other, and 22 yards apart. Each wicket consists of three stumps, driven into the earth, and surmounted by a pair of bails. The area of the wicket is 27 in. by 8 in. The ball is made of cork covered with leather; its circumference must be from 9 to 9¼ in., and its weight 5½ to 5⅝ oz. The bat must not exceed 38 in. in length, nor span more than 4¼ in. in its widest part. Each side elects a captain, and these toss for innings, the winner deciding whether his side shall bat or field first. The batting side sends a player to each wicket to bat. The fielding side distributes itself over the ground at certain positions (see p. 449), and one of its number, the bowler, stationed at the opposite wicket, tries with the ball to hit the wicket which the batsman defends with his bat. The latter also endeavors to make 'runs'—that is, to strike the ball to a sufficient distance, and in such a way, past the fieldsmen (whose aim it is to stop it), as to enable himself and his partner to cross the distance between the two wickets, exchanging ends of the pitch, and reaching a mark, known as the 'popping crease,' within which they are safe, before the wicket is put down by the ball, returned by the fieldsman for that purpose. These runs are known as the 'score,' and the side which scores most runs wins the match. After delivering four, five, or six balls from one wicket, the bowler gives way to another bowler, who delivers a similar number from the opposite wicket, and each series of deliveries is known as an 'over.' A batsman may be out in a variety of ways, and as soon as one is disposed of another takes his place, until ten batsmen are out, when the eleventh man ('not out') has to retire, and the 'out' or fielding side goes in, their opponents taking their places in the field.

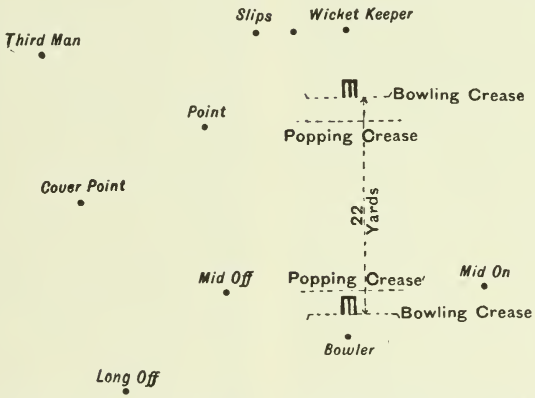
Batting.—It is important to play with a straight bat, and to meet the ball with the centre of the bat. In making runs there are many well-defined strokes, classified as 'on' and 'off' drives; 'forward,' 'square,' or 'late' cuts; 'square' or 'long' leg hits; glides or glances; draws, pulls, and hooks. The ball must be driven so as to touch the ground before any fielder can catch it; for if it is caught straight from the bat, the batsman is out. There are nine ways of dismissing a batsman—bowled, caught, stumped, leg before wicket ('l.b.w.'), out by hitting his own wicket, run out, and ruled out for hitting the ball twice (except to guard his own wicket), for obstructing a fieldsman, or for handling the ball. The fielding side can assist their opponents' score in four ways—by their bowler delivering a 'wide' (or ball which is out of the batsman's reach), a 'no-ball' (or ball improperly delivered, either because it is thrown or jerked instead of bowled, or because it is not delivered from the proper spot behind the bowling crease), by allowing a run from a ball which has not been struck by the batsman, called a 'bye,' or by a fieldsman stopping a ball other than with his hand or person, which entails a fine of five runs.

Bowling.—In the original game all bowling was underhand. In 1825 round-arm bowling was legalized, which permitted the bowler to deliver the ball with his arm at any angle, so long as his hand was not above his elbow. Finally, in 1864, overhand bowling was sanctioned; and at the present day practically all bowling is overhand. Bowling is generally classified by its pace, as fast, medium, or slow. The first requirement of bowling is accuracy; the second 'length,' or the ability to pitch a ball at that distance from the opponent's wicket which makes it most difficult to play. Thus, if the batsman is tall and able to reach far out, the ball must be pitched much shorter than to a man of less height and more limited reach. The ball is classified, according to its pitch, as a long hop, good length ball, half volley, yorker, or full toss. After accuracy and length, in importance come 'break' and 'spin,' which are produced by an artificial twist given to the ball at the moment of its leaving the hand. The result is that the ball deviates from its original course or speed directly it touches the ground. In what is called the 'leg-break,' it turns to the left in its course; in the 'off-break,' to the right. Spin either accelerates or slackens the speed of the ball as it leaves the ground. The chief art of a bowler is strategy—the delivery of every ball with an object, and constant variation of method with each delivery. Thus, without any change of action to indicate his intention, he puzzles his opponent, and adapts his strategy to the peculiarities of the different batsmen.

Fielding.—The fieldsmen are stationed at various positions, each having its particular name (see diagram). Their duties are to stop the ball when it has been struck, and return it sharply to the wicket, so as to prevent the batsman from getting runs; and, if it is hit into the air, to catch it, and thus terminate his innings. The most important position is that of wicket keeper, who stands behind the wicket to stop those balls which the batsman fails to strike. Originally he was aided by another fielder, stationed behind him and called 'long stop,' but skilful wicket keepers dispense with such assistance. With each over the fieldsmen change their places in the field; they also vary their positions with different bowlers and batsmen, as directed by captain or bowler.

Umpires and Scorers.—There are two umpires and two scorers in every match. The former take their places on the field, one at each wicket, and are the sole judges of fair and unfair play, and all disputes are settled by them. The scorers keep a record of the runs made and the balls bowled; these records are subsequently subjected to analysis.

United States.—Cricket has never taken a strong hold there, although it is played in the larger cities of the North to some extent. By far the largest number of cricketers are in Philadelphia, where there are several clubs.



CRICKET.—*One of the Ways in Which the Field is Stationed.*

Consult Spalding's *Official Cricket Guide;* B. F. Warner, *The Book of Cricket* (1911); H. S. Altham, *History of Cricket* (1926). Wirden's *Annual.*

Crick'et Frog (*Acris gryllus*), a small frog of terrestrial habits, common in the warmer portions of the United States east of the Rocky Mountains. It measures from ⅝ to 1¼ inches in length. Its coloration is protective, usually some shade of brown, with a triangular patch of darker color between the eyes, and markings of color on the back and sides. The most striking characteristics are the long, pointed head; rough, warty skin; cricket-like song; and its remarkable activity.

Crickets (*Gryllidæ*), a family of insects belonging to the order Orthoptera, and nearly allied to the green grasshoppers (*Locustidæ*). The head is somewhat rounded; the feelers (antennæ) long and slender; the wings closely folded lengthwise, and oftentimes, along with the wing covers, degenerate; the hind legs long, and adapted for leaping (saltatorial); and the habit of life nocturnal, retiring, and more or less subterranean. Near the tip of the abdomen are two long, flexible appendages of velvety texture, and in the females of most species there is a long exserted ovipositor. Definite organs of hearing are located on the front legs. In the male each of the wing covers is provided with a stridulating file on its lower aspect, by means of which the characteristic chirping call of the insect is produced. The females are fertilized by means of peculiar spermatophores, and as in allied Orthoptera there is no marked metamorphosis in the life history.

The House Cricket (*Gryllus domesticus*), common in Europe and Canada, and found to some extent in the United States, has a lank, yellowish-brown body about an inch long. It is fond of warmth, and usually inhabits the ground floors of dwellings, especially bakeries, where it conceals itself around fireplaces or chimneys and under baseboards. It remains quiet during the day, but hunts about actively at night for crumbs and other scraps of animal and vegetable food. In hot weather it is occasionally found out of doors, but always in the neighborhood of human habitations.

The European Field Cricket (*G. campestris*) is larger than the house cricket, and darker in color, and lives in small burrows in fields and heaths. The common black Field Cricket of the United States (*G. neglectus*) frequently enters houses and accommodates itself to domesticity as well as the true house cricket. The Mole Cricket (*Gryllotalpa*) is provided with powerful forelegs especially adapted for burrowing (see Mole Cricket). Tree Crickets (*Œcanthus*), comprising several species of small pale-colored insects bearing a marked resemblance to the Locustidæ, are found in trees and shrubs.

Crieff, krēf, town and tourist resort, Perthshire, Scotland, on the Earn River, beautifully situated at the foot of the Grampians; 18 miles west of Perth. There are chemical works and tanneries and woollen factories. Pop. (1931) 5,544.

Crile, George Washington (1864–1943), American surgeon, was born in Chili, Ohio; graduated from Ohio Northern University in 1884 (A.M. 1888), and in medicine from Wooster University in 1887; studied in Vienna, London and Paris. He was lecturer and demonstrator in histology (1889–90), professor of physiology (1890–93) and of the principles and practice of surgery (1893–1900) at Wooster; professor of clinical surgery (1910–11) and of surgery (1911–24) at Western Reserve University; visiting surgeon, Lakeside Hospital (1911–24). He was one of the founders and, from 1921, director of the research laboratories of the Cleveland Clinic Foundation. Dr. Crile served as military surgeon in Cuba and Porto Rico (1898), in the World War (1917–18), was decorated by England and France and received the D.S.M. (U. S.) in 1919, besides numerous scientific institutional medals and honors. Publications: *Surgical Shock; Surgery of Respiratory System; Certain Problems Relating to Surgical Operations; On the Blood Pressure in Surgery; Hemorrhage and Transfusion; Anemia and Resuscitation; Surgical Shock and the Shockless Operation through Anoci-Association; Origin and Nature of the Emotions; A Mechanistic View of War and Peace; Man, an Adaptive Mechanism; The Kinetic Drive; The Fallacy of the German State Philosophy; Notes on Military Surgery; A Bipolar Theory of Living Processes; Problems in Surgery; The Thyroid Gland,* etc. [illegible]

Crillon, krē-yoṅ′, Louis Balbis de Berton de (1541–1615), French soldier, surnamed 'Le Brave,' was born in Provence. Under Francis of Lorraine, duke of Guise, he was trained for war, and while still a boy was distinguished for his conduct at the siege of Calais, and at the capture of Guines. He further distinguished himself at Dreux, Jarnac, and Moncontour, and was wounded in the fight at Lepanto (1571). He protested against the Massacre of St. Bartholomew, but he took part in the siege of La Rochelle in 1573. Faithful to Henry III in his struggle with the Catholic League (1580–9), after his death he gave hearty allegiance to Henry IV. When the peace with Savoy was concluded, Crillon retired to Avignon, where he died.

Crime: ***Nature and Scope.***—Crime is an act committed or omitted in violation of public law either forbidding or commanding it. In states where the common law obtains whether a particular offense as to which there is no statute or no prior ruling applicable thereto is indictable, crime must be defined as a wrong which public policy requires to be prosecuted by the state rather than redressed by private suit, for in certain matters, *i.e.*, involving peace, order and health of community, a wise social economy calls for state intervention. The condition of indictability then, is a public sense of right rather than immorality. In those states where the common law is by legislation declared not to be in force it continues in force for purposes of construing legislative action.

The common law classification comprising treason, felony and misdemeanor is rapidly giving way to classifications in the main determinable by statutes of the respective states. To constitute a punishable offense, however, the crime must comprise two elements — the *actus reus,* or overt act, and the *mens rea,* or criminal intent. An attempt which is an intended, apparent unfinished crime is generally punishable as a misdemeanor. Mere words, unless provocative of a breach of peace, do not constitute attempt. Solicitation involving a breach of the public peace may be indictable, but mere preliminary preparations are not, for the attempts must have gone so far that the crime would have been committed but for extraneous intervention. There must be apparent physical capacity but not necessarily capable of success. Where the means are apparently and absolutely inadequate there can be no attempt.

The overt act comprises (1) a *corpus delicti,* the body of the crime charged (2) which must be brought about by criminal means (3) through defendant's guilty agency or complicity therein. Freedom of will—the capacity to distinguish between right and wrong as to the particular act or delusion as to act, and ability to do or refrain from doing the act are essential prerequisites. The wrong need not be a moral wrong nor the delusion non-negligent. Though mental disorder may go to disprove malice it is no defense nor is even irresistible impulse in many jurisdictions a defense, the courts holding that the accused 'can be taught.' In addition to the overt act there must be the conscious intent to commit the act. To be possessed of responsibility in the eyes of the law there must be capacity of intellectual discrimination, and proof must be clear, not necessarily by direct and positive evidence, circumstantial or presumptive being ofttimes the only available evidence. It may be of extrajudicial confession, which, however, must be corroborated. Both the commission of the offenses and the defendant's agency must be proved beyond a reasonable doubt, the presumption always being in favor of innocence and sanity, the burden of disproving which remains with the state.

Defences.—Insanity induced by intoxication not voluntary is a defense, but where voluntary, the intoxication will not exculpate. It may, however, be admissible on the issue of aberration and intent. On the issue of permanent insanity, inferences may be drawn from conduct, physical peculiarities and hereditary tendencies. In the latter case, however, the proof is only admissible as cumulative evidence and of itself alone is no defense. Somnambulism, narcotic addiction and hypnotism are valid defenses. An infant under seven is incapable of committing a crime. From 7 to 14 he is rebuttably presumed incapable. A married woman is in the main no longer deemed presumably coerced by her husband into the perpetration of a crime. Though ignorance of law or fact is no defense to an indictment, it may negative the criminal intent prerequisite to the commission of the crime. Where, however, *scienter* (guilty knowledge) is irrelevant (as in the growing number of recent statutes which dispensed with *mens rea*) ignorance or mistake of fact is no excuse, as is illustrated in laws against sale of adulterated foods, intoxicating liquors, abduction, etc., where the intent is immaterial.

Agency will not be a defense to a crime nor the fact that the act was done at direction of government. Even an act done under a statute subsequently declared unconstitutional will not protect the defendant nor will 'advice of counsel' entitle the defendant who has gone afoul of the law to immunity from punishment. Consent, active not merely passive submission, provided public interest and welfare are not vitally affected, is a defense. Condonation and settlement, conviction and acquittal of another jointly tried are no defenses. Neither is entrapment, where the crime is conceived by the accused and not suggested by the prosecuting witness or his agents. Nor is imprisonment for life at the time of the commission of the crime (*autrefois attaint*) a defense, though it was at the English common law. Religious beliefs, custom and usage are not permitted to supersede the criminal statutes.

The jurisdiction of equity, being limited to the protection of civil and property rights only, cannot be invoked to enjoin the commission of a crime, the prosecution of a criminal or the stay of a prosecution, except where suit has already been instituted and is properly pending in a court of equity. But the suit must involve the same issues, affect the same parties and entail no criminal liability separate and distinct from the civil liability, limited as it is to the protection of civil rights, where irreparable injury is to be occasioned without adequate remedy at law. Inasmuch as a criminal offense usually affects the interest of individuals as well as those of the public, each has a remedy, concurrent and independent, not exclusive. The mere pending of or recovery in civil action will not bar a criminal prosecution. Where injury is purely personal, ratification is a defense as is reparation.

Statistics are of inestimable value. Their utility relative to crimes and criminals collected at all important stages of criminal procedure, from statistics of crimes known to the police through the various stages of arrest, preliminary hearing, grand jury indictment, prosecution, probation, imprisonment, parole and pardon, and their assistance in crime control is self-evident. They should and frequently do cover three units, the crime, the case, and the criminal. But their compilation has been unsystematic, spasmodic and uncoordinated. New York in 1829 offered the first collection of annual statistics and the Federal Government began in tentative form with the census of 1850. Discontent with the faulty and all too frequent corrupt administration of criminal justice has led to surveys in such places as Missouri, Illinois, Pennsylvania, New York, and Cleveland, and further progress in the compilation of police statistics. Interest and attention have been aroused in and attempts made at the introduction of uniform crime reporting and the promise is forthcoming of a compilation by the Bureau of Identification of the Department of Justice. In the main, all that has been achieved is a survey compilation of statistics and an array of facts with which little has as yet been done.

Criminal statistics differ vastly according to the varying objectives of the statistician. The Illinois Crime Commission was interested in the felonies passing through the office of the prosecutor or the Supreme Court of Illinois. The International Association of Chiefs of Police, concerned with the adequate picture, limit their view to the sex and age of offender, nature and periodicity of the crime, etc. Grouping on the basis of similarity, relating crimes of the same type together, produces illogical results. The analytical method of grouping crimes around some common element suffers from lack of comprehensiveness and definiteness of characterization. Its radical approach might disturb its effectiveness as a statistical aid. Other classifications suffer from excessive complexity.

See CRIMINAL LAW; CRIMINOLOGY; also the following entries:

Abortion
Abduction
Acquittal
Adultery
Appeal
Arrest
Arrest of Judgment
Arson
Assault
Bigamy
Blasphemy
Bribery
Burglary
Capital Punishment
Conspiracy
Contempt of Court
Court
Defamation
Desertion and Non-Support
Embezzlement
Felony
Forcible Entry
Forgery
Fraud
Homicide
Incest
Judgment
Jury
Kidnapping
Larceny
Libel
Lottery
Maintenance
Malice
Malicious Injury
Malicious Prosecution
Manslaughter
Misdemeanor
Perjury
Piracy
Prisons
Punishment
Rape
Receiving Stolen Goods
Riot
Robbery
Seduction
Slander
Tort
Treason
Trial

Consult G. Aschaffenburg, *Crime and its Repression* (1913); C. Goring, *The English Convict: A Statistical Study* (1913); H. M. S. O., *Criminal Statistics, England and Wales:* H. M. S. O., *Criminal Statistics, Scotland;* C. Lombroso, *Crime, Its Causes and Remedies* (1911); J. W. MacDonald, *Classification of Crimes*, 18 Cornell Law Quarterly, 554 (1921); L. N. Robinson, *History and Organization of Criminal Statistics in the United States* (1911); S. B. Warner, *Survey of Criminal Statistics in the United States for the National Commission of Law Observance and Enforcement.*

BENJAMIN WERNE, S.J.D.

Crimea, kri-me'*a*, an autonomous Russian Soviet Republic lying between the Black Sea and the Sea of Azov, and joined to the mainland by the Isthmus of Perekop. In general shape the Crimea is an irregular quadrilateral, projecting eastward into the peninsula of Kerch. It measures about 200 miles from east to west, and 125 miles from north to south; total area, 14,910 square miles.

Along the Sea of Azov and the Sivash or Putrid Sea, on the north and east, the coasts are flat and open. To the west of the wide bay of Kaffa or Theodosia the south coast is rocky and picturesque, forming a succession of capes and small gulfs. Balaklava, and more especially Sevastopol, have fine harbors. The northern and larger portion of the peninsula consists of flat, treeless steppes, cold and damp in winter, and oppressively hot in summer. The southern part, from Cape Chersonese to the Strait of Kerch, is highland, traversed by the Yaila (Plateau) Mountains, a continuation of the Caucasus, of which the best known peak is Chatyrdagh, the ancient Mons Trapezus (4,700 feet). The climate of the southern part is healthful. The narrow belt of coastland south of the Yaila Mountains was formerly a much frequented resort of Russian society, sometimes known as the Russian Riviera. The only river of importance is the Salghir.

The steppes of the Crimea furnish excellent pasturage for great herds of cattle. Oxen of the Ukraine and Tatar breeds, horses, buffaloes, sheep (both local and merino), and two-humped camels are raised. Bee keeping is an important industry, and honey and wax are among the chief products. In the south are vineyards, orchards, and grain fields. Tobacco, mulberries, eastern poppies, saffron, plantain trees, and fig trees are cultivated. On the upper slopes grow fine woods of pines, oaks, and beeches. Large quantities of salt are obtained from the lakes and marshes of the steppes, and marbles and porphyries are found. On the seacoast near Kerch there are productive fisheries. Manufactures include flour, leather, wool, soap, preserved fruits and vegetables, and metals. Shipbuilding is carried on and skins, leather, and wool are exported. The population numbers about 760,000, and includes Tatars, Russians, Jews, Germans, Greeks, Armenians, and Albanians. In the country districts Tatars predominate, though long-continued emigration has greatly reduced their numbers. The Jews are largely Karaites. The principal towns are Simferopol, capital of Taurida government; Sevastopol, the chief Russian naval port and arsenal of the south; Theodosia, and Kerch.

History.—The Crimea was known to the ancients as *Chersonesus Taurica* (see CHERSONESUS), and as early as the sixth century B.C. was the seat of flourishing colonies of Ionian and other Greeks. From the fifth to the end of the second century B.C. it formed the kingdom of Bosporus (q. v.), under an independent dynasty; in 115 B.C. passing to Mithridates, and in 63 B.C. to his son Pharnaces. Afterward it fell successively into the hands of the Goths (A.D. 250), Huns (376), Khazars (eighth century), Byzantine Greeks (1016), Kipchaks (1050), and Tatar tribes from Central Asia (1237). The Genoese established themselves on the coast in the thirteenth century, and developed a flourishing trade centring at Kaffa (Theodosia). They were expelled by the Turkish sovereign, Mohammed II, in 1475, and the whole peninsula was made an Ottoman dependency under a native prince or khan. The independence of the khan was recognized by Turkey in 1774, and the country was incorporated in Russia in 1783. From 1854 to 1856 the Crimea was the scene of the Crimean War (q. v.). Following the Russian revolution of 1917 Crimea became an autonomous Republic, a part of the Russian Socialist Federal Soviet Republic. Consult Sir Evelyn Wood's *The Crimea in 1854 and 1894;* J. B. Telfer's *Crimea and Transcaucasia.*

Crimean War, the conflict of 1853–6 between Russia on the one side, and Turkey, France, England, and Sardinia on the other, so called because it was waged chiefly in the Crimea (q. v.). Louis Napoleon of France had appealed to the Sultan of Turkey for the restoration to the Latin monks of the custody of the 'holy places in Palestine,' which had been taken over by Greek monks. The Tsar of Russia, as traditional champion of the Greek Church, demanded that its monks be left undisturbed; and early in 1853 claimed a protectorate over the millions of orthodox Christian subjects in the Turkish dominions. As the granting of this latter claim would have given Russia an excuse for constant intervention in the internal affairs of Turkey, the Sultan refused, and Russian troops were despatched to the principalities of Moldavia and Wallachia. The Western Powers attempted mediation, but without success, and on Oct. 23, 1853, war was declared on Russia by Turkey. France and England came to the latter's support, and also declared war on Russia (March 28, 1854). Early in 1855 Sardinia joined the alliance, and sent a contingent to the seat of war.

In the spring of 1854 a powerful British and French fleet appeared in the Gulf of Finland, and the Russian fleet retired behind the forts of Kronstadt and Sveaborg. A second Baltic campaign in 1855 was a repetition of this; while in the Black Sea the Russian fleet followed the same tactics. As a consequence, except for the destruction of Bomarsund in 1854 and the partial destruction of Sveaborg in 1855, the operations of the war were almost exclusively of a military nature.

The allied forces were first landed at Varna in Bulgaria; but after the successful defence of Silistria by the Turks themselves, it was seen that an advance in that direction was unnecessary, and it was resolved to carry the war into the Crimea. Accordingly, on Sept. 14–16, 1854, the allied forces were landed there, under the British general Lord Raglan and the French marshal St. Arnaud. On Sept. 20 they attacked and defeated the Russians at the River Alma; then, taking up position near Balaklava, to the south of Sevastopol, they commenced the siege of that great fort. The Russians made desperate efforts to relieve it, and two notable battles were fought—Balaklava (Oct. 25) and Inkerman (Nov. 5).

The *Battle of Balaklava* was a cavalry engagement, made memorable by the charge of the Light Brigade, which has been immortalized by Tennyson. In obedience to a bungled order the Light Brigade advanced for a mile and a half beneath a heavy fire from the Russian field batteries; and though it reached the guns and cut down the artillerymen, it lost two-thirds of its men, and failed to dislodge the enemy.

The *Battle of Inkerman,* known as the 'Soldiers' Battle,' took place on a dark autumn morning, wherein 8,000 British sustained a hand-to-hand conflict with nearly 50,000 Russians, until the French came to their aid and routed the enemy.

The prodigious extent and strength of the fortifications of Sevastopol, together with the skill and obstinacy of its defence, protracted the siege for nearly a twelvemonth, during which the besiegers suffered incredible hardships. Famine and disease swept away thousands, and of the twenty thousand British lost, but twelve per cent actually fell before the Russians. The terrible sufferings of the soldiers were in part mitigated by the labors of Florence Nightingale (q. v.), to whom the organization of proper nursing in military hospitals was due. On Sept. 8, 1855, after a three days' tremendous cannonade by the allies, the French stormed and carried the Malakoff fort, the key to the Russian position, and that night Sevastopol was evacuated.

Except for the surrender of Kars in Circassia by the Turks, the war ended with the fall of Sevastopol. In March, 1856, the treaty of peace was signed at Paris, by which a portion of Bessarabia was added by Russia to Moldavia; the Russian claims to a protectorate over Moldavia and Wallachia were abandoned; the independence and integrity of the Turkish empire were guaranteed; the Danube was declared open to navigation; and the Black Sea was neutralized and opened to international commerce (see PARIS, TREATIES OF).

Consult Kinglake's *Invasion of the Crimea;* Sir E. Hamley's *The War in the Crimea; Cambridge Modern History* (vol. XI, 1909).

Criminal Courts. See COURTS.

Criminal Law is that branch of jurisprudence which deals with the punishment and prevention of crime. Its aim is the protection of social interests. The law was of sacred origin, at least with certain races. Its secularization was gradual and even long afterwards it preserved traces of its early state. Among monotheistic people particularly, law originated through divinity or his intermediary, as witness the Mosaic Code and the Koran. A violation of the law was an offense against the deity and expiation was demanded to avoid public calamity. Under the earliest Germanic law, priests executed penalties. It was only when man mastered the formulae upon which legal actions were predicated that law became fundamentally the object of human administration. But even in the stage of complete secularization of the law as in France, clerical influences persevered in the form of oaths, a direct invocation of deity.

In the sacred books are found traces of a criminal code in which were interpolated fragments of the civil law. Among the Chinese the separation of civil and criminal law is unknown. So, too, with Hebraic, Gothic, Swedish and Germanic systems, law was revealed only through the penalty prescribed. Today, contrariwise, wrongs against the person tend to lose their tortious character and penalties have, in the main, disappeared in the civil law. Despite the autonomy of the civil law, however, certain penalties still attach, as where an heir fraudulently conceals property belonging to the succession. And today in procedure the criminal action is preliminary to the civil or suspends it. The criminal law grew out of the crude forms of social control: religion, summary community self-help, the paternalism of the state, private self-help, magisterial discipline and legislative justice. 'The criminal law begins,' says Mommsen quoted by Roscoe Pound, 'when the arbitrary action of the holder of power to punish and jurisdiction to judge has limits put upon it by the law of the state or by custom of equal authority with it.' When the criminal law aspired to higher ends than the mere keeping of the peace between warring kindreds, the criminal law and the law of civil injuries diverged, the former losing all but a few rudiments of its patriarchical character.

The two-fold nature of the criminal law as conditioned by its origin and history comprises on the one hand prohibitions addressed to the individual to secure social interests, and on the other, limitations on the magisterial enforcement of these prohibitions to secure the social interest in the individual life. Throughout the development of the criminal law as a system of checks on the arbitrary mode of social control it seems that the criminal stood up against the magistrate in Roman law, that he was matched against the king among the Anglo-Saxons. Hence, the bill of rights standing between the individual and the state came to be regarded as the protection against the oppression of the state. Inherent in the history of the criminal law, according to Dean Pound, is this swing from wide magisterial power to restricted procedure beset by innumerable checks and back again to summary administrative action. Seventeenth and eighteenth century theories of natural rights emphasized the social interest in individual life. The nineteenth century and juristic thinking of contemporary America stress the limitations on magisterial enforcement of prohibitions.

Divisions of Criminal Law.—Criminal law embraces three branches: substantive, procedural and administrative. The substantive branch treats of the nature of crime, classification, constitution, mental elements and the criminal act, capacity to commit crime, defenses, justification, offenses against the person, habitation and property, public health, justice, authority and peace, and the existence of government and the law of nations.

Procedure deals with jurisdiction, prosecution, indictment, pleadings, arraignment and trial, evidence, judgment, and sentence and appeals. The *administration* of criminal justice includes police organization, administration, scientific investigation and detection, probation, parole and pardon, penology and penal administration, juvenile courts, special procedures for crime prevention and means of controlling social and industrial conditions to prevent crimes. Jurisdiction over crime is determined by the locality of the offense, the laws of the country generally being without extraterritorial effect. Courts of one country generally will not punish for acts committed beyond its own territories, except offenses committed on its ships; by its subjects abroad, or where the crime is perpetrated abroad but consummated through an innocent agent within its territorial bounds.

Federal courts in the United States can exercise only such criminal jurisdiction as is expressly conferred upon them by Congress. They are empowered to punish offenses against the law of nations, against the Federal government, person, property and other offenses against public justice. The Federal courts have no criminal jurisdiction by virtue of the common law. They may, however, look to the latter for definition of certain crimes, undefined by the act, over which jurisdiction has been conferred them. In some cases, Federal and State courts have concurrent jurisdiction over crimes, both under the State laws and Federal laws. Though generally all within the territorial limits of the country are subject to its jurisdiction, certain official representatives of foreign governments are exempt from its process.

Procedure.—Certain ancient safeguards surrounding the accused continue to persevere despite their inherent undesirability and all too frequently tend to obstruct the lawful administration of justice. Carefully planned crime surveys and painstaking studies by commissions on law revision uniformly urge their radical modification if not complete abolition. Among the more detrimental aspects of criminal procedure sought to be eliminated are the unanimous jury verdict, the restrictions upon the trial court, and the privilege against self-incrimination.

Trial by Jury was originally volitional in character; currently, jury trials may be waived in some states by constitutional amendment, in others by statutes. The requirement of unanimity originating at a time when jurors were witnesses rather than triers of the facts, was, in effect, a rule as to the quantum of evidence. Early evidences of the existence of less than unanimous verdict in cases of juries which functioned as triers of the facts and not as witnesses are abundant. Lieber in *Civil Liberty and Self-Government* condemned it as did Jeremy Bentham in his essay *On the Art of Packing Juries,* and according to Cooley it is repugnant to experience and understanding. Only Montana, Idaho, Oklahoma and Texas permit (1936) less than unanimous verdict in criminal cases not involving felony, and in some states the statute requires the unanimous verdict.

Self-Incrimination.—Abolition of this privilege against self-incrimination, whether to testimonial privilege or to questioning prior to indictment or formal complaint, but subsequent to arrest on warrant or probable cause would aid in effective prosecution, for the accused is still protected by counsel, court and other safeguards. Similarly, an enactment granting the right to comment on the failure of the defendant to testify in a criminal case cannot prejudice an innocent defendant, for generally one unjustly accused is eager to testify. Where he has any valid reason not to, his counsel is not prevented from stating that reason to the jury. Under present American practice the judge is a mere moderator at the trial with power to preserve order, rule upon objections and testimony and to instruct the jury on the law. The jury receives the information on facts from arguments from opposing counsel and are exposed to the persuasive force of insignificant details by able counsel. At common law the judge had been the directing and controlling influence at the trial, which he still is in England, Canada and the Federal courts, wherein he is given the right to examine witnesses, advise the jury on the facts, express an opinion thereon and on the credibility of the witnesses. Given an intelligent jury there is no reason why it should not be given the benefit of the court's experience and faculty of critical analysis.

The evidence of prior convictions in the prosecution's case is inadmissible, for the prosecution may not initially attack defendant's character. Furthermore, there is too great a likelihood of convicting him not for the offense with which he is charged, but for his past record.

Consult J. P. Bishop, *Criminal Law* (9th ed. 1923); F. Wharton, *Criminal Law* (12th ed. 1932); J. Miller, *Handbook of Criminal Law* (1934); W. L. Clark and W. L. Marshall, *Treatise on the Law of Crimes* (3rd ed. 1927); W. O. Russell, *Treatise on Crimes and Misdemeanors* (8th ed. 1923); R. Pound, *Future of the Criminal Law*, 21 *Columbia Law Review*, 1 (1921) and *Science and Legal Procedure*, 8 *American Journal of Psychiatry*, 38 (1928); J. F. Stephen, *History of the Criminal Law of England* (1883); Von Bar, *Continental Criminal Law*.
Benjamin Werne, S.J.D.

Criminology is the combined social and biological science dealing with the causation, treatment and prevention of crime. Its scientific origins are traceable to the treatise on physiognomy by Aristotle, who anticipated the criminal anthropologists to some extent. The satire of Montesquieu and Voltaire and the plea of Beccaria against the torture and barbarous punishments of the criminal law gave added impetus to the criminology of the 18th century which really began with Lavater (1741–1801) and Gall (1758–1828), whose recognition of the importance of clinical observations led him to study the head for signs of moral sentiments. His phrenological approach was followed by Pinel who, viewing the problem as an alienist, discussed mental disorders without lesion of the understanding. Then followed Esquirol, Despine, Pritchard and Maudsley, who accounted for much of criminality on the basis of moral insanity. Among the pioneers of modern criminology, Romilly, Bentham and Howard sought moderation of penalty, a rational system of prison discipline, and the humanization of the criminal code.

Criminal Anthropology.—The founders of modern criminology are comprised of the Italian triumvirate: Cesare Lombroso (1836–1909), Enrico Ferri (1856–1928), and Rafaele Garofalo (1851–1934). Following his anthropological studies Lombroso promulgated his doctrine that the criminal as found in prison is an atavistic anomaly presenting definite morbid physical stigmata. His contention, based upon his proof of the identity of moral insanity and crime, was the extreme rarity of the first in insane asylums and its great frequency in prisons. He inferred from the skulls of criminals that although some of the anomalies were present in about the same proportion in non-criminals, yet the skulls of the criminals surpassed the insane in most of the cranial anomalies.

The theory most closely connected with his name is that of the criminal anthropological type. From his first contention that crime is atavistic in origin as borne out in his opinion by anatomical, anthropometric and hieroglyphic considerations, he advanced to a recognition of degeneracy as a cause of congenital criminality. He even came to regard atavism as a form of degeneracy where he speaks of the criminal type as 'the presence of five or six characteristics of degeneracy and especially outstanding ears, frontal sinuses, jaw and zygomas voluminous, a ferocious look or strabism, thin upper lip.' His insistence that there are criminal anthropological types corresponding to habitual modes of criminal conduct (indicating his belief in the hereditability of acquired characteristics) betrayed his ignorance of biology and especially of the theory of heredity.

In the *English Convict*, Dr. Charles Goring indicated that the characteristics supposedly peculiar to the criminals were as likely to be found at Oxford as in Dartmoor Prison. According to Enrico Ferri crime is a biologic and social abnormality produced in part, at least, by truly extra-social forces. But under the influence of Lombroso on the one hand, and of the materialism of Spencer on the other, he fails properly to consider the psychic factor, or the subjective environment surrounding every individual in the causation of crime. These, argued Garofalo, must be understood the more adequately to protect society against future harm; to eliminate the recidivist and not merely incarcerate him. Society's task is to discover the motive and give such treatment as will tend to alter that motive and render the offender no longer a menace to society. Crime, far from being an artificial creation of the law, is a natural phenomenon thoroughly intelligible only through the scientific study of the individual, which includes not only his biologic, chemical, and psychic compositions, but also the cultural conditions to which the individual is heir.

The existence and interplay of these heterogeneous forces on the individual would tend to emphasize the absurdity of a common treatment for all offenders, a method at present in vogue under most of the codes of the civilized world.

The researches of Gall, Lombroso and their followers appear to be concerned mainly with the determination of innate physical characteristics, though they contend they have not neglected the economic and social causes of crime.

Criminal Sociology emphasizes the external factors in the social environment in the production of crime. To Gabriel Tarde and Emile Durkheim crime is a natural and inevitable incident of social evolution. To Vaccaro it is an act which the triumphant in the economic struggle consider dangerous to their interests, the criminal being a rebel against the system best adaptable to their own ends. W. A. Bonger lays crime largely to economic conditions. While the Spaniard Salillas and the Viennese Nordau saw in the criminal a social and economic parasite; to Aubert he was a psychically segregated, nervously exhausted being suffering from frustrated life and in fear of poverty and ignominy. To Arbuthnot and Montesquieu criminality was in the main dependent upon climatic conditions, and while recognizing that meteorological conditions alone do not make the criminal, subsequent writers and statisticians tend to confirm Quetelet's 'Thermic law of delinquency,' that these factors wield a not inconsiderable influence over the production of crime.

The *Scientific School* is less concerned with dogmatics. Mercier, studying the relationship between insanity and criminality; Goring, the English prison doctor who undid much of Lombroso's work, and Wm. Healy, pioneer psychiatrist and criminologist, through their case study and psychiatric methods ended arbitrary classification. A. Myerson successfully challenged the notion of hereditability of mental illnesses and C. Murchison and W. T. Root have proved that feeblemindedness is no more marked among convicts than among the law-abiding. According to Schlapp, Pende, Vidoni, Pappilaut and Ruiz-Furis, crime is produced by endocrine deficiency, excesses and disturbances.

Today criminologists have come to regard as of great importance the value of acquired and inherited causative factors. From his researches into the causation of juvenile delinquency, Cyril Burt concludes that in rather less than half the cases examined some constitutional failure is the source of misconduct, attributing delinquency to temperamental deficiency. Heredity in man playing the minor role or predisposing cause, Mercier sees the environmental factor in temptation or opportunity acting on the predisposition of the criminal as the inherent or constitutional factor. And Sir Bryan Donkin taught that the mental makeup of all men is dependent upon inborn capacities or possibilities of development as well as on the many agencies from without that act on the germinal material and tend to influence its development.

Criminologists have discarded phrenological speculation and anthropometrical data and are turning to psychology and the entire domain of medicine for explanation, treatment and prevention of anti-social conduct.

Psychological Abnormalities.—When limiting ourselves to intellectual abilities we are on firmer ground, for defects of knowledge and power of judgment may be ascertained, but we are confronted with insuperable difficulties when we seek to appraise man's emotional age. It is, however, observed that the natural affections are not highly developed; remorse is rare, cynicism, vanity, and untruthfulness are marked. Though mental deficiency has been frequently manifested it cannot be considered a potent factor. Lack of social adaptability and of self-restraint, frequently due to emotional instability, distinct psychoses, dementia praecox, paranoia, manic-depressive psychoses, epilepsy and such borderline disorders as hysteria and compulsional neuroses or psychasthenia, characterized by peculiar fears and fixed ideas are unmistakably evidenced. Lack of integration of the personality is not an uncommon trait.

Physiological Anomalies.—More recently physiological conditions have been regarded as even more definitely characteristic of the criminal than the anatomical. Chemical imbalance, glandular disturbance, destabilization of cell plasms in the emotional region, the menopause and blood chemistry are by the newer criminologists accredited with the initiation of more crime than are the conventional factors of causation. We have no canon of the normal man by which to measure all deviations. Intermarriages have made a myth of the purity of national type. Structure differs to such an extent that it is difficult to judge of the value of striking deviations. Eminent anatomists today reject most of the anomalies described, showing that although they do occur somewhat more frequently in criminals than in others, yet they are to be regarded as variations of the normal type of convolution.

Detection.—The scientific investigation and detection of crime are rapidly becoming an integral part of the police system. The conclusions of laboratory technicians have been a source of invaluable aid not only to the investigator by elucidating otherwise obscure data, but also to courts and prosecution. To point out how the crime was perpetrated, the means utilized and the character of the criminal, crime detection laboratories have been instituted abroad and in the United States, generally in connection with universities and the Department of Justice.

The most important auxiliaries in the investigation and detection of crime are the experts without whose knowledge and special training the solution of almost insoluble problems could never be obtained. From the medical jurisprudent aid may be obtained in an understanding of the identification of corpses, the infliction of wounds, the perpetration of sexual crimes, the requisite force used in the commission of an act and in the detection of malingering. For the determination of mental affections, the existence of sanity, the effect of hypnosis and post-hypnotic suggestion, the existence of color blindness, the condition of the teeth, the expert's services are indispensable. The microscopist for bacteriological examination, the chemist for blood stains, hair and excrement, the toxicologist for analysis of poisons, physicist for explanation of natural forces, zoologist, mineralogist, botanist, experts in firearms, handwriting, photography and fingerprints, all can assist the medical experts in their histological, anatomical and physiological cases by complementing their existing knowledge.

One of the most valuable assets of the criminological laboratories is the recently founded office of medical examiner to replace the obsolete coroner system. Where death of a person is supposed to have resulted from violence, the medical examiner must be summoned to take charge of the body. If as a result of his view thereof further examination seems necessary he shall perform a postmortem examination on the body to determine the cause of death. Since the term murder generally is suggestive of concealment, the violence resorted to may range from dismemberment of the cadaver to the puncture of a hypodermic needle or the introduction into the system of poisons as gases, liquids or solids. Many a crime has been detected which but for the scientific evidence would have gone unsolved. Particularly noteworthy is the assistance granted by the toxicological laboratory in such cases where though the cadaver was marred beyond all possible identification, the crime was proved by toxicological analyses.

Delinquency.—Preceding delinquency there is generally a history of overt experience which cannot be explained in terms of a few causative factors. The logical approach to the subject would be through the large primary groups: the Family, Playground, Neighborhood. It is in the home that the delinquent's basic patterns are formed. The clash between the cultures of young and old and the irreconcilability of incompatible elements tend to demoralize parental discipline. Delinquency is frequently the result of misdirected play, the time during which delinquent acts are impressionably brought to his attention.

Socialized education in the schools, vocational training, camp life and social clubs tend to enrich the child's education. The elimination of child labor and the substitution therefor of wholesome recreation have been of immeasurable assistance. The establishment of a more wholesome attitude toward the police by the activities of the policewoman, and a scientifically administered probation system furnishing the courts with a social diagnosis have enabled us to see the delinquent in terms of the entire social setting.

Among the agencies which have proved their worth in this phase of prevention are the boys' clubs, religious organizations, the junior police for traffic control, and educational films.

Sterilization.—The sterilization of criminals may be considered from three points of view. *Eugenic,* when the criminal is suffering with mental disorder which is a manifestation of habitual criminality. The great difficulty in such cases is to ascertain the amount of abnormality present in the family of the prisoner. In the case of *therapeutic* or preventive sterilization, distinction must be made between sexual potency and sexual desire and consideration must be given to the effect of such an operation on the general health of the subject. As a *punitive* measure, sterilization has been abandoned in the few American states which once sanctioned it. Medical science has not as yet been able to establish that the criminality in any individual is transmissible.

Consult A. F. Hamon, *The Universal Illusion of Free Will and Criminal Responsibility* (1899); C. Burt, *The Young Delinquent* (1925); C. B. de Quiros, *Modern Theories of Criminality* (1911); C. Lombroso, *L'Uomo delinquente* (1876); E. Ferri, *Criminal Sociology* (1917) and *The Positive School of Criminology* (1906); R. Garofalo, *Criminology* (1914); H. Münsterberg, *On the Witness Stand: Essays on Psychology of Crime* (1909); M. H. Smith, *The Psychology of the Criminal* (1933); B. Hollander, *Psychology of Misconduct, Vice and Crime* (1922); E. B. Hoag and E. H. Williams, *Crime, Abnormal Minds and the Law* (1923); S. S. Glueck, *Mental Disorder and the Criminal Law* (1925); C. Murchison, *Criminal Intelligence* (1936); H. Begbie, *Punishment and Personality* (1927); L. Grimberg, *Emotion and Delinquency* (1928); N. East, *The Relation of Skull and Brain to Crime* (1928) and *Medical Aspects of Crime* (1936); O. Kinberg, *Basic Problems of Criminology* (1935); A. Vollmer and A. E. Parker, *Crime and the State Police* (1936); H. G. A. Gross, *Criminal Investigation* (1934); J. J. O'Connell and H. Söderman, *Modern Criminal Investigation* (1935); B. Malinowski, *Crime and Custom in Savage Society* (1926); J. Michael and M. Adler, *Criminal Law and Social Science* (1933); R. M. McConnell, *Criminal Responsibility and Social Restraint* (1912); H. Ellis, *The Criminal* (1910); W. Healy, *The Individual Delinquent* (1915); T. E. Sullenger, *Social Determinants in Delinquency* (1936); C. Lombroso and W. Ferrero, *The Female Offender* (1895); G. Pailthorpe, *Studies in Psychology of Delinquency* (1933); S. and E. Glueck, *Five Hundred Delinquent Women* (1935); M. G. Schlapp and E. H. Smith, *The New Criminology* (1928); R. H. Gault, *Criminology* (1933); H. E. Barnes, *The Story of Punishment* (1930); E. N. Sutherland, *Criminology* (1935). 'Warmark,' *Guilty but Insane.*
BENJAMIN WERNE, S.J.D.

Crimp, a person who usually keeps a sailors' boarding house, and who professedly occupies himself in finding employment for seamen. Crimps, or 'runners' as they are often called, and the disreputable persons who are associated with them, live by pandering to the follies and vices of the lower and less provident class of seamen. Their object is to get hold of the sailor and his effects; keep him by means of drink or drugs in their power until his wages are paid; and fleece him of his money, and even of his clothes.

Crinoidea, krī-noi'di-*a*, or SEA LILIES, a class of echinodermata (q. v.), differing from other members of that order in being either permanently or temporarily fixed by a stalk to rocks, stones, or the soft mud of the sea bottom. Apart from the stalk, which is usually jointed, the body consists essentially of a calyx or cup enclosing the visceral mass, and of long, branched arms radiating from this cup. The alimentary canal is U-shaped, and the mouth and anus are in close proximity on the oral plate, which forms a sort of lid to the cup. The water-vascular system consists of a ring closely surrounding the mouth, from which radial canals are given off, extending into the arms, and bearing lateral tube feet in the form of tentacles, and respiratory in function.

Crinoidea.

There is a double nervous system: the upper system, accompanying the water vessel, being wholly motor; the lower system, with a central mass and radial extensions, being both sensory and motor. The arms, though typically five in number, may be greatly multiplied by branching; they bear lateral pinnules, which produce the characteristic feathered appearance. Both arms and pinnules are provided with ciliated grooves, down which the food—protozoa, diatoms, small crustacea, etc.—is conveyed to the mouth. As in most echinoderms, there are numerous limy plates forming the stalk, the supporting cup, the framework of the arms, and other parts. The sexes are separate and similar; the larva is oval and ciliated.

Living sea lilies were formerly supposed to be few in number; but explorations in the deep sea, especially the great ocean abysses, have shown that they exist in large numbers—some 400 species, distributed among 12 genera, having been discovered. The Rosy Feather Star (*Antedon rosaceus*), which is the best-known modern form, breaks away from the stem at a certain stage, retaining only a stump of the stalk. It swims gracefully by bending and straightening its arms, and moors itself temporarily by tiny whiplike outgrowths, or cirri.

The fossil forms (stone lilies) are extremely abundant, and over 200 genera and 1,500 species are known from fossiliferous strata. Primitive forms are traced back to Cambrian times, and they were very numerous in certain periods of the Palæozoic era. Their contribution to rocks is chiefly calcium carbonate from their calcareous plates and stems. Some limestones are made up largely of these fossil remains (see ENCRINITAL LIMESTONES).

Crin'oline, a term derived from the Latin *crinis* ('hair'), was originally given by French modistes to a stiffening fabric of horse hair, employed to extend women's skirts; and it was also applied to structures of steel wire or hoops by which the same effect was obtained. The fashion appeared in England in the form of the farthingale (q. v.), in the reign of Elizabeth, and later as the 'hoop petticoat' of the early eighteenth century.

Crinum, krī'num, a genus of bulbous plants, comprising about 80 species, belonging to the order Amaryllidaceæ. The flowers are borne in umbels, on a solid, leafless stem, and are generally funnel shaped, fragrant, and brightly colored. They require a fairly rich, well-drained soil. The best-known species are: *C. Moorei*, a native of Natal, and *C. longifolium*, both of which can be grown out of doors; *C. asiaticum*, with white-and-green flowers; *C. Powellii*, with peach-colored blossoms; and *C. capense* with red and white flowers. *C. Americanum*, with creamy white petals, is the Swamp Lily of Florida. The bulbs of *C. asiaticum* serve as a strong emetic.

Crip'ple Creek, tn., Colo., co.

seat of Teller co., 70 m. s. of Denver, on the Florence and Cripple Creek and other R. Rs., including the famous Colo. Springs and Crip. Cr. or 'Short Line,' which follows the cañon rim and passes through nine tunnels. It is near Pike's Peak, at an altitude of 9,800 ft. The Cripple Creek gold region is one of the most productive in the world. Since the discovery of the metal here in 1890 the place has been a thriving mining-camp. Pop. (1900) 10,147; (1920) 2,325; (1930) 1,427.

Crises, ECONOMIC, occur during times of commercial difficulty, when the pressure becomes acute in consequence of a collapse of credit and of public confidence. The best approach to an understanding of the deeper causes of crises is that of human relationships formed in our efforts to gain a livelihood. In an isolated economy where individuals or small family groups live for the most part to themselves, there may be and often is want and even famine, but there are no crises, because life is not dependent on complicated economic relationships. Consequently, there are no relationships to be disturbed.

As life grows increasingly complex its delicate adjustments are easily thrown out of balance. Unsound money is one cause of disturbance; it upsets calculation and brings distress. An agricultural surplus disturbs relations between farmers and those who buy commodities and banks fail because relationships have been miscalculated. A crisis is generally the culmination of protracted trouble of great groups of producers. They are unable to sell at a living price and their distress proceeds outward into ever-widening circles until, finally, the whole nation and much of the whole world become involved. What appears on the surface is generally not a fundamental cause, but a surface manifestation of causes. Surpluses of many kinds had been accumulating; there was a lack of balance in economic life and the relationship between consumer and producer had been thrown out of adjustment.

Remedies consist in establishing a more harmonious relationship between groups of consumers and producers. Capital and labor have to be transferred from surplus production to production of things for which want exists. The process is difficult.

One of the chief causes of crises is human psychology; men expect the impossible and act on feeling and emotion. The land boom in Florida which lasted for several years and culminated about 1926, was not based on actualities. Land was sold at prices that could not be based on any possible income that the land could produce. Inflated values always precede a crisis; all goes well so long as the illusion continues, and when that fails, the collapse is inevitable. Stagnation and a slow period of recovery follow. One generation may learn the lesson, but a new generation appears and again over-expansion based on high price continues until another crash, then depression, and another slow recovery. Booms and their aftermaths stand first as causes; closely connected with these are wars and their consequences.

Numerous crises have fallen in the United States under our modern civilization of the steam and electricity era, and even somewhat earlier when commerce was growing in scope and significance. The following dates have been given of American crises: 1796, 1815, 1825, 1837, 1857, 1873, 1884, 1893, 1907, 1913, 1920, 1929. Each of these crises was followed by years of stagnation. It may be questioned if 1884 was not simply a continuation of the crisis of 1873. Though causes varied, we always find over-expansion in certain particulars. The difficulties following 1815 were produced by the War of 1812 with England. This shut off importations and stimulated home production. After the peace British goods entered in great quantities and ruined producers in the United States, bringing the hard times of 1818–1819.

Inflated land values and wild speculation in land preceded the crisis of 1837; that of 1857 followed speculation in land and over-expansion in railways, while 1873 witnessed the close of a period of inflation and wild speculation connected with the Civil War. During 1861–65 abnormally high prices had been brought about by war demand and inflated American currency; war demand ceased and unsound paper currency was replaced by a gold standard in 1879, but the paper currency was gradually rising in value, and this meant depression in prices.

The crisis of 1893 had as one of its causes the disturbance produced by uncertainty in regard to money metals and standards. Silver as a full legal tender, which would mean inflation, had its advocates, and while the advocates of cheap money did not win, they secured the coinage of large quantities of silver and produced depression.

The stock exchange crash of 1929 was not unlike crises of the past. If one reads David A. Wells' excellent account of the crisis of 1873 in his book, *Recent Economic Changes* (1889), one may see the same phenomena repeating themselves. Step by step, the development is strikingly similar. Farm land values collapsed late in 1920 and continued to fall for at least a decade, accompanied by a wide-spread fall in urban land values. Over-expansion was general in production of coal, copper, textiles, etc. Public utilities had a remarkable growth and a far sounder one than the development of the railways two generations earlier.

On the stock exchange, however, people lost their reasoning faculties; stocks, like real estate, sold at prices that could not reasonably be expected to yield as much as money put in the savings banks. Transactions were based on illusions, and the resulting crash was one of the worst in American history.

In recent years able economists have given much attention to business cycles. They divide economic life into cycles of prosperity, recession, recovery and prosperity, and within these cycles crises find their place as acute disturbances. The subject of business cycles is one of the most complex and difficult problems in economics, and the interest in it is shown by the fact that a recent (1930–31) bibliographical list of titles numbered nearly a thousand.

Consult D. R. Dewey, *Financial History of the United States;* R. T. Ely, *Outlines of Economics,* Ch. 17; W. C. Mitchell, *Business Cycles;* E. Wagemann, *Economic Rhythm: A Theory of Business Cycles.*

Crisfield, tn., Somerset co., Md., 90 m. S.E. of Washington, on the E. shore of Chesapeake Bay, a terminus of the N. Y., Phila. and Norf. R. R. It has canneries and packing establishments, fish, game and oysters being the chief products. Pop. (1930) 3,850.

Crisp, CHARLES FREDERIC (1845–69), American jurist, was born, of American parentage, in England. He served in the Confederate army during the Civil War until captured in 1864. After the war he studied law and in 1878 became judge of the superior court of Georgia. He was elected to Congress in 1882, and re-elected until his death. He was speaker of the House of Representatives from 1891 to 1895.

Crispi, FRANCESCO (1819–1901), Italian statesman, born in Sicily; took active part in the overthrow of the kingdom of the Two Sicilies, being (1849) secretary of war for the revolutionary movement. In 1859 he planned the second Sicilian revolt. As representative for Castelvetrano, Sicily, in the first Italian Parliament (1861), he became leader of the constitutional opposition and champion of the people's rights. Elected to the presidency of the

Chamber of Deputies (1876), minister of the interior (1877), he maintained an amicable understanding between England, Germany, and Italy on the Eastern question, but resigned office early in 1878. He at this time published a brochure entitled *Repubblica e Monarchia*, directed against the Mazzini party.

On the reconstruction of the Depretis ministry in 1887, Crispi entered it as minister for foreign affairs, and when Depretis died (1887) Crispi succeeded him as prime minister. After Italy entered the Triple Alliance, of which he was a firm supporter, the large amounts voted for increased army and navy caused a financial crisis. Crispi became very unpopular, two attempts being made upon his life (1889). The Crispi ministry fell (1891) on a question of taxation. He resigned the leadership of the opposition (1892), but retained his seat. He again became premier in 1894, but was driven from office after the disastrous defeat of the Italians in Abyssinia (1896). During his retirement, charges reflecting upon him were made by his political enemies. The affairs of the Bank of Naples were exhaustively investigated by a commission of the Chamber of Deputies, as well as Crispi's relations with the bank. Although he was acquitted of any criminal offence, certain irregularities were brought home to him; and a section in the chamber endeavored to secure his impeachment, but in vain. See Stillman's *F. Crispi, Insurgent, Exile, Revolutionist, and Statesman* (1899); L. Fortis's *Crispi, Note Biografiche* (1895).

Crispin (or CRESPIN), tutelary saint and patron of shoemakers, was traditionally born at Rome towards the close of the third century, and maintained himself by working as a shoemaker while spreading the gospel. The tale is, however, probably apocryphal. His festival falls on October 25. See *St. Crispin and the Gentle Craft* (1868).

Crissa, CRISA, or CIRRHA, tn. of Phocis, ancient Greece, a few miles S.W. of Delphi. The name Cirrha was eventually restricted to the port on the Corinthian Gulf at which travellers to Delphi landed. The inhabitants of Crissa levied dues on the pilgrims to the oracle at Delphi, and claimed to control the oracle; the Delphians therefore appealed to the Amphictyonic League against the men of Crissa, and the first sacred war was waged against them, in about 590 B.C., with the result that Crissa was utterly destroyed, and its territory declared sacred to Apollo.

Critias, politician at Athens at the close of the 5th century B.C., and a pupil of Socrates. Banished from Athens towards the end of the Peloponnesian War, he returned with other exiles when the city was taken by the Spartans (B.C. 404), and became leader of the Thirty Tyrants established by the Spartans. In this position he showed the greatest severity towards the supporters of the democracy, and even towards moderate oligarchs, executing his opponents without trial and seizing their property. In 403 B.C. he fell in a battle fought at the Piræus against the returning democrats. Critias had some reputation as an orator and a poet; the fragments of his poetry will be found in Bergk's *Poetæ Lyrici Græci*. He also wrote a work on politics, which has been identified by many scholars with the *Treatise on the Athenian Constitution* included among the writings of Xenophon, who certainly is not its author. Plato makes him the chief speaker in his dialogue *Critias*.

Critical Temperature. The recognition of the conditions under which it is possible for a substance to exist in both the liquid and gaseous forms we owe to Andrews of Belfast. Working with the substance known as carbon dioxide, he showed that when the temperature was below 31° C. the vapor and liquid conditions could be clearly distinguished, and could exist in presence of each other; but that at temperatures above 31° C. no amount of pressure could produce a true liquid condition—*i.e.* a state characterized by the appearance of a free liquid surface. The substance might be compressed to a density less than that in a liquid condition at lower temperatures, but it was impossible to mark any transition from the gas to the liquid form such as is familiar to us in the ordinary case of steam and water. This temperature above which no condensation to a liquid form can be effected Andrews called the critical temperature. It is a definite temperature, associated with a definite pressure for every substance. Not until we reduce the temperature of the particular substance below its critical temperature can we effect its liquefaction. The five gases, oxygen, nitrogen, hydrogen, carbon monoxide, and marsh gas, were long known as the permanent gases. To get them in the liquid state it was necessary to cool them down below their critical temperatures, and this has been done only within the last thirty years. Thus air cannot be liquefied till its temperature is reduced below −140° C., under a pressure of 39 atmospheres; and before hydrogen can be obtained in a liquid form it must be cooled to −241° C., under a pressure of 15 atmospheres. Helium has not yet been liquefied, its critical temperature lying below the lowest temperature that has been reached by means of liquid hydrogen.

Criticism, BIBLICAL. The higher criticism (so called in contrast to the 'lower' or textual) is not so much concerned with the text of a document as with its origin and character—its integrity, its authenticity, its credibility; though, of course, the two fields of inquiry cannot be kept wholly distinct: for example, the adoption of a particular reading will sometimes influence the view taken of the authorship, and *vice versa*. As regards integrity, the critic may come upon omissions, interpolations, or transpositions; *cf.* the confused state of the Hebrew text of Jeremiah, or the additions to Josephus' *Antiquities* in connection with Jesus Christ. It is in this domain in particular that the higher and the lower critic must collaborate. The question of authenticity—did the work under discussion really come from the author whose name it bears, or to whom it is traditionally ascribed?—is complicated by the fact that in certain periods of the past the fabrication of works professing to be written by distinguished authors was so common as almost to be called a profession: Plato, Epicurus, etc., were credited with books they never saw. The problem of credibility is naturally a very involved one, and its solution in any special instance will largely depend upon the knowledge and presuppositions of the critic; it demands acquaintance with the laws of historical evidence, and skill in the application of them.

For a long time the writings of the Bible were considered to lie outside the domain of criticism; but the modern textual criticism of the New Testament (see Erasmus, Elzevir, Griesbach, etc.), followed by that of the Old Testament (J. D. Michaelis, Kennicott, De Rossi, etc.: much remains to be done), having in some measure unfixed the popular idea of the inviolability of the Scripture texts, prepared the way for the more fundamental and more far-reaching investigations of the higher criticism. Doubts began to be thrown on the integrity of certain books—*e.g.* Isaiah; the ascription of the Pentateuch to Moses was questioned, the credibility of certain passages in the historical books suspected; and, in course of time, the views of scholars regarding the majority of the Old

Testament (and many of the New Testament) writings underwent a radical transformation, and as a consequence the history of Israel required to be rewritten from a point of view entirely new. The conclusions drawn, indeed, have led many to look upon the higher criticism as an enemy to the belief in an inspired Bible. But since it is admitted by all thinking men that we do not possess the Scriptures in their original form, it is difficult to see why an embargo should be laid upon investigations designed to get as near as possible to the autographs, since, whatever inspiration means, it cannot very well belong to the errors of copyists or editors. In point of fact, it might be held that the criticism of the Scriptures presupposes their inspiration, seeing that its main purpose is to ascertain the circumstances of their authorship, and, on the basis of the resultant facts, to portray the development of the religion of the chosen people, or, as it might be put, to exhibit the process of the Divine revelation to man. The higher critic and the lower critic alike must, of course, have an extensive knowledge of the language of the documents they investigate; they will also require a certain indefinable insight and tact; moreover, if it be the Biblical writings that are under investigation, we have a right to demand great sobriety of mind, and (especially in the higher critic) a responsiveness to religious ideas. On the other side, the conclusions of criticism are not to be summarily set aside on *a priori* grounds; if they are to be rebutted at all, it can only be by means of a scholarship and a sympathy not less than those of the critic himself.

The methods and results of the higher criticism will be found in books of introduction, and usually in commentaries. See article BIBLE, under *Literature;* compare also HEXATEUCH, GOSPELS, and articles on separate books. The science of literary-historical criticism is usually treated in theological encyclopædias—*e.g.*, Heinrici's *Encyclopädie*, pp. 194 *ff.*, 200 *ff.* For textual criticism, see also under BIBLE, and Rishell's *Higher Criticism* (1893); Zenos's *Elements of Higher Criticism* (1895); and Gilmore's 'Higher Criticism' in *Monist* (Jan., 1904).

Criticism, LITERARY. Criticism may be said to be established in Aristotle's *Poetics*, a treatise which has had an overwhelming influence, and remains the greatest single pronouncement in the whole history of criticism. The important discussion on poetry in Plato's *Republic*, as well as the censure of Euripides in the *Frogs* of Aristophanes, is of earlier date: but Plato examines poetry with regard to its moral value, and his treatment of it is incidental to his main scheme. The greater part of the *Poetics*, which is unfortunately fragmentary, deals with tragedy—a fact which accounts for the predominance of dramatic criticism in modern times down to the 18th century; and though its views are drawn from the example merely of Greek poetry, they are indisputable in their essentials. The *Rhetoric* is a hardly less valuable treatise on prose, though not so important a contribution to the philosophy of literature. After Aristotle, the first Greek critic of importance is Dionysius of Halicarnassus (d. 7 B.C.), the author of a treatise on composition or the arrangement of words, a rhetoric, and various judgments on Greek authors, in which attention is centred largely on technique. But his work pales in interest before the Περὶ Ὕψους (*De Sublimitate*), generally ascribed to Longinus (*c.* 213–273 A.D.). This treatise on the sublime stands in more than one sense by itself. No early reference to it is known; it had no influence till the time of Boileau, and it is entirely distinct from contemporary criticism in its regard for the total effect or æsthetic value of a work as well as for literary technicalities. By virtue of this characteristic, it is, though meagre in influence, the greatest piece of classical criticism after the *Poetics*. Latin criticism is best represented by Cicero (in his *Brutus*, *Orator*, and *De Oratore*), Horace, the author of the *Dialogus de Claris Oratoribus* (perhaps Tacitus), and Quintilian. Unlike Greek criticism, it had another literature with which to compare its own; but it felt the domination of Greece too strongly to avail itself properly of this advantage. Lacking independence, it wants also intrinsic value. It is marred by its extremely epideictic quality, and has not the philosophical grasp of Greek criticism; and yet its influence has been considerably greater. The *Epistola ad Pisones* or *De Arte Poetica* of Horace has had more to do than any other single book with the establishment of the general doctrines of literary 'classicism.' The practice of verbal criticism and the teaching of rhetoric date from the 2d and 3d centuries B.C. The influence of the scholars of Alexandria and Pergamos, which was first felt in Rome about 160 B.C., may be traced down to the renaissance. The middle ages produced a large number of formal treatises on rhetoric, and scholastic expositions devoted specially to prosody and metre; but the only work before the renaissance which stands out pre-eminently as criticism, by reason of its spirit, range, and attitude, is the *De Vulgari Eloquio* or *Eloquentia* of Dante.

The very enthusiasm of the renaissance was inimical to the immediate growth of criticism. The treasures of Greece and Rome were accepted indiscriminately, and the chief care was the mere text. Criticism made little or no advance before Vida's *De Arte Poetica* (1537), the herald of the great critical activity in Italy during the 16th century. This poem, which is devoted mostly to instructions on the writing of epics, shows the domination of Virgil, while in subject and method it is influenced by Horace. But it was the *Poetics* of Aristotle which gave a special impetus to criticism, at the time when his authority in philosophy was on the wane. Unlike Horace's *De Arte Poetica*, which had apparently never been lost sight of during the middle ages, the *Poetics* was barely known till the middle of the 16th century (first edited critically in 1548 by Robortelli). Its influence is nowhere more noticeable than in the *Poetices Libri Septem* (1561) of J. C. Scaliger, in which Aristotle is styled 'imperator noster, omnium bonarum artium dictator perpetuus,' though in poetry Scaliger preferred Virgil to Homer, and the Romans generally to the Greeks. It is an exaggeration to say, as an enthusiast has done, that Scaliger was the 'founder of classicism,' while the ascription to him of the rules of the three unities is an injustice to Castelvetro, whose translation of the *Poetics* appeared in 1570; but the *Poetices Libri Septem* contains the essential doctrines of classicism, and had a greater effect on vernacular literatures than any other critical work of that century. Italian vernacular criticism, which found a fruitful subject in the *Gerusalemme Liberata* of Tasso, is represented by such books as Trissino's *Poetica* (1529–63), Daniello's *Poetica* (1536), Giraldi Cinthio's *Discorsi* (1554), Minturno's *Arte Poetica* (1563), and Tasso's *Discorsi dell' Arte Poetica* (*c.* 1564, pub. 1587). Among the successors of Scaliger may be mentioned Heinsius, whose *De Tragœdiæ Constitutione* (1643) was studied by Racine; and G. J. Vossius, who codified the classical theories in his *De Artis Poeticæ Natura*, *Poeticarum Institutionum Libri Tres*, and *De Imitatione*, all three in 1647.

If Italy played the chief part in the development of criticism during the 16th century, the lead in the 17th passed to France.

There was, however, a considerable body of French criticism before the influence of the classics and the Italian critics began to be felt. Deschamps wrote an *Art de Dictier* about 1400. The 'grands rhétoriqueurs' have their art of poetry represented in the anonymous *Art et Science de Rhétorique* (1493), and in the equally formal treatises of Pierre Fabri (1521) and Gratien du Pont (1539); and a similar office is performed for the school of Marot by Thomas Sibilet, whose *Art Poétique Français* appeared in 1548. Sibilet was not ignorant of the classics, but he could not 'turn them into blood and nourishment.' This was the work of the Pléiade, who are the real founders of French literary criticism. Their doctrines are stated in Du Bellay's epoch-making *Défense et Illustration de la Langue Française* (1549), Ronsard's *Abrégé de l'Art Poëtique Français* (1565), and his two prefaces to the *Franciade* (1572, 1584), and Vauquelin de la Fresnaye's *Art Poétique* (*c.* 1590, pub. 1605), as well as in many other treatises of less importance. French critics undoubtedly owe to the Italians, or rather to Scaliger, their knowledge of Aristotle, the first allusion to whose *Poetics* occurs in 1562, in the *Bref Discours* prefixed to the *Théâtre de Jacques Grévin.* From this time Aristotle's influence went on steadily increasing, and his views, or rather the theories that were read into his words, came to be taken as rigid laws. Alexandre Hardy's prefaces to his plays (5 vols. 1626) and Ogier's preface to Jean de Schelandre's *Tyr et Sidon* (1628) represent the struggle of the French drama against the imposition of rules; but the classical school soon triumphed, with the aid of Richelieu and his literary henchman Chapelain. The *Sentiments de l'Académie sur le Cid* (1638) has the importance not merely of being the first piece of applied criticism in France, but also of establishing definitely the three unities and other characteristics of the French classical drama. The pedantry to which the criticism of this school lent itself is eloquently illustrated by the *Poétique* (1640) of La Mesnardière and the *Pratique du Théâtre* (1657) of D'Aubignac. The only valuable piece of dramatic criticism at this time, and perhaps the most valuable in the whole history of French literature, is the *Discours Dramatiques* (1660) of Corneille. There is a large amount of criticism dealing with epic poetry; it is generally in the form of prefaces to the many pseudo-epics, such as Scudéry's *Alaric* (1654) and Chapelain's *Pucelle* (1656), but its chief embodiment is the *Traité du Poëme Epique* (1675) of Le Bossu, a monument of wrong-headed erudition. By far the greatest work is the *Art Poétique* (1674) of Boileau, a full statement of the general principles of French classicism, and an admirable expression of the literary spirit of the time. It marks the complete maturity of the doctrines introduced by the Pléiade and furthered by Malherbe. They were to be impugned in the 'Quarrel of the Ancients and Moderns,' but they held their ground during the 18th century. The influence of Voltaire, which was much less than might be imagined, only tended to confirm them. His early critical work, such as the *Essai sur la Poésie Epique* prefixed to the *Henriade* (1727) and his *Lettres Philosophiques* (1734), shows restiveness; but in the *Commentaire sur Corneille* (1764) and in the *Dictionnaire Philosophique,* etc., he returned piously to the old faith. Unorthodoxy is rampant in Diderot, who pleaded for a new drama in his *Entretiens sur le Fils Naturel* (1757) and *De la Poésie Dramatique* (1758), and generally neglected the arbitrary rules and formulæ on which criticism relied. The regard for Shakespeare in France at this time likewise testifies to the weakening of the old traditions. Towards the end of the century, however, there was a classical revival. It is seen in the work of Batteux, the later judgments of Voltaire, the *Poétique* (1763) and *Eléments de Littérature* (1787) of Marmontel, but best of all in the *Lycée, ou Cours de Littérature* (1786, etc.) of La Harpe, the definitive expression of French classicism.

The real beginnings of English criticism are to be found in the rhetorics of the 16th century, the most important of which is the *Arte of Rhetorique* (1553) of Thomas Wilson; and, like French criticism, it developed when fructified by the work of the Italians. This influence is very marked in Roger Ascham's *Scolemaster* (1570) and is no less so in the *Apologie for Poetrie* (1595) of Sir Philip Sidney, the masterpiece of Elizabethan criticism, interesting alike in its defence of poetry as an art, its classical doctrines, and its references to contemporary English literature. Most of the treatises of the time deal with the formal elements of poetry, as G. Gascoigne's *Certayne Notes of Instruction* (1575), W. Webbe's *Discourse of English Poetrie* (1586; Arber's ed. 1869), and G. Puttenham's *Arte of English Poesie* (1589); and there is persistent praise of the excellency of the English tongue. Some writers, notably Gabriel Harvey and Webbe, advocate the imitation of classical metres, as certain Italians and Frenchmen (*e.g.*, Tolomei and Jacques de la Taille) had already done; and as late as 1602 T. Campion made a similar plea in *Observations on the Art of English Poesie,* which in turn called forth Daniel's *Defense of Ryme* (1602; Haslewood's ed. 1811). A very different note is struck in Bacon's *Advancement of Learning* (1605), bk. ii., where he deals with the nature of poetry, and finds its source in the faculty of imagination. In Ben Jonson we have a critic of pronounced classical tastes; but his classicism, unlike that of so many others, owes more to the example of the ancients than to the theorizings of the Italians, though of these he was by no means ignorant, and accordingly it is not trammelled by conventions which were imposed in France. The exuberant romanticism of the Elizabethans prevented the domination of critical theory; but in the 17th century criticism developed with the growth of the 'classical' or correct doctrines of poetry. Johnson has called Dryden the 'father of English criticism;' and the title may be easily justified, for in Dryden criticism concerns itself with discussing methods rather than with dictating rules, judges an author or work in respect of the general characteristics, and is established as a distinct literary form. The fully-developed French criticism was bound to exert an influence now that English literature was itself classical. Boileau-Despréaux's *Art Poétique* (1674), which was rendered in verse by Sir William Soame and Dryden in 1683, suggested Sheffield's *Essay on Poetry* (1682) and Roscommon's *Essay on Translated Verse* (1684); and nearly all the French critics of repute—Boileau, Le Bossu, Rapin, Dacier, Bouhours, Fontenelle, Fénelon, and Saint Evremond—were translated. Their influence, however, is apt to be exaggerated. Though well known, and referred to as authorities, they told only on the weaker men. They were at least unable to make England accept Aristotle as a dictator. Their influence is seen most clearly in the pseudo-classicism of such men as Rymer. Yet it may be traced also in much of the criticism of Addison, to whom posterity has given greater credit for originality than he deserves. The youthful *Essay on Criticism* owes much to Boileau, and bears other testimony to its own statement that 'critic learning flourished most in France,' while the 'View of the Epic Poem,' prefixed to the translation of the *Odyssey* is extracted from Le Bossu; but the French critics are neglected once English classicism has achieved its own perfection in the mature work of Pope. The culmination of English classical criticism is seen in Johnson, in some respects the greatest of English critics. As a judge of the literature of the 18th century he is unequalled, but he has in a marked degree the limitations imposed upon him by his age. Macaulay's remark that Johnson's attitude is that of the lawyer is particularly happy, for Johnson expounds and applies his literary doctrines, and treats even his favorite authors, with the cold impartiality of the bench. The development of 18th-century taste is well seen in the treatment of Shakespeare; and there are many other proofs of the widening of the critical horizon, as in Hurd's *Letters on Chivalry and Romance* (1762); Thomas Warton's *Observations on Spenser* (1754), and especially his *History of English Poetry* (1774–81), the scholarship and attitude of which are remarkable in an age deficient in historical sympathy.

In the latter half of the 18th century attention was given to the more general problems of taste. The English school is represented by Hume's essay, *Of the Standard of Taste* (1742), Hogarth's *Analysis of Beauty* (1753), A. Gerard's *Essay on Taste* (1758), Burke's *Sublime and Beautiful* (1756), Reynolds's papers in the *Idler* (1758–9) and *Discourses* (1769, etc.), Kames's *Elements of Criticism* (1762), A. Alison's *Essays on Taste* (1790), and Sir Uvedale Price's *Essay on the Picturesque* (1794–8). The French representatives are Du Bos, the Encyclopedists, and especially Diderot. But the study was fully established, and in a sense claimed as it own, by Germany. G. E. Lessing's *Laokoon* (1766), which is under some debt to the earlier of the English works, had a profound influence, and is the forerunner of the work of Schiller, Kant, Richter, the Schlegels, Schelling, Herder, Fichte, and Hegel. But their doctrines belong rather to the domain of æsthetics than to that of literary criticism, though they told greatly on the practice of literary criticism at a time when the romantic revival threw the old methods and theories into the melting-pot. The study of æsthetics started under the ægis of classicism. Of the *Poetics* of Aristotle Lessing had said, 'I do not hesitate to acknowledge that I consider this work as infallible as the *Elements* of Euclid;' but in pointing out the errors in the superstructures of the French critics, he helped on the overthrow of classicism itself.

The advent of romantic criticism in England was announced by the preface to the *Lyrical Ballads* (1798) of Wordsworth and Coleridge, but it was not established, for want of concerted effort, and even of recognition of the full bearings of the movement, till about 1820. The interval is marked by the founding of the reviews—the *Edinburgh* in 1802, the *Quarterly* in 1809, and *Blackwood's Magazine* in 1817. The work of Jeffrey, Gifford, and Lockhart, however, was more or less reactionary. It had much in common with the old criticism; and if it discarded the classical code in favor of impressionism or mere whim, it retained the old attitude. The two great critics of the new school are Coleridge and Hazlitt. The revolution in aim and manner is brought out admirably by a statement in the *Biographia Literaria* (1817) of the former: 'Critics are too apt to forget that rules are but means to an end; consequently, where the ends are different, the rules must be likewise so. We must have ascertained what the end is before we can determine what the rules ought to be.' The 18th century had passed verdicts or drawn up formal reports; in requiring an intelligent sympathy with the author's aim, criticism now becomes essentially interpretative. To some extent Coleridge was under the influence of German criticism, though the debt is easily overrated; but neither this, nor his general view of criticism, gave him catholicity of taste. He was blinded by prejudice to the good points of 18th-century classicism and of French literature generally. It was otherwise with Hazlitt, whose catholicity, marred only by bursts of political or personal prejudice, does not seem to have been adequately recognized. He frankly asserts the futility of trying to reconcile different tastes in literature. More than this, he says emphatically, with reference to English and French taste, 'Both are right in what they admire; both are wrong in condemning the others for what they admire.' But Hazlitt was absolutely indifferent to the historical circumstances of a work. He says we have no right to ask whether an author 'could do anything else, or how he did it, or how long he was about it.' He views a work merely in itself, and with regard to the feelings which it arouses in him. The addition of historical sympathy to the interpretative and catholic attributes of the new school was urged by Carlyle, who, however, has left little purely literary criticism. His view is thus formulated in his *Essay on Goethe* (1828): 'First, we must have made plain to ourselves what the poet's aim really and truly was, how the task he had to do stood before his own eye, and how far, with such means as it afforded him, he has fulfilled it. Secondly, we must have decided whether and how far this aim, the task of his, accorded, not with *us* and our individual crotchets, and the crotchets of our little senate, where we give or take the law, but with human nature, and the nature of things at large.' Of the other champions of the new school, the more important are Lamb, Leigh Hunt, and De Quincey. But though critics of delicate taste, they hardly affected the theories or principles of criticism; and still less did Macaulay, whose work is reactionary, for he was so deficient in sympathy as to be lacking in interpretative power, and, by his own confession, was unable to analyze his enjoyment of works of the imagination. In the latter half of the 19th century the greatest force in English criticism was Matthew Arnold. While in earlier pleas for historical sympathy interest is centred in the individual, Arnold inclines, under the influence of Sainte-Beuve, to consider a writer in relation to the mental atmosphere of the time (see, for example, his criticism of Gray). More important than this is the attention he devotes to foreign literatures, which has led to the development of comparative criticism. While earlier criticism was mostly insular, Arnold insists on the study of the classics and of other literatures as a corrective to British national shortcomings and extravagances, and he enunciates the important view that 'the criticism which alone can much help us for the future is a criticism which regards Europe as being, for intellectual and spiritual purposes, one great confederation, bound to a joint action and working to a common result. His views on the 'interpretative power' of poetry, summed up in the statement that 'poetry is at bottom a criticism of life,' do not bear directly on the principles and practice of literary criticism, and accordingly do not concern us here. It would be difficult to gauge the influence of Ruskin, but it is seen to best effect in the interpretative criticism, with its doctrines of æsthetic enjoyment of Walter Pater.

The searching of hearts caused by Poe's audacious criticisms of his contemporaries in this country was no doubt of the greatest use in the development of American literature, even though we admit that Poe allowed personality to influence him—yet more often than not there was sound principle in his gibe. Of similar import was Margaret Fuller's work in the N. Y. *Tribune*. Whipple was a useful guide to our early students. Emerson, in his critical work, let his inquisitive mind play over some essential point. Taylor and Ripley established a standard of newspaper criticism scarcely attained before their day. Lowell, of course, was the comparative critic *par excellence,* on whom the best of his successors have modelled their styles with variations of their own.

Modern French criticism begins with Madame de Staël's *La Littérature* (1800) and *L'Allemagne* (1810), and Chateaubriand's *Génie du Christianisme* (1802). The former broke down the barriers of the old classical criticism by examining the influence of religion and 'social institutions,' and urging the study of the Teutonic literatures. She is well said to have enlarged the sphere of French criticism in point of space. Chateaubriand, on the other hand, enlarged it in point of time, for he helped to create an interest in ages before the period of classical ascendency. Madame de Staël, in particular, prepared the way for the romantic movement in the third decade. But neither Victor Hugo's preface to *Cromwell* (1827), the manifesto of the romanticists, nor the criticisms in the *Globe,* their official mouthpiece, had much effect on the development of critical method; the real stimulus came from the Sorbonne, and the form it took was the introduction of history into criticism. Victor Cousin, whose *Du Vrai, du Beau, et du Bien* (1854) is one of the ablest French contributions to the study of æsthetics, applied history to the interpretation of philosophy, and expressed views on the influence of climate and surroundings which were to be fully developed by Taine; while Villemain, in his *Tableau de la Littérature Française au XVIIIe Siècle* (5 vols., 1828–9), and *Tableau de la Littérature au Moyen Age* (2 vols., 1846), marked a further advance by showing the interaction or parallel development of different literatures, and bringing both history and biography to bear in the illustration of an author's work. In this latter respect he showed the way to Sainte-Beuve; but while Villemain gave large and often vague 'tableaux,' Sainte-Beuve's great works, the *Causeries du Lundi* (15 vols., 1851–62) and *Nouveaux Lundis* (13 vols., 1863–72), are collections of individual portraits. His interest is essentially psychological. He approaches the study of a work through the study of its author; or rather his wonderfully subtle analysis of a work has for its main object the faithful portraiture, the realization, of its author. He aimed at what he calls 'l'histoire naturelle des esprits,' and looked forward to a day when, despite the complexity of man's moral nature, 'les grandes familles d'esprit seront déterminées et connues.' A clear definition of personalities was an essential preliminary to their classification into species, and herein lay the reason of his preponderating regard for the individual; but though ultimately he imposed on his monographs this scientific aim, they are not in themselves disfigured, like so much later work, by the incubus of science, and they remain the highwater mark of French criticism. The scientific purpose is fully developed in Taine, who says in the Introduction to his *Histoire de la Littérature Anglaise* (1863), 'J'entreprends ici d'écrire l'histoire d'une littérature, et d'y chercher la psychologie d'un peuple.' In his theory the essential character of a literature is established by three conditions—the *race,* the *milieu,* and the *moment*—of which every author is regarded as a resultant. But his theory, though expounded with the greatest skill and force, is powerless to explain the problem of the individual, and it has the glaring fault of viewing literature, not in the respect of its own laws, or even of its attributes, but of what are often merely indispensable concomitants. A further scientific development is seen in the evolutionary theories of M. Brunetière, who holds that, after the influence of the individual, the greatest is that of works on works. He has applied to criticism the doctrines of Darwin and Haeckel, with the result that he is unsurpassed in tracing a literary influence or tendency; but his insistence on the evolutionary method has dwarfed his faculty of appreciating a work in itself. Of recent years the comparative method, of which there had been fitful hints from time to time, has been established, and numbers many votaries in France and America. Only recently has the development of literary criticism been recognized as a definite study, Professor Saintsbury's *History of Criticism and Literary Taste in Europe* being the principal attempt at an adequate treatment of the subject. With the greater attention now paid to the study of literature, greater demands are made on the critic's scholarship; but the development of research and 'laboratory work,' in which the Germans have for long been the most assiduous, is not without danger to the generalizing power which, in his own way, the critic must possess no less than must the poet. At the same time, increased attention is apparently being paid to the technical and formal. On the whole, criticism is now descriptive rather than interpretative, and is more occupied in disengaging an author's qualities than in judging them. If it compares one author with another, its purpose is not to prove one the better—as in the old disputes over Homer and Virgil, Ariosto and Tasso, Corneille and Racine—but rather to illustrate the different methods, manners, and points of view. Perhaps its best work is in placing the author in relation to the general tendencies of the time, and in analyzing and tracing the main movements in the literary life, whether individual or national.

See G. E. B. Saintsbury's *Hist. of Criticism* (1900); W. J. Courthope's *Liberty and Authority in Matters of Taste* (1896); B. Bosanquet's *A History of Æsthetic* (1891); S. H. Butcher's *Aristotle's Theory of Poetry and Fine Arts* (1902); W. Rhys Roberts's *Longinus* (1899); A. E. Egger's *Essai sur l'Histoire de la Critique chez les Grecs* (1849); H. Nettleship's *Classical Antiquities* (1902); J. E. Spingarn's *Literary Criticism in the Renaissance* (1899); C. Borinski's *Die Poetik der Renaissance* (1886); G. Gregory Smith's *Elizabethan Critical Essays* (1897); F. E. Schelling's *Literary and Verse Criticism of the Reign of Elizabeth* (1891); W. P. Ker's *Essays of John Dryden* (1900); P. Hamelius's *Die Kritik in der Englischen Literatur des 17- und 18 Jahrhunderts* (1897); D. Nichol Smith's *Eighteenth-Century Essays on Shakespeare* (1893); C. E. Vaughan's *Literary Criticism* (1896); F. Brunetière's *L'Evolution des Genres dans l'Histoire de la Littérature* (1890); E. Tissot's *Les Evolutions de la Critique Française* (1890); E. Llanglois's *De Artibus Rhetoricæ Rhythmicæ* (1890); Pellissier's introduction to Vauquelin de la Fresnaye's *Art Poétique* (1862); Hatzfeld and Meunier's *Les Critiques Littéraires au XIXe Siècle;* E. Hennequin's *La Critique Scientifique* (1889), a pronounced example of the scientific tendencies; E. Droz's *La Critique Littéraire et la Science* (1893), a denunciation of the 'scientific' methods of criticism; Petit de Julleville's *Histoire de la Littérature Française* (1900); F. Braitmaier's *Geschichte der Poetischen Theorie und Kritik von den Diskursen der Maler bis auf Lessing* (1888); Menéndez y Pelayo's *Historia de las Ideas Estéticas en España* (1883); Stedman's *The Nature and Elements of Poetry* (1892), and his *Poets of America* (1885) and *Victorian Poets* (1875); Woodberry's *A New Defence of Poetry* (1900); W. M. Payne's *American Literary Criticism* (1904); C. M. Gayley and F. N. Scott's *Methods and Materials of Literary Criticism* (1899), a useful bibliography. See also the references of the separate articles on the chief critics.

Critolaus, krit-ō-lā'us, of Phaselis in Lycia, Greek philosopher of the Peripatetic school. He was sent by the Athenians to Rome in 155 B.C., with Carneades and Diogenes, to obtain the remission of a heavy fine imposed on the Athenians, and with his colleagues made a great impression at Rome by his lectures.

Crit'tenden, JOHN JORDAN (1787–1863), American political leader, was born in Versailles, Ky. He was graduated from William and Mary College in 1807, was admitted to the bar, and in 1809 was attorney general of Illinois Territory. Having returned to Kentucky, he soon became prominent in politics, and was several times elected to the state legislature. At first a Democrat or Democrat-Republican, he allied himself with J. Q. Adams and Henry Clay rather than with Jackson, and became a National Republican and afterwards an ardent Henry Clay Whig. He was a member of the U. S. Senate (1817–19, 1835–41, 1842–8, and 1855–61); U. S. district attorney (1827–9); attorney general of the United States (1841 and 1850–3), governor of Kentucky (1848–50), and a representative in Congress (1861–3). He is best remembered for his loyalty to the Union at the time of the Civil War, and his efforts to prevent war. In 1860 he allied himself with the Constitutional Union Party (q. v.), and after the election of Lincoln proposed in the U. S. Senate the famous Crittenden Compromise (q. v.). During the war he supported the Administration in the main, but was identified with the conservative rather than with the radical element in Congress. Consult Coleman's *Life of John J. Crittenden.*

Crittenden, THOMAS LEONIDAS (1815–93), American soldier, son of John Jordan Crittenden, served during the Mexican War, becoming lieutenant colonel (1847), and after the war was appointed consul at Liverpool by President Taylor. In the Civil War he served on the Federal side, advancing from the rank of brigadier general of volunteers (1861) to major general (1864). He was afterward appointed colonel of the Thirty-second Infantry in the regular army, and in 1867 was brevetted brigadier general for gallant and meritorious conduct in the battle of Stone River.

Crittenden Compromise, a measure for compromise between the Northern and Southern States of the United States proposed in the U. S. Senate by John J. Crittenden (q. v.) on Dec. 18, 1860, when the outbreak of hostilities between the two sections seemed imminent. It provided for the adoption of six amendments to the Federal Constitution, the most important of which was that the line of 36° 30′ N. lat. should divide slave from free territory, so long as such territory should remain under territorial government, but that 'when any territory north or south of said line . . . shall contain the population requisite for a member of Congress . . . it shall, if its form of government be republican, be admitted into the Union, on an equal footing with the original states, with or without slavery as the constitution of such new State may provide.' The other proposed amendments prohibited Congress from hindering or preventing the interstate slave trade, and from abolishing slavery in the District of Columbia, 'so long as it exists in the adjoining States of Virginia and Maryland, or either, nor without the consent of the inhabitants, nor without just compensation first made to such owners of slaves as do not consent to such abolishment.' Moreover, Congress was to provide by law for the payment by the U. S. government to any slave owner of the full value of a fugitive slave owned by him and because of opposition in the North not duly returned to him. In addition to the amendments the Crittenden Compromise contained a proposed resolution calling upon Congress to do all in its power (in certain specified ways) to promote the return of fugitive slaves. The compromise scheme gained many adherents but was rejected in the Senate, Mar. 2, 1861. The text is given in Macdonald's *Select Documents Illustrative of United States History,* 1776–1861.

Crivelli, krē-vel'lē, CARLO (1430?–1494?), Venetian painter, was influenced by Vivarini and the Paduan school. In 1468 he settled in the Marches of Ancona and lived remote from any contemporary art movement. His upright single figures and altar-pieces in *tempera* retain the best of the Byzantine traditions in the elaborate use of gold and jewels, but are graceful and individual. His treatment is realistic; his architectural perspective and firmness of line remarkable; his color rich and clear; his finish elaborate. England is rich in his pictures—the National Gallery has eight including his masterpiece, *The Virgin in Ecstasy*—and there are a number in America.

Croaghpatrick, krō'äk-pat'-rik, mountain (2,510 ft.), Ireland, in county Mayo, 4 miles southwest of Westport, on the south side of Clew Bay. St. Patrick is said to have commenced his missionary work here, and it is consequently visited by many pilgrims. Splendid panoramic views are obtained from its summit.

Croatia, krō-ā'shi-*a*, a republic of the Federal People's Republic of Yugoslavia, formerly an Austro-Hungarian state, subject to Hungary from 1868 until the First World War. The district falls into two main divisions: the western consists of a stretch of some 100 miles of Karst country, chiefly limestone mountains and plateaus, rising in places to 3,000 feet above the sea; the eastern of the plains between the Drave and Save. The only coastal plain is near Fiume and the Gulf of Bakar. The climate on the coast is Mediterranean, with warm winters and hot summers; the Karst region is colder, with heavy snowfalls, and the eastern plains have a continental climate, with a mean annual temperature of 50° F. Both mountains and plains are swept by the *bora,* a northeastern wind which is bitterly cold and often accompanied by rain or snow. The chief rivers are the Danube, Drave, Save, Kulpa, and Bošut.

Croatia is essentially agricultural country; a third of the land is arable or garden land, another third forest (oak, fir, beech, ash, maple, and chestnut), and the remainder meadow and pasture land. Cereals, potatoes, fruits, nuts, and the vine are the most important products, and cattle and horse raising, poultry farming, bee keeping, and fishing are carried on. Lignite, gold, zinc, iron, copper, and sulphur occur, but are little worked. Manufacturing, though slowly increasing, is under developed, and is confined to the production of clothing, wooden articles, chemicals, flour, and spirits. Livestock is the chief export; corn, textiles, and chemicals are the chief imports. Education is compulsory but in a backward state. The people are mostly Southern Slavs (Croats, Serbs, and Slovenes) of the Orthodox and Roman Catholic faith.

History.—Croatia, with Slavonia, having formed successively part of Pannonia, Illyria, and the Western (Roman) Empire, was colonized by the Croats towards the middle of the 7th century, and about 910 became an independent kingdom. It was subject to Hungary from 1091 to 1526; a period of more or less complete Turkish occupation (middle of 15th to end of 17th century) followed, and Austria acquired control at the beginning of the eighteenth century.

From 1777 to 1868 Croatia and Slavonia were alternately connected with and separated from Hungary, restoration taking place in the latter year.

The middle of the 19th century saw the development of a strong nationalist feeling among the Croats. This received a new impulse with the Austrian occupation of Bosnia and Herzegovina (qq. v.) in 1878, and agitation continued intermittently until in 1918, at the close of the First World War, Croatia became a part of the newly created state of Yugoslavia (q. v.).

Croce, krō'chā, BENEDETTO (1866–), Italian scholar, was born in Pescasseroli, and was educated in Naples and in Rome. In his early life he was occupied in literary and historical study but after his thirtieth year devoted himself chiefly to philosophy. In 1910 he was made an honorary senator of the Italian kingdom; in 1920–21 he was minister of education. After the fall of the Mussolini regime, he accepted a post in the Italian Cabinet as minister without portfolio (1944). His works, which have had great influence on literary history and philosophy, include: *Estetica* (1902); *Logica* (1905); *Filosofia della pratica* (1906); *Problemi di estetica* (1908); *Saggio sullo Hegel* (1910); *La revoluzione napolitana del 1799* (3rd ed. 1912); *La letteratura della Nuova Italia* (1914–15); *Conversazioni critiche* (1918); *Goethe* (1919); *Aristo, Shakespeare, e Corneille* (1920); *La poesie di Dante* (1920); *Nuovi Saggi di estetica* (1920); *Storia d'Italia dal 1871 al 1915* (Eng. tr. 1929); *Nuovi Saggi sulla letteratura del Seicento* (1931); *Saggi d'una Storia dell' Europa nel secolo XIX* (1931); *Storia di Europa nel secolo decimonono* (1932); *Poesia popolare e poesia d'arte* (1933); *Poesia antica e moderna* (1942); *Per la nuova vita d'Italia, discorsi e Scritti* (1944); *Pagine politiche* (1945).

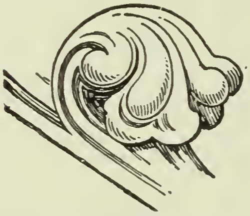
Consult his Autobiography (tr. 1927); Carr, *The Philosophy of Benedetto Croce* (1917); Piccoli, *Benedetto Croce, An Introduction to his Philosophy* (1922); Castellano, *Benedetto Croce* (1924); de' Negri, *Per un' interpretazione del pensiero crociano* (1929).

Crochet Work (Fr. *crochet,* 'a hook'), work in wool or cotton thread with a hooked needle according to certain patterns. A delicate crochet lace is manufactured at Clones, Ireland.

Crocidolite, krō-sid'ō-līt, a mineral obtained chiefly from Griqualand West, north of the Orange River, South Africa, and consisting of quartz in which are enclosed parallel fibers of a blue, yellow, or brown color. In polished specimens a play of light is produced by reflection from the surface of these fibers, and this gives the mineral its value as an ornamental stone. It is used principally for brooches, handles of walking sticks, small boxes, and ornaments, and is also known under the name of tiger-eye (being, in fact, a variety of quartz cat's-eye). The enclosures are supposed to be threads of asbestos, which when fresh are blue, but on weathering turn yellow or brown, owing to the formation of oxides of iron.

Crock'er Land, a supposed land in the Arctic regions northwest of Cape Thomas Hubbard, reported by Peary in 1906, but proved by MacMillan, in his expedition of 1914, to be a mirage.

Crock'et, a floriated ornament applied to the copes, capitals, cornices, and gables of churches and buildings of the early English period. They appeared in the 12th century, ana may be found in various forms throughout the Gothic period.



Crocket, Exeter Cathedral, England

Crockett, town, Texas, county seat of Houston county, on the International and Great Northern Railroad; 112 miles north of Houston. It is the seat of Mary Allen Seminary. The chief industries are lumbering, fruit, stock, grain and cotton raising, and the manufacture of cottonseed oil. Pop. (1930) 4,441; (1940) 4,536.

Crock'ett, DAVID (1786–1836), American pioneer, was born in Limestone, Tenn. He received little education, but early became schooled in all the arts of the backwoodsman, and in the Creek War of 1813–4 commanded a battalion of mounted riflemen under Gen. Andrew Jackson. He was a member of the Tennessee legislature (1821–4) and, as a Jacksonian Democrat, of the National House of Representatives (1827–31 and 1833–5), in which his eccentricities of manner and speech attracted national attention, and his independence led to a breach with his autocratic party chief. He subsequently took part in the Texan war for independence, and was killed in the Alamo (q. v.), Mar. 6, 1836. His motto, 'Be sure you are right, then go ahead,' is often quoted. An autobiography, attributed to Crockett, appeared in 1834. Consult *Lives,* by Abbott and by Ellis.

Crockett, SAMUEL RUTHERFORD (1860–1914), Scottish novelist, entered the Free Church of Scotland as minister of Penicuik, Midlothian, in 1886, but retired in 1895 to devote his time to literary work. His first book was a small volume of poems entitled *Dulce Cor* (1886), followed by *The Stickit Minister* (1893), a series of Scottish sketches.

Croc'odile, a member of the reptilian sub-class Crocodilia, which includes in addition the alligators and gavials (qq. v.) together with a number of extinct forms. In all living crocodilians two pairs of limbs are present, the tail is long, the quadrate bone of the skull is fixed, and the teeth, which are confined to the upper and lower jaws, are separately planted in sockets. Unlike that of the alligator, the crocodile's upper jaw moves while the lower is fixed. The true crocodile occurs in Africa, the southern part of Asia, and extends southward to tropical Australia. It reappears on the opposite side of the world in Central America, the West Indies, and the northern part of South America.

In habit, recent crocodilians closely resemble one another, being actively carnivorous animals, at home in the water, from which they do not stray far except when compelled by drought to migrate. The female crocodile lays numerous eggs in a pit excavated on a sandy shore, and appears to visit the nest regularly till hatching takes place. The young pip within the shell as unhatched chicks do, and there appears to be little doubt that the mother hears the sound, and digs out her offispring, which she conducts to the water. Some of the best-known crocodiles are the mugger (*C. palustris*) of India and the neighboring countries, which is smaller than *C. porosus,* another and much larger Indian form known to have reached a length of thirty-three feet; the Nile crocodile (*C. niloticus*), which reaches Madagascar and also occurs at the Cape, and is the form whose habits are discussed by Herodotus; and *C. americanus,* the American crocodile. All are encased in a strong armor of bony scales, with external scales due to the epidermis. The heart is four-chambered, as in birds and mammals; but owing to the arrangement of the blood-vessels the great arteries contain mixed, not pure blood, so that the circulation is of the same type as in other reptiles. Crocodiles have many other striking peculiarities, but it is only possible here to add that there is a muscle which is *functionally* comparable to the diaphragm or midriff of mammals, although its development is different. These brief notes on structure refer to crocodilia in general, and not only to the crocodile.

Crocodile River. **(1.)** River, S. Africa; rises in Transvaal, and flows N.E. until it joins the Komati on the border of Portuguese territory. **(2.)** See LIMPOPO.

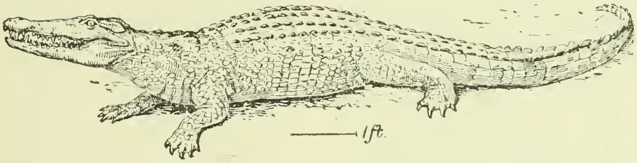
Crocus, a genus of hardy cormous plants belonging to the order Irideæ. They have upright, cup-shaped flowers, spreading 6-perianth segments wide in sunlight. The stigma (in *C. sativus,* the source of saffron) is orange-colored. Even in the 17th century Parkinson described as many as thirty-one kinds. *C. imperati,* found wild near Naples, is one of the earliest species to flower, as it is also one of the most beautiful, the inside of the petals being colored a deep purple, while the outside is of a lightish brown.

The parents of most of the Dutch crocuses are two species which grow wild in S. E. Europe, *C. Moesiacus* and *C. vernus.* Among other spring-blooming species are *C. biflorus, C. versicolor, C. Susianus,* and *C. reticulatus;* while among the autumn bloomers are *C. dalmaticus, C. sativus, C. zonatus, C. pulchellus.*

Crœsus, son of Alyattes, king of Lydia from 560 to 546 B.C. He extended the kingdom of Lydia over all Asia Minor as far east as the river Halys, also establishing his power over the Greek colonies in Asia. Noted for his reverence for the oracle of Delphi, he gave enormous presents to it out of his great wealth. Many Greeks visited his courts, including Solon, whose interview with him is described by Herodotus. Finally he declared war on Cyrus, king of Persia, the oracle having assured him that if he crossed the Halys he would destroy a great empire. But the empire to be destroyed was his own; he was utterly defeated, and Sardis, his capital, was taken (546).

Croffut, WILLIAM AUGUSTUS (1835–1915), American journalist and author, filled positions as reporter and correspondent for many papers before settling down in Washington, D. C., as a general writer and correspondent. Croffut served in the Civil War on the Union side. From 1888 to 1894 he was executive officer of the U. S. Geological Survey. Among his books are *The History of Connecticut in the Rebellion* (1867), *Bourbon Ballads* (1880), and *The Vanderbilts* (1886).

Croft, SIR HERBERT (1751–1816), English author; vicar of Prittlewell, Essex (1786–1816); because of debts retired to the Continent (1802), and died at Paris. He wrote *Memoir of Young* for Johnson's *Lives of the Poets* (1779), *Love and Madness* (1780), and *The Abbey of Kilkhampton, or Monumental Records for the Year* 1780 (1780; 14th ed. 1822). See Nichol's *Literary Anecdotes* (1812–15).



Egyptian Crocodile (*C. niloticus*).

Croft, WILLIAM (?1677–1727), English organist and composer, is remembered chiefly by his sacred music, most of which took the form of anthems composed for state ceremonies. He was organist of St. Anne's, Westminster (1700–11), Chapel Royal (1707), Westminster Abbey (1708).

Crofter. The origin of the class of small tenants known as crofters, and of the crofter question, was the transformation in the middle of the 18th century of the clan chief into the landlord, partly as the result of the abolition of heritable jurisdictions in 1746, and partly of general economic causes operating through the opening up of the Scottish Highlands by means of roads, and the suppression of lawlessness. The change made the relation between the landlord and the tenant purely a business relation, but it deprived the tenant of his customary rights, which practically amounted to co-proprietorship. In the change the co-proprietary rights of the former clansman were not sufficiently regarded and he became simply a tenant-at-will of a landlord who ceased to pay much regard to the person of his tenant. The crofter question specifically arose out of the agricultural depression. The evidence taken before the Crofters Commission (1883–4) does not bear out the statement, frequently made, that crofters were dispossessed to create deer forests, but the restriction of his common rights (*i.e.,* his right to pasture) seriously prejudiced the ability of the crofter to make his croft yield him a living. General economic conditions contributed to make his position worse. Home industries almost disappeared, and the kelp industry failed comparatively early in the 19th century. Repeated failures of the potato crop, and the general unsuitableness of the climate for agriculture, contributed their share; while the burden of local taxes, particularly those necessitated by the Education Acts, further depressed their condition. All these causes contributed to create so widespread a distress and consequent agitation that a royal commission was appointed in 1883; and their report was made the basis of legislation, in particular of the Crofters' Holdings Act of 1886, the chief provisions of which are security of tenure, fair rents, compensation for improvements, and a right to claim an enlargement of holding. The government has endeavored to remedy the distressed conditions by encouraging emigration, and promoting the fishing industry by provision of boats, etc., building harbors, establishing telegraphic connections, etc. The crofting parishes are mostly included within the counties of Argyll, Inverness, Ross and Cromarty, Sutherland, Caithness, and Orkney and Shetland Is. The crofter population was estimated in 1883 to be about 200,000. There are three classes included under the name—(1) those occupying land in separate tenancy, really small farmers, and known as independent crofters; (2) those occupying arable land in separate tenancy but pasture in joint tenancy, known as township crofters; and (3) cottars, who are usually squatters, and exist chiefly by fishing and casual employment. The second class, the township crofter, is the real crofter. See Duke of Argyll's *Scotland as It Was and as It Is* (1887); Shaw-Lefevre's *Agrarian Land Tenures Report of the Royal Commission,* 1883–4 (1884).

Crofts, ERNEST (1847–1911), English painter. His works include *The Retreat* (Royal Academy, 1874), now in the gallery of Königsberg; *The Morning of the Battle of Waterloo* (1876); *The Evening of the Battle of Waterloo* (1879); *Marlborough after Ramillies* (1880; medal, Paris, 1889); *Napoleon leaving Mos-*

cow (1887); and *Roundheads Victorious* (1894).

Croker, John Wilson (1780–1857), British statesman and man of letters, born in Galway. In 1804 he wrote *Familiar Epistles on the Irish Stage, An Intercepted Letter from Canton,* and *Songs of Trafalgar,* and in 1808 *A Sketch of Ireland, Past and Present.* Croker was returned to Parliament for Downpatrick (1807), subsequently representing in succession Dublin, Yarmouth, Athlone, and Bodmin. In 1809 he published *The Battle of Talavera,* and the same year was appointed secretary to the Admiralty, an office which he filled ably for twenty years. He wrote *The Battles of Albuera* in 1811, and about the same time began his long connection with the *Quarterly Review,* first as contributor and afterward as editor. In 1831 appeared his edition of Boswell's *Life of Johnson,* which was mercilessly attacked by Macaulay, his bitter enemy. Croker was happier in his services to historical literature when he edited Lord Hervey's *Memoirs* (1848), the *Suffolk Papers* (1824), Walpole's *Letters to Lord Hertford* (1824), and translated several foreign works, the best known perhaps being Bassompierre's *Embassy to England.* On the passing of the Reform Bill of 1832, of which he was the determined opponent, Croker retired from the House of Commons, and at a later period he severed his friendship with Sir Robert Peel because of the repeal of the Corn Laws. Disraeli drew a most unflattering portrait of him as Rigby in *Coningsby,* but Sir Theodore Martin takes a different view in the *Dict. of Nat. Biog.* His last literary effort was *Essays on the Early Period of the French Revolution* (from the *Quarterly Review,* 1857). See the *Croker Papers,* with *Correspondence and Diaries,* edited by L. J. Jennings (3 vols. 1884).

Croker, Richard (1843–1922), American politician, was born at Black Rock, Ireland, and was brought as a child to New York. He was elected an alderman of that city in 1867, and reelected in 1869 and 1883. From 1873 to 1876 he was coroner, was appointed fire commissioner in 1883, and was made city chamberlain in 1889, serving two years. He rose from the position of a district leader of Tammany Hall to be chairman of its finance committee and undisputed 'boss,' and gave a final demonstration of his power in the election of Robert A. Van Wyck as the first mayor of Greater New York in 1897. He retired from politics in 1902, and made his home at first in England and afterward in Ireland, where he devoted himself to horse-breeding and racing. On June 5, 1907, his Orby, bred from an American dam, and ridden by an American jockey, won the Derby.

Croker, Thomas Crofton (1798–1854), Irish antiquary, born at Cork, served in the Admiralty till 1850. Croker is known by *The Fairy Legends and Traditions of the South of Ireland* (1825), which greatly delighted Scott (new ed. 1902), *Daniel O'Rourke* (1828), *Legends of the Lakes* (1829), *The Adventures of Barney Mahoney* (1832). See Memoir by his son, T. F. Dillon Croker, in *Fairy Legends* (1859).

Croll, James (1821–90), Scottish scientist, born in Coupar-Angus, Perthshire, was self-taught. In 1864 he wrote an essay on *The Physical Causes of the Changes of Climate during the Glacial Epoch*—a work which was the means in 1867 of procuring his appointment on the Scottish Geological Survey. His most important work, *Climate and Time* (1875), gave rise to much hostile criticism, to which, in 1885, he replied in his *Climate and Cosmology.* Among his other and better known works are *Stellar Evolution* (1889) and *The Philosophical Basis of Evolution* (1890). His life was written by Campbell Irons in 1896.

Croly, George (1780–1860), British author, who settled in London (1810), where for twenty-five years he devoted himself entirely to literature, but afterward became (1835–47) rector of St. Stephen's, Walbrook, where he gained a great reputation for his eloquence. Croly's chief novel, *Salathiel* (1829), reprinted in New York as *Tarry Thou till I Come* (1901), and his principal poem, *Paris* (1817), an imitation of *Childe Harold,* though fanciful, ornate, and lacking in humor and imagination, may still be read with pleasure. See *Memoir* by Frederick Croly, prefixed to Croly's *Book of Job* (1863).

Croly, Jane Cunningham ('Jennie June') (1831–1901), American author, was born in England. She was brought to New York when ten years old and was educated there and in Poughkeepsie. She was married to David G. Croly in 1856, and in 1860 assumed the editorship of *Demorest's Mirror of Fashion,* afterward *Demorest's Illustrated Monthly,* and held this position for twenty-seven years. Mrs. Croly wrote for many papers, and invented the system of duplicate newspaper correspondence. She founded the woman's club, 'Sorosis,' in 1868, and was its president for many years. Some of her books are *Talks on Women's Topics* (1863), *For Better or Worse* (1875), and *Three Manuals for Work* (1885–9).

Cro-Magnon Man, a race of primitive white men who settled in Europe probably during a temperate interval in the Ice Age about 20,000 years ago, and following Neanderthal man, who either died out or was exterminated at that time. The first evidence of the Cro-Magnon type was four skeletons discovered in 1868 in the Dordogne area of the Cro-Magnon Cave, near Les Eyzies, in southwest France. The Cro-Magnons were tall, had large skulls, big jaws, rugged faces; the women were shorter than the men. Two contending schools of anthropologists variously derive them from Africa and Asia. A joint British-American expedition in 1932 discovered extensive carvings of the Cro-Magnon period on the walls of a cave on Mount Carmel, in Palestine. Consult Sir Arthur Keith's *Antiquity of Man* (2nd ed. 1925).

Cromarty. (1.) Parliamentary burgh, spt. and par., Ross and Cromarty, Scotland, on Cromarty Firth, 19½ m. N.E. of Inverness. A life-size statue of Hugh Miller, a native of Cromarty, was erected in 1859. There are manufactures of sailcloth and rope, but the chief industries are fishing and fish-curing. **(2.)** Firth, opening into the Moray Firth, from 7⅜ m. to 1 m. broad at its mouth, and forming a fine natural harbor. At its entrance is a lighthouse visible for 13 m. On its shores stand the towns of Dingwall, Invergordon, and Cromarty. The islets known as the N. and S. Sutors of Cromarty are at the entrance, and are composed of Old Red Sandstone. Hugh Miller's writings have made them famous.

Cromartyshire. See Ross and Cromarty.

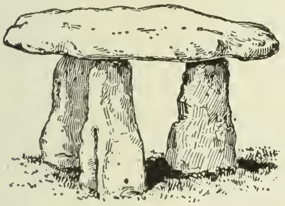
Crome, John (1768–1821), English landscape painter, called 'Old Crome' to distinguish him from his son John Bernay Crome (1794–1842). His style was determined by the study of some Dutch and Flemish pictures, but his genius led him to an indefatigable observation of nature, and to depict rural Norfolk scenery with veracity and dignified sincerity. His vigorous work, with its accuracy of detail and its knowledge of trees, meadows, sky, and clouds, has earned for him the name of the 'English Hobbema.' In 1803 he gathered the Norwich artists together, and in 1805 the 'Norwich School' was founded. Of his pictures twelve were exhibited in the

Royal Academy between 1807 and 1818. In the National Gallery, London, are five of his works; one is in the S. Kensington Museum; and the British Museum contains a fine collection of his etchings. See E. Chesneau's *The English School of Painting* (1884); Redgrave's *The Century of Painting* (2d ed. 1893).

Crome, John Bernay, more properly Barney (1794–1842), landscape painter, son of the preceding, lived first at Norwich, then at Great Yarmouth; attained local reputation as a painter of coast and country scenes, and of moonlight pictures.

Cromer, Evelyn Baring, 1st Earl (1841), British consul-general at Cairo, and one of the makers of modern Egypt. He was born at Cromer Hall, Norfolk. His connection with Egypt began in 1877, when he was appointed English commissioner on the Egyptian debt. The country was then virtually on the verge of bankruptcy. Major Baring devoted himself to the work of financial regeneration for two years, during which time the commission carried into effect a number of useful reforms. In 1880 he was appointed finance minister of India; but in 1883 he returned to Cairo as British agent and consul-general, with the additional rank of minister-plenipotentiary. Under Baring's rule Egypt became transformed into a well-governed, well-administered, and prosperous country. He also saw the power of the Mahdi destroyed and the Sudan restored to civilization. In 1892 he was made Baron Cromer received an earldom in 1901, and in 1907 resigned his post in Egypt. died 1917

Cromlech, a Celtic word applied to certain types of ancient megalithic structures: in Brittany, to a circle of standing stones; and in Wales, to three or more upright stones, closely grouped together and capped by a large horizontal stone. This latter appears also to be the prevailing application in Ireland and in Scotland. The most plausible and probably the correct deduction is that cromlechs were 'stones of bowing' or 'worship' (Stukeley, 1740; R. A. Armstrong's *Gaelic Dictionary*, 1825; and Forbes Leslie's *Early Races of Scotland*, 1866, ii. 317). Nevertheless, the pagan tribes of Ireland used to worship an idol at Moy Slacht, in Co. Cavan, which was called Crom Duhb (Black Crom), otherwise Crom Cruach, and it was surrounded by twelve stone idols. The structure known in Britain as a cromlech is styled a *dolman* in Brittany, where, as already stated, cromlech denotes a stone circle.



Cromlech: Lanyon Quoit near Penzance.

Crompton, tnship., Lancashire, England, 2½ m. N. of Oldham, but included in its parl. bor.; has cotton mills and collieries. Pop. (1901) 13,427.

Crompton, Samuel (1753–1827), English inventor of the spinning-mule (1779). His spinning-mule, in addition to combining the principles of Arkwright's and Hargreaves's machines, had as its distinctive feature a spindle-carriage which, receding in a way that eased the strain of winding on the spindles, produced yarn fit for the manufacture of fine muslins (till then chiefly imported from India), and thus practically created the British muslin trade. See French's *Life and Times of Crompton* (1859).

Cromwell, Bartlett Jefferson (1840), American naval officer, was born in Nebraska, and studied at Annapolis in 1857–60. He served in the Civil War, being assigned to blockading duties on the *Quaker City*, off the coasts and among the West Indies. Subsequently, as commander, he accompanied Admiral Schufeldt on his voyage around the world in the *Ticonderoga*, 1879–81. At the close of the Spanish War Cromwell received the surrender of the naval station and stores at Havana, and remained as commandant of the station until it was abandoned by the Americans. He was promoted rear-admiral in 1899 and retired in 1902.

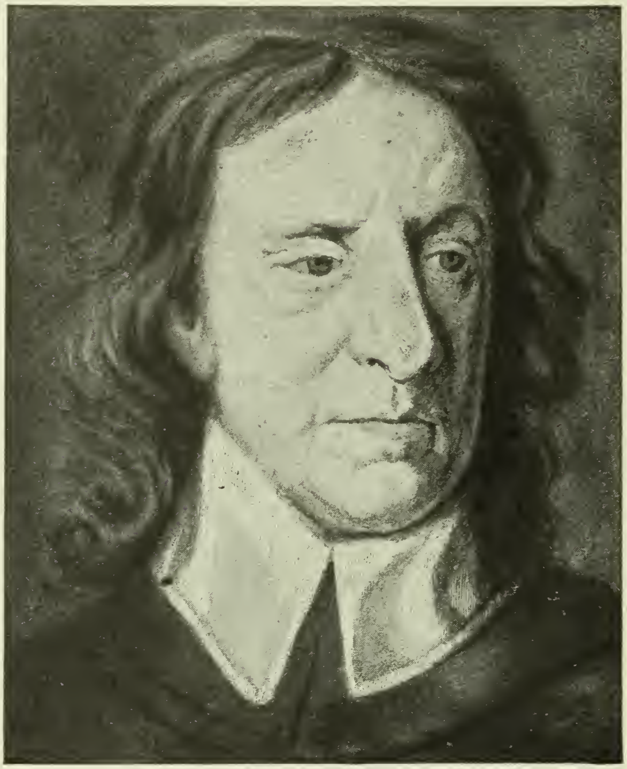
Cromwell, Oliver (1599–1658), the great Protector, born at Huntingdon, of Welsh descent—one of his ancestors, called Williams, having adopted the surname of his patron, Thomas Cromwell, whose agent he was in the suppression of the monasteries. Early experiencing a 'saving change,' he emerged from his period of gloom and anxiety a stern and convinced Puritan and Calvinist, and a determined foe of Laud's absolutist pretensions in church and state. He sat as a member for Huntingdon in the Parliament of 1628. When the Scottish revolt compelled Charles to summon the Short Parliament (1640), Cromwell sat for Cambridge; and again in the Long Parliament as an active supporter of the popular and Puritan cause. He was never a parliamentarian in the ordinary sense of the word.

When the Civil War began, his opportunity came. He fought at Edgehill (1642), and there perceived the weakness of the parliamentary levies against the spirit and dash of the royalist cavaliers. He saw that a counter-motive was required to meet the gallant traditions inspiring the king's soldiers, and this he found in the stern godliness of the English yeoman. He organized his famous cavalry regiments from this class, and at Marston Moor (1644) demonstrated the superiority of his troops, and stood forth as the greatest English military leader of the time—a fact which he showed again at Newbury (1644), Naseby (1645), Preston (1648), Dunbar (1650), Worcester (1651)—though the Scots general Leslie excelled him in strategy.

Cromwell attached himself early to the extreme and Independent party in the army and the state, and was their representative in their struggles with the Presbyterian Parliament, which, after Naseby, wished to disband the army. It is probable that Cromwell was moulded by circumstances rather than that he was himself the moulder of them. The execution of the king shocked all the moderate men; and after Cromwell's return from a ruthless expedition against the royalists in Ireland, he was summoned to Scotland, where Charles II. had been declared king by the whole nation. The 'crowning mercy' at Worcester (1651) followed his victory over the Scots at Dunbar, and the three kingdoms were at the feet of the victor.

His first troubles were with Parliament. The 'Rump,' the remnant of the Long Parliament, being recalcitrant and determined to prolong its own existence, Cromwell summarily dissolved it; and when the convention of Independents (nicknamed 'Barebone's Parliament') proved itself useless and impracticable, it also was dismissed, and all power reverted to the only body that knew its own mind—the army and its officers. Cromwell was elected Protector, with a Parliament as a check on his authority; but he was forced to dissolve his own Parliament, and thenceforth ruled alone, relying upon the army for support. He was as great as a statesman as he had been as a general; and although his constructive policy at home left no permanent trace on English history, which has developed on far other lines than he approved, yet his destructive work in safeguarding English liberties, both civil and religious, has been permanent. The question of his place as a maker of the

British empire is discussed in the historical article on that subject. Under his rule England was prosperous at home and successful abroad. But his policy was too strenuous for the people of England; and he was entering on a period of difficulty regarding his revenue which forced him to contemplate calling another Parliament, when he died, and the nation returned contentedly to the rule of the Stuarts. He was one of the greatest of Englishmen, long execrated as a regicide, now revered as a hero, saint, and demigod, guilty of many mistakes, but animated by the highest ideals of religion and liberty. See Carlyle's *Cromwell's Letters and Speeches* (1845–6); F. Harrison's *Cromwell* (1888); John Morley's *Cromwell* (1900); S. R Gardiner's *History of the Great Civil War* (4 vols.. 1893), and *History of the Commonwealth and Protectorate* (3 vols., 1894–1901); C. H. Firth's *Oliver Cromwell* (1900), *Cromwell's Army* (1901), and Roosevelt's *Oliver Cromwell* (1900).



Oliver Cromwell.
(*From the pastel portrait by Cooper, Sidney Sussex College, Cambridge.*)

Cromwell, RICHARD (1626–1712), son of the great Protector, Oliver Cromwell; succeeded his father as Lord Protector, but inherited little except the office. He had neither the energy nor the ability of his father; he placidly acquiesced in the Restoration, and lived a blameless country life at Cheshunt till his death.

Cromwell, THOMAS, EARL OF ESSEX (1485–1540), English statesman, was the chief agent in bringing on the English reformation, and in establishing Tudor absolutism. Of his early life little is known. He was an ardent student of Italian politics and methods, and an admirer of Machiavelli. His policy may be summed up in this, the creation of absolutism; he was absolutely thorough and dispassionate in his methods, and, as chief minister, kept his king (Henry VIII.) as much 'in the terror' as the people of England. Entering Wolsey's service as early as 1514, he was, on the whole, faithful to his master, even in his fall; but at the same time he had the ear of the king, then fighting for a divorce from Catherine of Aragon. Cromwell advocated divorce by the exercise of royal supremacy. To secure absolute power for Henry he made use of Parliament, by whom the Act of Supremacy was passed (1534), and he secured revenue by the suppression of the monasteries. He ruthlessly crushed a Catholic revolt in the north, known as the 'Pilgrimage of Grace'; but when he provided Henry with a new consort in Anne of Cleves, and his international combination of Protestants against the Emperor Charles V. broke down, he fell before the hatred of nobles and clergy, and, abandoned by Henry, was executed.

Cromwell, WILLIAM NELSON, American financier and corporation lawyer, was born in N. J. He was graduated from Columbia College Law School in 1876, and entered legal practice in New York. As counsel for the Panama R.R. he organized the New Panama Canal Co., conducted the educational campaign in favor of the Panama route, and completed the transfer of the French canal company's property to the U. S.

Cronholm, ABRAHAM (1809–79), Swedish historian, born at Landskrona. His principal productions deal with the reign of Gustavus Adolphus—*Sveriges Historia under Gustaf II. Adolphs Regering* (6 vols. 1857–80), and *Trettioariga Kriget och under handlingarna i Tyskland,* 1632–48 (2 vols. 1876); though he also wrote *Wäringarna* (1852), *Forn Nordiska Minnen* (2 vols. 1833–5), and *Sknaes Historia och Beskrifning* (2 vols. 1842–51).

Cronje, PIET ARNOLDUS (1835)-1911 Boer general, of Huguenot descent. In the war of 1880 with the British he commanded a division of his countrymen at Doornkop and Majuba Hill; and led the Boers who besieged Potchefstroom, where, keeping the garrison ignorant of the fact that a general armistice had been signed, he forced its capitulation (1881). It was he who frustrated the Jameson raid at Krügersdorp (1895); and when the Boer War began Cronje, appointed commander of the western army of the S. African Republics, unsuccessfully attacked Kimberley, but (November 28) repulsed the British under Lord Methuen at the Modder River, and again (December 11) at Magersfontein. When, on Feb. 15, 1900, General French raised the Boer siege of Kimberley, Cronje retreated in an easterly direction. Intrenched in the bed of the Modder River at Paardeberg, he at last found himself (February 18) hemmed in on all sides. Generals De Wet and Botha, attempting his relief, were beaten back, but the British suffered severely. For eight days Cronje maintained the struggle, but at last, on February 27, the anniversary of Majuba, surrendered with his whole army of 4,069 men and 6 guns. Taken to Cape Town, he was thence sent (April, 1900) to St. Helena, but returned to the Transvaal after the conclusion of peace.

Cro′nos, identified by the Romans with their god Saturn, in Greek mythology was the ruler of the gods before Zeus. He was the youngest of the Titans, and the son of Uranus (Heaven) and Ge (Earth); and was the father, by Rhea, of Hestia, Demeter (Ceres), Hera (Juno), Hades (Pluto), Poseidon (Neptunus), and of Zeus (Jupiter). He expelled his father Uranus from the throne of heaven, and was in his turn dispossessed by Zeus.

Cronstadt, Russia. See Kronstadt.

Crook, George (1828–90), American soldier, was born near Dayton, O. He was graduated from West Point in 1852, and in the Civil War served with distinction as a cavalry leader. He entered the war as a captain (commissioned May, 1861), and became a colonel of volunteers (Sept., 1861), a brigadier general of volunteers (Sept., 1862), and a major general of volunteers (Oct., 1864). He commanded the Federal forces in West Virginia for some time in 1864, and for a time in 1865, was in command of the cavalry of the Army of the Potomac. After the war he became well known as an Indian fighter in the West. He quelled an uprising of the Apaches in Arizona (1872), defeated the Sioux at Slim Buttes, Dak., after the Custer massacre, and in 1886 commanded the United States forces during most of the campaign against Geronimo. He became a brigadier general in the regular army (Oct., 1873), and a major-general (April, 1888), and in 1888–90 was in command of the Department of the Missouri.

Crooked Islands. See Bahamas.

Crooked Lake. See Keuka Lake.

Crookes, Sir William (1832–1919), English scientist, was born in London. Entering the Royal College of Chemistry (1848), he was for some time assistant to Dr. Hoffmann. In 1854 he was appointed meteorological director of the Radcliffe Observatory, Oxford, and the next year became professor of chemistry at Chester Training College. In 1861 he discovered the metal thallium, and in 1872 began a series of researches into radiant matter with the aid of a radiometer, an instrument invented by himself (1873–6). He founded the *Chemical News* in 1859, and became editor of the *Quarterly Journal of Science* in 1864. One of his most important inventions was the Crookes tube (q.v.). In recognition of his discoveries, he received a prize of 3,000 francs and a gold medal from the French Academy of Sciences (1880) and in 1907 shared the Nobel prize in chemistry with Buchner. He was an expert in matters of water-supply and sanitary questions, more especially in connection with town sewage, and also an authority in electrical matters. He was knighted in 1897 and in 1898 was president of the British Association. His publications include *Select Methods in Chemical Analysis* (3d ed., 1894); *Manufacture of Beet-root Sugar in England* (1870); *Handbook of Dyeing and Calico Printing* (1874); translations of Kerl's *Treatise on Metallurgy* (1868–70, with Ernst Röhrig), and Ville's *Artificial Manures* (2d ed., 1882); *The Wheat Problem* (1899).

Crookes Tube. See Vacuum Tubes.

Crookston, city, Minnesota, county seat of Polk County, in the northern part of the State near the Dakota border, on the Red Lake River and on the Northern Pacific and the Great Northern Railroads; 230 miles northwest of Duluth. The river affords abundant water-power and manufactures include lumber, machinery, furniture, leather and biscuits. Pop. (1910) 7,559; (1920) 6,825.

Crop, in various animal species a name given to a dilatation of the anterior part of the gullet, having for its object the storing of food. When present, it is usually followed by a gizzard or grinding region, and the crop then acts like the hopper of a mill. In the bee-hive, the crop is the bag in which the insects carry food back to the hive. In pigeons, the walls of the crop at the breeding season produce what is known as 'pigeon's milk.'

Crops, Farm, a term used collectively to indicate the produce or harvest of cultivated land. The leading staple crops of the United States are corn, hay, cotton, wheat, oats, potatoes, barley, tobacco, sugar-cane and sugar-beets, rice, rye, flaxseed, and buckwheat. The term crop also includes various fruit and market-garden products. For accounts of these various crops see the articles treating of them individually. See also Agriculture.

Cropsey, Jasper Francis (1823–1900), American painter, was born in Rossville, Staten Island, N. Y. He was educated as an architect, but abandoned this profession and studied art under Edward Maury, the landscape painter. From 1847 to 1863 he passed much time abroad in study and painting, residing seven years in London and exhibiting at the Royal Academy. He returned to New York in 1863, and thereafter lived in that city and vicinity. He became a member of the National Academy in 1851. Among his paintings are *Pontine Marshes, Backwoods of America, Ramapo Valley, Niagara Falls, Sunset at Lake George.*

Croquet, krō′kā′, a lawn game, in which the players drive wooden balls, by means of long-handled mallets, through a series of hoops. The object of each player is to make the complete circle of six to ten hoops or arches; but during the course of the game he may have the progress of his ball retarded by his opponents, or assisted by his partners; and these friendly aids and hostile attacks constitute the chief interest of croquet. The game seems to be substantially a revival of the old game of Pall Mall, which gave its name to what is now the well known London street, and to other places in England. Pall Mall, played with ball (Ital. *palla*) and mallet (Ital. *maglia*), came from France into England early in the 17th century, and died out in the 18th. Croquet (Fr. *croquer*, 'to crack') became a popular game about 1850, was the great summer social game during 1860–70, but was later superseded by lawn tennis and other more active games. A *croquet ground* should be a well-rolled level grass lawn, not less than 30 yards long by 20 yards wide. A later development of the game is called Roque (q.v.).

Crosby, Ernest Howard (1856–1907), American author and reformer, was born in New York City. He was graduated from New York University and Columbia Law School and practised in New York in 1878–89. He was a member of the New York assembly in 1887–89; judge of the International Court, Alexandria, Egypt, in 1889–94, and subsequently a promoter of social reforms. His works include *Swords and Plowshares* (1902), *Tolstoy and His Message* (1904), *William Lloyd Garrison* (1905), *Labor and Neighbor* (1907).

Crosby, Frances Jane (1820–1915), American hymn writer, was born in South East, Putnam County, N. Y., and became blind at the age of six weeks. She received instruction at the New York Institution for the Blind, and was instructor there from 1847 until her marriage to Alexander Van Alstyne, a blind teacher of music, in 1858. She early developed a faculty for writing songs and hymns, many of which gained wide popularity in Moody and Sankey's collections. She wrote the words of 'There's Music in the Air' and 'Hazel Dell.' Her hymns include 'Safe in the Arms of Jesus,' 'Pass Me Not, O Gentle Saviour,' 'Jesus, Keep Me Near the Cross,' and 'I am Thine, O Lord.' She also published *The Blind Girl, and Other Poems* (1844) and *Bells at Evening, and Other Poems* (1898).

Crosby, HOWARD (1826–91), American clergyman, was born in New York City. He was graduated (1844) from New York University, where he was professor of Greek from 1851 to 1859, when he accepted a similar professorship at Rutgers College. In 1861 he became a Presbyterian minister, and in 1863 was chosen pastor of the Fourth Avenue Presbyterian Church, New York City. He was held in high esteem in the councils of the Presbyterian Church in the United States, and was a delegate to the first Presbyterian general council at Edinburgh. He was chancellor of New York University from 1870 to 1881, and was the leading promotor of the New York Society for the Prevention of Crime. His published works include *The Lands of the Moslems* (1851); *Social Hints for Young Christians* (1866); *Jesus: His Life and Works* (1870).

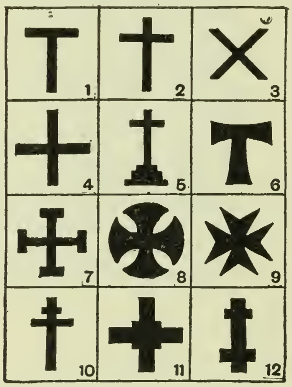
Crosby, JOHN SCHUYLER (1839–1914), American soldier, was born in Albany County, N. Y. He studied at New York University, and at the opening of the Civil War entered the Union army as second lieutenant in the regular artillery, and was brevetted major for carrying the first despatches from the Red River to Farragut. After the war he remained in the army until 1871, and was promoted colonel. In 1876 he was appointed United States consul to Florence, Italy, and was governor of the Territory of Montana (1882–4), in that capacity helping to secure the Yellowstone Park for the use of the nation.

Crosier, krō′zher, properly an archbishop's staff terminating in a floriated cross, but also applied to a bishop's staff terminating in a crook. Its origin is the shepherd's crook, symbolical of the duties of a pastor or leader of a flock. It is usually richly adorned and made of costly material and in the Roman Catholic Church is carried before bishops or abbots when they are exercising priestly functions. See PASTORAL STAFF.

Crosman, HENRIETTA (1870–), American actress, was born in Wheeling, W. Va. She was educated at the Moravian seminary in Bethlehem, Pa., and made her début in 1889 with Bartley Campbell's company in *The White Slave.* Subsequently she played with Daly's and the Frohmans' companies. In 1897 she was married to Maurice Campbell. The next year she began to appear as a star. One of her most successful parts was that of the title character in *Mistress Nell,* by George C. Hazleton, produced at the Bijou Theatre, in New York, in 1900. She has also played acceptably Shakespearean rôles, especially Rosalind, in *As You Like It,* and many others.

died Oct. 31, 1944

Cross (Lat. *crux*), the intersection of two stakes at right angles, commonly used amongst the dominant peoples before the Christian era as an instrument of punishment and death; hence the symbol implies suffering and loss. Among the Romans the practice of capital punishment by means of the cross continued until the 4th century, when Constantine the Great abolished it. With the triumph of Christianity the cross became a symbol of dignity and honor. Among the Carthaginians and Phœnicians it was used as an instrument of sacrifice to Baal. The Persians believed it to be a charm against evil and death, and to the Gauls it was a solar symbol endowed with creative and fructifying power. In Central and South America the natives worshipped it as the emblem of the god of rain.



Various Forms of Cross

1. Crux Commissa or ansata; the Egyptian cross (or St. Anthony's). 2. Crux immissa or capitata; Latin cross. 3. Crux decussata, saltire or St. Andrew's. 4. Greek cross. 5. Calvary. 6. Tau or St. Anthony's. 7. Jerusalem cross or potent. 8. Formy. 9. Maltese or St. John's of Jerusalem. 10. Patriarchal cross. 11. Lowy quadrant. 12. Lorraine cross.

When to the upright stake, the original form of the cross or gibbet, a horizontal beam was added across the top, T, it formed the *crux commissa.* More often the beam was fixed at a lower level, †—the *crux immissa,* the form used at the crucifixion of Christ. This latter cross and the Greek cross, having equal arms, are those most commonly known and used. The *crux decussata* consists of two beams placed diagonally, X, and is supposed to be that on which St. Andrew, the patron saint of Scotland, died. The cross of Christ is fabled to have been made of four kinds of wood (palm, cedar, olive, and cypress), signifying the four quarters of the globe; and in its adaptation by Constantine it contains, in the form of a monogram, the initial letters of the name of Christ, ☧, often found enclosed in a circle. The true cross of Christ is recorded to have been discovered by the Empress Helena near the scene of our Lord's sufferings (A.D. 326). Part of it was deposited in a chest by Constantine, where it is still preserved at Rome; and other portions were distributed throughout Christendom. In the 13th century a relic of the true cross was taken to Paris, and is preserved in Ste. Chapelle. The cross exercised a powerful influence upon mediæval thought. In ecclesiastical architecture it was the plan upon which the grandest churches were erected, the walls carrying upward the cruciform sign, the spire pointing upward in the sacred figure.

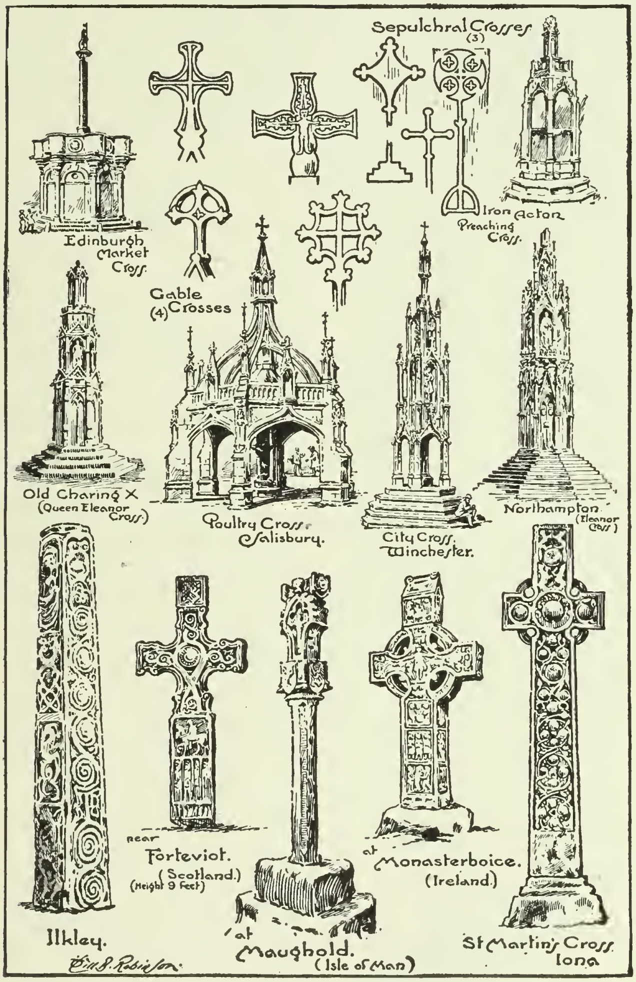
Various spiritual fraternities take their name and ensign from the cross. The ancient Gammadion order used a symbol composed of four 'gammas' (hence its name). The fylfot form of the cross, 卐, is also an arrangement of gammas. There was a Brazilian Order of the Cross, and the Order of the Cross in Bohemia was confirmed in 1238 by Pope Gregory. The Knights of St. John bore a white Greek cross upon red; and the Knights of Malta had as their ensign a cross of four limbs converging to a point in the centre, with two points to each limb. The cross of St. Patrick, the patron saint of Ireland, is a plain diagonal red cross on white ground. St. George's cross (+), incorporated with St. Andrew's cross, blend their form and color in the British Union Jack; and by international agreement the Geneva red cross on a white ground safeguards the medical corps on the field of battle.

Among the variations of the cross, those found in upright architecture form a distinct class. The sanctuary cross is usually an obelisk of beautiful sculptural design. The boundary and monumental crosses belong to the pre-Reformation period. The runic crosses of ancient Scandinavian workmanship found in the border counties of England and Wales are elaborated representations of the hammer of the god Thor. The Celtic crosses of the 12th and 13th centuries, found in the monasteries and convents of Ireland; the beautiful St. Martin's cross, Iona, and the famous Eleanor or Norman crosses were either religious or commemorative. The Eleanor crosses (so called because they commemorate the death of Queen Eleanor, and mark the resting-places of her funeral progress) were erected by her consort, Edward I. (1290). They resemble a turret, decorated, in the Gothic style, with figures and pinnacles. There were nine of them, of which two remain at Northampton and Waltham (the latter restored). The others at Lincoln, Stony Stratford, Woburn, Dunstable, St. Albans, Cheap, and Charing (London) have long since disappeared. The Scott Monument, Edinburgh, is an example of the Norman cross on a gigantic scale.

The crosses were originally erected as a sort of pulpit from which preachers spoke; they were erected also to commemorate signal events. The wooden crosses were replaced by stone; and, with the extension of the use to which they were put, they gradually assumed a more imposing form. The town or market cross, at Winchester, is vaulted and has a spacious chamber below. The Scottish 'mercat' cross, used for royal and civic proclamations, is usually circular or hexagonal. A raised platform is surrounded by a parapet, and surmounted by a decorated stone shaft. Edinburgh Mercat Cross is an example: the stone shaft has been preserved since 1617, before which time the cross stood in the High Street, near the west side of St. Giles's cathedral. It was removed in 1617 to a site farther down, but now stands near the old site, on the east side of the cathedral; it was re-erected by Mr. Gladstone in 1885. It has an octangular sub-structure with a parapet; the shaft rising upward measures about 20 feet. The famous Paul's Cross (near St. Paul's, London) was destroyed by the Puritans in 1643; it was erected in the reign of Henry III. in 1259, and was the scene of many religious and historical events.

In heraldry the cross is one of the ordinaries or principal charges. It has a variety of expression. It may be blazoned on the field standing out in relief, or, where the field consists of metal (as may be seen in some of the British shields-of-arms), it may be uncharged. It occupies one-third of the field, if charged; if uncharged, one-fifth. It may be borne simply, or combined with other charges; these, in turn, may be charged with other figures. There are supposed to be more than a hundred varieties of the cross blazoned in heraldry, each bearing a different signification, name, and tincture. The saltire, the cross of St. Andrew, is a combination of the bends known as dexter and sinister, argent azure; St. Patrick's, saltire, argent gules; St. George's, argent, a cross gules. These may be said to be quarter-pierced. See HERALDRY.

The practice of affixing a person's signature to a document, when that person is unable to write, by making his mark, X, is said to date from as far back as the 6th century.


Sepulchral Crosses (3)
Iron Acton Preaching Cross
Edinburgh Market Cross
Gable (4) Crosses
Old Charing X (Queen Eleanor Cross)
Poultry Cross, Salisbury.
City Cross. Winchester.
Northampton (Eleanor Cross)
near Forteviot. (Scotland.) (Height 9 feet)
at Monasterboice. (Ireland.)
Ilkley.
at Maughold. (Isle of Man)
St Martin's Cross Iona

Memorial and Monumental Crosses.

The Southern Cross is the name of a great constellation in the Southern hemisphere. Several varieties of coin have been named from pictures of the cross engraved on them—*e.g.* the Austrian kreuzer, the Portuguese crusado, etc. See A. Rimmer's *The Ancient Stone Crosses of England* (1875); Ashton and Baring-Gould's *Legendary History of the Cross* (1887).

Cross, riv. of W. Africa, rises in Kamerun, flows W. into S. Nigeria, but in about 8° E. bends abruptly to the S., and thereafter flows S. with an E. inclination, forming a wide estuary for some miles before it enters the head of the Bight of Biafra. It is navigable for three-quarters of its length.

Cross, CHARLES ROBERT (1848), American physicist, was born in Troy, N. Y., and graduated (1870) at the Mass. Institute of Technology, where he remained as instructor, and subsequently (1877) professor of physics and director of the Rogers Laboratory. In 1882 he established at the institute the first course in electrical engineering in the U. S., remaining in charge of it until 1902. His investigations in electricity and acoustics have been printed in the publications of learned societies.

Cross, MARIAN. See ELIOT, GEORGE.

Cross, RICHARD ASSHETON CROSS, 1ST VISCOUNT (1823), English politician, born near Preston. He has been described as one of Disraeli's 'experiments.' It was he who, in 1874, appointed Cross, then a comparatively untried man, to the post of Home Secretary, with cabinet rank. Disraeli's selection was justified by results. Mr. Cross presided at the Home Office from 1874 to 1880, and again from 1885 to 1886. From 1886 to 1892 he was Secretary of State for India, and from 1895 to 1900 he filled the office of Lord Privy Seal. His legislative record in the House of Commons, where he had a seat from 1857 to 1886, includes the Artisans' Dwellings Act (1875), the Factory and Workshops Act (1878), and the Housing of the Working Classes Bill (1885). died 1914

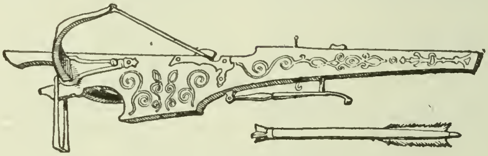
died oct. 5, 1948

Cross, WILBUR LUCIUS (1862), American educator and English scholar, was born at Mansfield, Conn., and graduated (1885) at Yale, remaining to take his Ph. D. He joined the teaching staff of the Sheffield Scientific School at Yale as instructor in English in 1894, and was made assistant professor in 1897, and professor in 1902. He edited editions of *Macbeth* (1900), *Ivanhoe* (1903), *The Works of Laurence Sterne* (1904), and *Silas Marner* (1903). Prof. Cross was editor of the department of English literature in the *New International Encyclopedia* (1901–4). He also published a careful brochure on *The Development of the English Novel* (1899).

Crossbills, a genus (Curvirostra) of large finches inhabiting the coniferous forests of Northern Europe and America, and characterized by the fact that the mandibles pass, or 'cross,' one another at the tips—apparently an adaptation to the better tearing away of the scales of pine and spruce cones, to get at the seeds upon which these birds mainly subsist. Their plumage is a mixture of red and greenish tints. One species, the white-winged crossbill, is frequently seen in the Northern United States in winter, when it migrates southward from its Canadian breeding-home, where its nest is built on the branch of a forest tree.

Crossbill.

Crossbow, or ARBALEST, a weapon in use chiefly in the 12th century, after which it was superseded by the less cumbersome longbow, consisted of a powerful bow mounted on the end of a stock, shaped like that of a short musket, and having a suitable groove along the top of its barrel for the reception of the missile. The bow was stretched either by hand or by some mechanical contrivance till the cord rested on a notch or catch, from which it was released by the pressure of the archer's finger on a trigger below the stock. The missiles, which were either arrows or bolts (or 'quarrels,' as they were called), varied considerably in size and shape, but generally consisted of a winged wooden shaft tipped with metal. See the exhaustive monograph, *The Crossbow,* by Sir R. Payne-Gallwey (1903).



Crossbow and Quarrel.

Cross-examination. See EVIDENCE.

Crosshead. The crosshead of an engine is a block fixed at the end of the piston rod, and working in parallel guides, to take up the thrust caused by the obliquity of the connecting rod, and to cause the end of the piston rod to move in a straight line. Crossheads are usually of cast iron, but are often made of cast steel, and sometimes of wrought iron in cases where lightness is an important point.

Cross Keys, a village in Rockingham co., Va. Here on June 8, 1862, during the Civil War, an indecisive battle was fought between about 8,000 Confederates, forming part of 'Stonewall' Jackson's army, under Gen. Ewell, and about 18,000 Federals under Gen. Frémont, the Confederates losing in killed and wounded about 300 men, the Federals about 600.

Crossley, SIR FRANCIS (1817–72), English manufacturer, born at Halifax; as a carpet manufacturer he made a huge fortune, much of which he spent in gifts to associations connected with the Congregational Church, and in Halifax. See *Sir F. Crossley, Bart.*, R.T.S. Biog. Series, No. 1,028 (1873); Smiles's *Thrift*, pp. 205–17 (1875).

Crossopterygii, an order of fishes, defined by the presence of lobate paired fins, with a thick axis, and rays placed on either side of this axis. The Crossopterygians are ganoid fishes, and include the living Protopterus of Africa, together with numerous fossil forms.

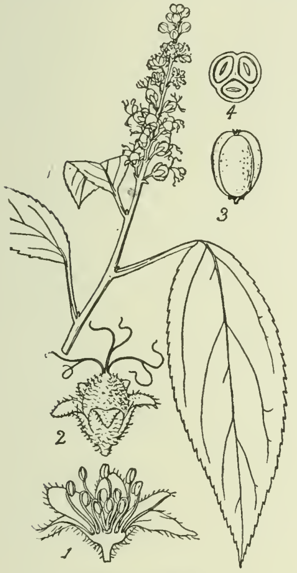
Crotalus, the genus to which the rattlesnake belongs.

Crotch, WILLIAM (1775–1847), English musical composer, born at Norwich; manifested in childhood a marvellous musical precocity. He became professor of music at Oxford (1797), and in 1822 first principal of the Royal Academy of Music, London. He composed largely, but excelled in anthems and oratorios. One of the best of the latter is *Palestine* (1812), based on Herbert's poem. He also wrote *Elements of Musical Composition* (1812).

Crothers, SAMUEL MCCHORD (1857), American clergyman and essayist, born at Oswego, Ill. He graduated at Princeton in 1874, studied at the Union Theological Seminary, and held pastorates as a Unitarian clergyman at Eureka, Nev., Santa Barbara, Cal., and in New England until 1894, when he took charge of the First Parish in Cambridge, Mass. His works include *Members of One Body* (1894), *The Gentle Reader* (1903) and *The Understanding Heart* (1903). died Nov. 9. 1927

Croton, a large genus of tropical shrubs and trees, some species of which are of economic importance. The seeds of *Croton Tiglium,* an E. Indian tree which grows to a height of about twenty feet, are the source of the irritant, croton oil and croton liniment of pharmacy, and of a very drastic and powerful purgative. The cascarilla of pharmacy, which is used as a stimulant tonic, is the bark of *Croton eleuteria,* a W. Indian shrub. From it are prepared an infusion and a tincture. Cascarilla bark is the most important constituent of fumigating pastilles.

Croton, a Greek colony founded by settlers from Achæa in 710 B.C., in the territory of Bruttium in S. Italy. It became very wealthy and prosperous, and about 510 B.C. was able to put an army of 100,000 men into the field against its neighbor Sybaris, which it destroyed; but in the next two centuries its power decreased, and eventually it became incorporated in the Roman empire. It was famous for its school of medicine, and also as the birthplace of the athlete Milo, and the residence of Pythagoras. Its modern name is Cotrone.



Croton Tiglium.
1, Male flower (section); 2, female; 3. fruit; 4, fruit (section).

Croton Oil is obtained by expression from the seeds of *Croton Tiglium*, and consists chiefly of fatty acids, both free and combined as fats, along with crotolinic acid, which appears to be its active principle. Croton oil is a thick, brownish-yellow oil, with a peculiar rancid odor and acrid taste. In doses of not more than a drop it acts as a drastic purgative; but in larger doses it is externally a powerful irritant, and internally a violent poison, causing inflammation of the digestive tract. Used externally as a counter-irritant in internal inflammation, it produces pustules, which leave scars on the skin. Rubbed on the skin of the abdomen it causes also purgation.

Croton River, a l. bk. trib. of the Hudson R., about 60 m. in length. Its basin, lying in Dutchess, Putnam, and Westchester cos., N. Y., containing many lakes and ponds, affords the chief water supply of N. Y. city. The two aqueducts from the vast reservoir, Croton Lake, are each 30 m. long. The old aqueduct was completed in 1842; the new one (mainly tunnel), in 1890. The new dam, one of the largest in the world, was constructed in 1892-1905.

Croup, an inflammatory condition of the larynx, which may also extend to the trachea, bronchi, and bronchioles, and is characterized by a loud and 'metallic' or 'brassy' cough. Inflammation of the larynx may, of course, occur at any age; but the peculiar development called croup is almost exclusively confined to young children, mostly between the ages of two and seven. A croupy cough may be produced by irritation of the larynx owing to some foreign body having lodged there, by scalding it with hot fluids, or by inflaming it with irritating gases. Diphtheria, however, cannot be produced by these causes. The presence of a membrane in the throat, together with much previous discomfort and a high temperature, denotes diphtheria. But in false croup the temperature is often not high, and the attack comes on suddenly, frequently at night. There is no membrane coughed up. Croup may be either membranous or non-membranous (false croup). This disease sets in most commonly with a chill, caused by damp and exposure, although it may follow any of the common fevers, such as measles or scarlet fever. It usually begins with rigor and a rise of temperature, accompanied by hoarseness of voice and a loud, hard cough. As the inflammation increases, the laryngeal mucous membrane swells, the internal diameter of the tube diminishes, causing the breathing to become increasingly difficult. The inspiration especially costs a great effort, and is hoarse and 'crowing.'

Treatment.—The physician aims at securing a subsidence of the swelling and an expulsion of the membrane, when present, after which a complete recovery may be expected in from two to six days. But should the larynx become too much blocked for respiration to continue, the child will collapse from exhaustion. In the early stages an emetic of ipecacuanha wine is often useful. A teaspoonful should be given every ten minutes until the child vomits. The air it breathes should be kept both moist and warm (moisture without warmth is valueless) by forming a tent of blankets over its bed, and introducing steam direct into the inside of the tent from the spout of a bronchitis-kettle. Hot sponges or poultices must be applied to the throat, but on no account should they be left there after they have cooled, and fresh ones must be ready to be applied as soon as the first are removed. A sedative is valuable if there is any tendency to spasm of the throat; but in extreme cases intubation or tracheotomy may become necessary, or intubation as devised by O'Dwyer of New York. The child will not be able to take any solid food, but nourishing stimulants must be given often and in small quantities, in the form of beef-juice, beef-tea, beef-jelly, etc. Inhalations of oxygen are of some use in lessening the respiratory effort. Diphtheria antitoxine acts admirably in croup, as well as in diphtheria. This treatment should therefore be tried in suitable cases; it will serve to some extent as an additional safeguard against a wrong diagnosis.

Another form of 'false' croup is due to a spasmodic contraction of the glottis, and exists quite apart from any inflammation. See Laryngismus Stridulus; also Diphtheria.

Crow. A large passerine bird of the family Corvidæ. The bill is stout and generally large, and is without a notch in the upper jaw; the tongue is non-extensile; the first toe is strong, but is shorter than the third; the nostrils are protected by a number of stiff bristles; there are ten primaries in the wings, and twelve rectrices in the tail; the sexes resemble one another in their plumage, and there is only one moult, which takes place in the autumn; the plumage is usually black, often with a metallic gloss. Many naturalists regard the crows as the highest of the birds. Some are gregarious; all are omnivorous in their diet, freely mingling animal and vegetable matter in their food, and showing great adaptability to special conditions. The members of the genus are almost cosmopolitan, but there are no crows in S. America or in New Zealand. To this group belong the worldwide raven (*Corvus corax*), the European rook, jackdaw, and other familiar species, considered in separate articles, and the common American crow (*C. Americanus*) which, originally confined to the Atlantic sea-coast, has now spread west to the Plains. Among exotic forms, mention may be made of the African rook (*C. capensis*), and white-bellied crow (*C. scapulatus*). As a rule the crows inhabit wooded country, though some species are found on bare moorlands. They nest in trees, and lay eggs heavily stained and marked with green and olive.

Crowds, Psychology of. There must be a common interest before a mere assemblage of individuals forms a crowd in the psychological sense. Some, with

Herbert Spencer, believe that the crowd represents the average intelligence of the individuals; but others, with Gustave le Bon, maintain that the qualities and power of a crowd are something quite different from anything represented by an arithmetical result. Crowds will rise above and fall below the average level of their constituents. The characteristics of crowds are explained by the fact that the common elements in human nature infinitely preponderate over those elements that are peculiar to individuals. In the crowd all these common or organic elements act together, and their cumulative power quite overwhelms the influence of individual peculiarities. The common elements strengthen one another by fusion, whereas the individual elements counteract each other, and thus neutralize their power by a process of arrest. The main causes of the peculiar action of crowds are the loss of individual responsibility, with the corresponding freedom, and the sympathy and encouragement arising from contact with a large number of individuals holding the same opinions, this sympathy, through suggestion, operating on the force of imitation that is fundamental in human nature. See Baldwin, *Dictionary of Philosophy and Psychology*, 1900.

Crowe, Catherine (?1800–76), English novelist, born in Kent. Her chief novels were *Susan Hopley* (1841), *Lilly Dawson* (1847), *Adventures of a Beauty* (1852), and *Linny Lockwood* (1854). She also wrote *Spiritualism, and the Age we Live in* (1859), and *Night Side of Nature* (1848).

Crowe, Sir Joseph Archer (1825-96), English writer on art, born in London; spent many years on the Continent with Cavalcaselle, studying art. Works: *Early Flemish Painters* (1879), *Hist. of Painting in Italy* (1868), *Titian* (1881), *Raphael* (1885).

Crowell, Edward Payson (1830), American educator and Latin scholar, was born at Essex, Mass., and graduated (1853) at Amherst. He studied divinity at Andover in 1856–8, and was licensed as a Congregational preacher in 1859, but was associated with Amherst as tutor and professor of Latin after 1855, and was dean of the faculty from 1880 to 1894. He edited, with notes, selections from Cicero, the poets, Pliny, Boëthius, and other Latin authors, and published *A Clue to the Prose Writings of the Silver Age* (1897).

Crow Indians. See Sioux.

Crowley, tn., La., co. seat of Acadia parish, 150 m. w. of New Orleans, on the Southern Pacific R. R. It has agricultural interests (rice being grown extensively), rice mills, and manufactures and iron. Pop. (1910) 5,099.

Crown, the name of various coins. According to Murray, originally a translation of the French *couronne* (*denier à la couronne*), the name given to a gold coin bearing on the obverse a large crown, issued by Philip VI. of Valois in 1339; or applied to the *écu de la couronne* of Charles VI. in 1384; and from the 15th to the 18th century the common English name for the French *écu* and other foreign coins of similar value. The crown in English coinage was introduced by Henry VIII., and was composed of both gold and silver, bearing a crowned rose and a crowned shield of arms. In modern times the English crown=5 shillings or $1.22; the Austrian crown (gold)=27s.; the Austrian crown (silver)=10d.; the crown (silver) of Denmark, Norway, and Sweden (*krone*)=1s. 1⅓d.

Crown. In England the king was in Saxon times elected by the Witenagemote almost always from among the members of the royal family, though little regard was paid to the strict right of primogeniture. This system was continued till the reign of Edward I., and a reign did not commence till a king had been elected by the nobles and confirmed by the clergy and people at his coronation. Edward I. reigned from the date of his election and before coronation, while Edward II. reigned from the day following his predecessor's death. Since then Parliament has intervened, and has done so rather by settling the succession before a vacancy than by electing a king after. The important distinction is that election is the act of the people alone, while succession is settled by Act of Parliament—*i.e.* by king and people. Parliament has altered or controlled the succession on many occasions: the most striking instance is afforded by the Act of 1537, which conferred on Henry VIII. the power of nominating any successor he might select. Thus, election to the throne has now become merely theoretical, and the coronation a formality. The succession was last altered by the Act of Settlement of 1700. It declared that no future king of England should be a Papist, or should marry a Papist. The king must take the coronation oath, undertaking to govern the country according to law, and to maintain the Protestant religion. He must join in the communion of the Church of England, and sign the declaration against transubstantiation. Subject to these conditions, the crown was settled on Princess Sophia, the granddaughter of James I., and the heirs of her body. In the succession to the crown, males are preferred to females of the same degree of relationship to the throne, but females take precedence of males of remoter degrees. This form of succession is peculiarly suited to constitutional monarchies. In absolute monarchies the so-called Salic law generally prevails, which excludes females and those who derive title through females. The Witenagemote had the right of deposing kings—a right which was claimed by Parliament in the cases of Edward II. and Richard II.; but there is now no constitutional method of deposing a king without his consent. The chief prerogatives of the crown as now exercised are to dissolve and convoke Parliament, to dismiss and to select ministers, to declare war and make treaties, to create peers, and appoint bishops, colonial governors, and judges. But, in fact, the exercise of the prerogative is not, and cannot be, of a capricious character, and it depends ultimately for its sanction on the will of the people. For instance, the king can appoint ministers, but constitutional practice requires that a minister who is censured by the Commons should resign. He can declare war, but the Commons can refuse supplies if they do not approve of the war. Moreover, the king can only express his will by certain formalities—*e.g.* the use of the great seal; and the seals are in the custody of his ministers, on whose advice he must act. In certain cases, however, he can act on his own initiative when he thinks that the government does not express the true wishes of the people. The king can also veto any bill of Parliament by refusing his assent; but this power has not been exercised since 1707. Out of the responsibility of ministers has arisen the theory that the king can do no wrong—*i. e.*, he is not amenable to any court, and he cannot sanction any wrongful act. A minister is supposed to commit a wrongful act without authority. The death of the king is technically known as the demise of the crown. On demise of the crown the Privy Council, and the lord mayor and aldermen of the city of London, and some other persons, meet and proclaim the king. The king attends, and takes the oath for the security of the church in Scotland. Then the members of the old Privy Council are sworn in as members of the new Privy Council. The king is thereupon proclaimed in the various cities and countries of the empire. His title is, 'By the grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the seas King, Defender of the Faith, Emperor of India.' The title of Defender of the Faith was conferred on Henry VIII. by Pope Leo X. The title of King of France, a survival of the Hundred Years' War, was dropped in 1800. The king's person and family enjoy a greater protection than that accorded to his subjects. To compass the king's death is treason. By an act of 1842, assaults on the queen were made punishable by whipping and imprisonment. There are extensive lands and hereditary revenues attaching to the crown; but for many years it has been the custom for the sovereign to surrender them to the nation in consideration of an annual payment called the civil list. The king is, *ex officio*, supreme head of the Established Church of England, and of the orders of knighthood. He sits in the Privy Council, but does not, and could not properly, sit in the cabinet. Consult Dicey's *Law of the Constitution* (6th ed. 1902).

Crown, in architectural construction, sometimes means a crown tower, but more generally the upper portion of a cornice, including its members or the top or meeting place of the sides of an arch.

Crown, a special headdress designed as a symbol of royalty or distinction. Alexander the Great wore the first Greek royal crown as a symbol of rank. In Rome the crown was regulated in its form and splendor by the fancy of the wearer, graduating from the plain fillet to the radiated crown which proclaimed the owner to be the recipient of divine gifts and honors. In Egypt, royal crowns, often very elaborate, were in common use. The crowns of the Ptolemies were distinguished by their simplicity. In Greece the archon wore a crown as an emblem of rank. The inter-Hellenic games in Greece brought into vogue the famous garlands of which Homer speaks. There was the 'crown of thorns' at Calvary. In Rome the crowns of distinction are varied in their use and form. The *corona civica* made of oak leaves and acorns was the reward of a soldier who saved the life of a fellow-countryman in battle. The *corona muralis*, a band of gold, was the prize of the soldier who first scaled the walls of a besieged city. The *corona vallaris*, a gold band decorated with pales, was given to the soldier who forced a palisade. The *corona navalis*, a band decorated with the prows of ships, was a gift to the sailor who gained a naval victory. The *corona obsidionalis*, a crown composed of herbs and grasses gathered at the place of victory, was the prize of the leader who rescued a Roman army in defeat. On occasions of conviviality the guests often wore garlands of crowns, sometimes of parsley. Bridal crowns are still worn to this day in Norway. The papal crown is a lofty, uncleft mitre. enriched with circlets, decorated with ribbons, a ball and cross surmounting the whole. The German imperial crown was of gold, rising into a semicircle, dominated by a cross, and ornamented with precious stones and pearls. The Italian crown was of gold and silver. The iron crown of Lombardy was made of a thin band of iron, mounted in gold, and fabled to contain a nail taken from the true cross. Napoleon, when crowned king of Italy at Milan (1805), wore an exact counterpart of the Lombard crown. The imperial crown used in the Continental empires rises from a circlet of gems, surmounted by golden leafage of delicate workmanship, in the form of a mitre debased in the centre; an arch, which is dominated by a mound and cross, springs over the sides above the space made by the cleft. The royal crown of England has passed through many modifications since the early days of the Anglo-Saxon princes. At the Norman Conquest it was a circle of pearls set in gold; later it was elaborated into a radiated diadem. The coronation crown of King Edward VII. was covered with jewels, and was lined with a cap of violet velvet. From the circlet of gems, surmounted by crosses and fleurs-de-lis, rise the arches and mound. The crown used on ordinary occasions has a double arch, four crosses, and four fleurs-de-lis.

Crown Colonies, British dependencies governed directly by the British crown. They are contrasted with the colonies which possess the right of self-government. Often a crown colony has also the apparatus of autonomy, but its parliament, though it may be representative, is not responsible. See British Empire.

Crowne, John (*c.* 1640–*c.* 1703), English dramatist, went to England from Nova Scotia (1660). He published a romance, *Pandion and Amphigenia* (1665), but thereafter devoted himself to dramatic writing. His comedies, notably *Sir Courtly Nice*, 1685 (which held the stage for a century), were considered by many to surpass those of Dryden, who regarded Crowne as a rival. Among his other plays are *The Destruction of Jerusalem* (1677), and *Caligula* (1698). His collected works, with memoir, were published in 2 vols. in 1874.

Crowninshield, Arent Schuyler (1843–1908), American naval officer, was born in Seneca Falls, N. Y. He was graduated (1863) from Annapolis and served in the Civil War, being present at the attacks on Fort Fisher. He passed through the regular grades until his retirement as rear admiral in 1903 and during the Spanish War, was a member of the Board of Naval Strategy.

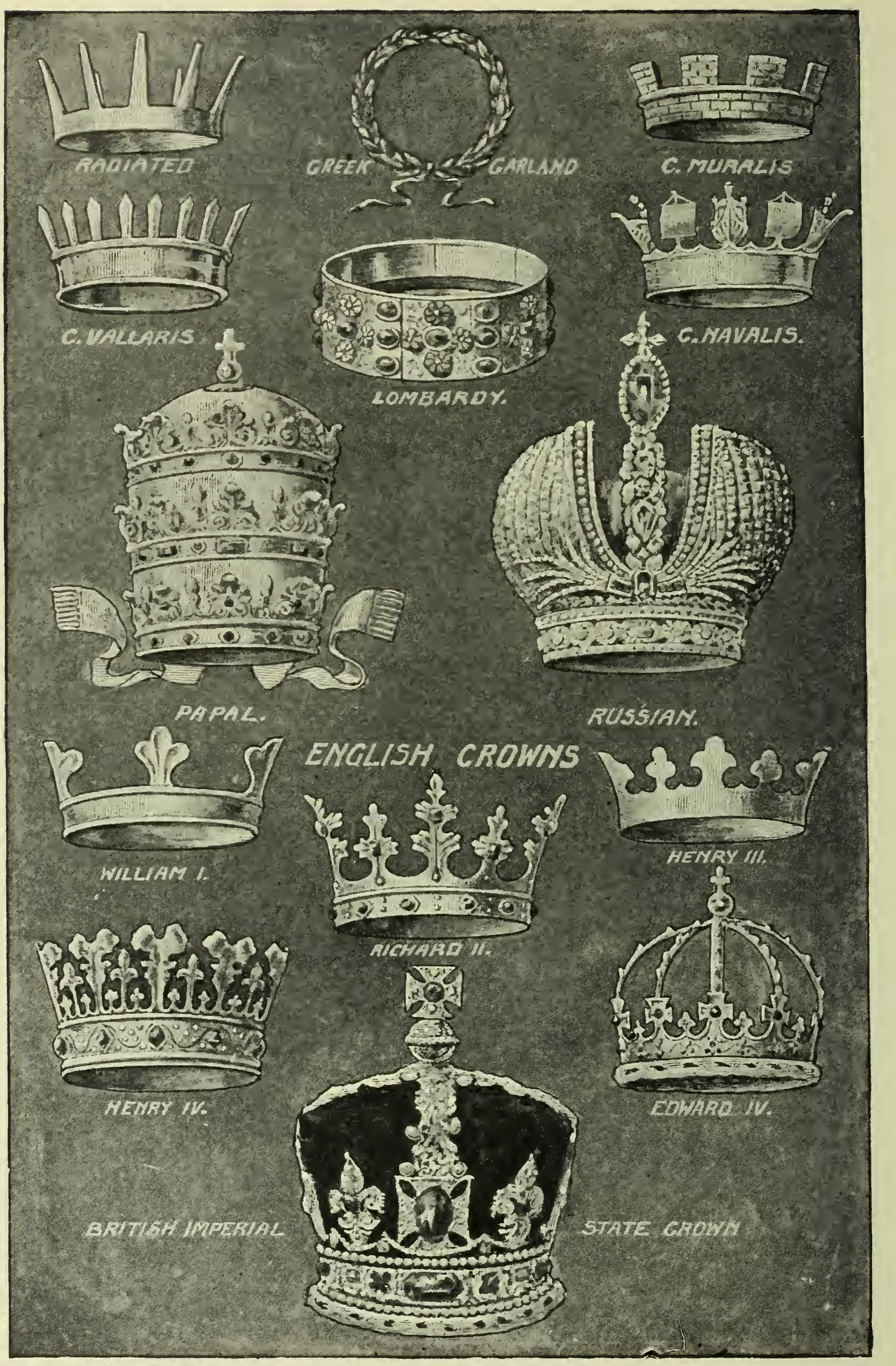
Crown Point, town, New York, in Essex County, on Lake Champlain, and on the Delaware and Hudson Railroad; 110 miles north of Albany. At this point in 1731, the French put up a fortification regarded as the key to Lake Champlain, and during the French and Indian War, Governor Shirley twice (1755 and 1756) planned an attack, but accomplished nothing. In 1759 General Amherst took possession, demolished the French fortifications and built new ones. On May 10, 1775, the fort was captured by Seth Warner while Ethan Allen and Benedict Arnold gained possession of Ticonderoga. In 1910 the grounds and ruined forts were given to the State for a public park. The States of New York and Vermont have erected a vehicular bridge across Lake Champlain near the old fort, opened for traffic in 1929, and nearby is a large State camping ground. There are deposits of iron ore in the vicinity and the town has manufacturing interests and grain elevators. Pop. (1920) 1,413.

Crown Point, town, Indiana, county seat of Lake County, on the Erie and the Pennsylvania Railroads; 34 miles southeast of Chicago. The manufactures include shirts and overalls and there are large grain elevators here. Pop. (1910) 1,690; (1920) 3,232.

Crown Wheel, or Contrate Wheel, a toothed wheel in which the teeth stand at right angles to its plane. See Gearing.

Crowquill, Alfred. See Forrester, Alfred Henry.

Crowther, Samuel Adjai (?1809–92), native African bishop, was born in Ochugu, near Dahomey. He was captured and sold as a slave, but on reaching Sierra Leone, after the slave-ship had been taken by a British frigate, attached himself to the Anglican mission. After the necessary training, he was entrusted with a mission to his countrymen, first as a teacher, then as a clergyman, and finally as bishop of Yoruba, to which he was consecrated in 1876. As an eloquent preacher, as a translator of the Bible into Central African



VARIOUS FORMS OF CROWN

languages, as a compiler of valuable grammars and dictionaries he did noble service in the cause of Christianity and civilization.

Croydon, municipal borough and market town, England, in Surrey; 10 miles south of London. It is chiefly a residential town, but is now famous as the most important airport in England and one of the best in the world. From there is direct regular service to many of the Continental capitals. The parish church, which dates from the 14th century, was rebuilt in 1870, having been in great part destroyed by fire three years before. The public buildings include a handsome town hall (1896), literary and scientific institutions, public libraries, theatre, barracks, and the general hospital. The Whitgift Hospital, founded by the archbishop of that name, is an Elizabethan building. The endowment bequeathed by Archbishop Whitgift now also endows the grammar (reconstituted in 1881) and middle schools; and there are also schools for boys and girls respectively, endowed by Archbishop Tenison in 1714. Recreation grounds (365 acres) include Park Hill and Wandle Park. The old archiepiscopal palace, said to have been founded by Lanfranc, was sold toward the end of the 18th century, and Addington Park was acquired in its place. Pop. (est. 1937) 242,300.

Croy'don, town, Queensland, in Norman County, near the Gulf of Carpentaria; 95 miles east of Normanton. It is in a gold-mining district. Pop. 3,000.

Crozet Islands, krō-zā', a group of islands of volcanic origin in the South Indian Ocean, lying between Prince Edward Island and Kerguelen; area, about 200 square miles. They were discovered by Marion's expedition in 1771, and belong to Great Britain. All are uninhabited and with the exception of Possession. East, Apostle, and Hog are mere rocks. They were visited by the *Challenger* Expedition in 1873–4.

Crozier. See CROSIER.

Crozier, krō'zher, FRANCIS RAWDON MOIRA (*c.* 1796–1848), English naval captain and explorer, made three voyages to the Arctic Circle with Captain W. E. Parry (1821–7), and accompanied Captain Ross to the Antarctic Ocean in the *Terror* (1839), returning in 1843. In 1845, in the same vessel, he sailed with the Sir John Franklin Expedition, and perished in the Polar regions. See ARCTIC EXPLORATION.

Crozier, JOHN BEATTIE (1849–1921), Anglo-Canadian philosopher, was born in Galt, Ontario, and was graduated in medicine from Toronto University in 1872. In the same year he settled in London, England, and received a pension from the civil list, in order to further his investigations for his *History of Intellectual Development on the Lines of Modern Evolution* (1897–1904), a work of learning and research, in which the author seeks to trace out the determining law of the development of civilization. Other books are *The Religion of the Future* (1880); *Civilization and Progress* (1885); *Lord Randolph Churchill; a Study of English Democracy* (1887); *My Inner Life* (1898); *The Wheel of Wealth* (1906); *First Principles of Investment* (1910); *Sociology as Applied to Practical Politics* (1911).

Crozier, WILLIAM (1855–1942), American soldier and inventor, was born in Carrollton, O. He was graduated from West Point in 1876, and served as second lieutenant in the Fourth Artillery against the Sioux and Bannock Indians (1876–9). Subsequently he was instructor of mathematics at West Point. Entering the Ordnance Department in 1881, he became distinguished as an authority on all matters pertaining to ordnance. In 1888 he proceeded to Europe to study artillery, and on his return invented, with Gen. A. R. Buffington, the Buffington-Crozier disappearing gun carriage, adopted by the U. S. Government, and other devices, including a wire-wound gun. During the Spanish-American War he was inspector of coast defenses, and in 1899 attended the Peace Conference at The Hague. He also saw service in the Philippine insurrection and in the Peking Relief Expedition against the Boxers in 1900. In 1901 he was made chief of ordnance, U. S. Army, with the rank of brigadier general. In 1912–13 he served as president of the Army War College, Washington, D. C. and during the World War was a member of the War Council, spending several months in France and Italy. He was appointed major general in 1918 and retired from active service that same year. He has received many honorary decorations. Died Nov. 10, 1942

Crucian, kroo'shan (*Carassius vulgaris*), a fresh-water fish, nearly related to the carp (q. v.), from which it differs in the absence of barbules, in the single-rowed arrangement of the pharyngeal teeth, and in a few other minor points. It is found in numerous varieties in rivers, ponds, and lakes in Europe and Asia; and is sometimes, though rarely, caught in the Thames. Its food chiefly consists of dead vegetable and animal matter.

Crucibles, open cup-shaped vessels used to contain solids that are to be strongly heated or fused. They should be themselves infusible, little liable to crack or break, and remain unacted on by their contents. For general industrial purposes these conditions are most nearly met by crucibles made of fireclay or of fireclay mixed with graphite; but if the very highest temperatures are to be withstood, lime or carbon must be employed. For analytical purposes platinum crucibles are by far the most convenient, porcelain being utilized where platinum is unsuitable.

The commonest form of crucible, and one that is adequate for nearly all ordinary purposes, is the *Hessian,* composed of equal parts of fireclay and sand. It will withstand extreme heat, but not extreme temperature changes. *Aluminum crucibles* have the advantage of withstanding sudden changes of temperature and of being practically infusible for all ordinary purposes. *Graphite crucibles* are largely employed in metallic operations, as in the making of crucible steel and various alloys, and the melting of gold-silver bullion. *Coke crucibles* are also employed in the fusion of certain metals. *Lime crucibles* are almost completely infusible, but they disintegrate rapidly on exposure to the air. *Platinum crucibles* cannot be used for the fusion of metals.

Crucif'eræ, an important order of plants whose flowers have four petals placed in the form of a cross, and six stamens, of which two opposite ones are shorter than the other four. The Cruciferæ include about 1,800 known species, mostly palæarctic, and especially abundant in Europe. No order is more familiar or more widely represented: the wild mustard, shepherd's purse, pepper grass, etc., are among the commonest weeds of cultivation, while the turnip, cabbage and cauliflower, the radish and cress, etc., are no less familiar and widespread in usefulness. Ornamental plants include the stocks, sweet alyssum, wallflower, etc. As wild flowers they are mostly inconspicuous, but the pretty cuckoo flower or lady's smock, and not a few others, might be mentioned; while a large number of genera are of the greatest value to the florist, for whom the exuberant masses of *Iberis, Alyssum, Arabis,* and *Aubrietia* are among the most admired resources of the rock garden. The general character of the order is antiscorbutic and stimulating, with more or less acridity; the familiar flavor being due to the presence of a characteristic ethereal oil. Striking examples of these properties are given by the Scurvy Grass, or more familiarly by the common watercress; while a wide range of variation of flavor is presented by the flesh, rind, and leaves of the common turnip, especially in different varieties, soils, and seasons. Among the genera are Draba, Cochlearia, Arabis, Cardamine, Dentaria, Nasturtium, Brassica, Sinapis, Erysimum, and Raphanus.

Crucifix (Latin, *crux,* 'the cross,' and *figo,* 'I fix'), a cross with the effigy of Christ fixed to it. Crucifixes are used on the altars of Roman Catholic churches. From the fourth century they have been common in the worship of the Western Church, and they have played an important part in the art of the successive centuries. Some of the greatest artists have devoted themselves to carving crucifixes. In Roman churches they are found not only on the high altar, but in all the subsidiary shrines, and also on the walls. In the earlier centuries the figure of the Christ on the cross was portrayed as clad and still in life; but later a dead Christ was usually represented, and nude, save for a waist cloth. Crucifixes are fashioned of wood, stone, or metal. See Cross.

Crucifixion. See Cross.

Cruden, krōō'den, Alexander (1701–70), British scholar, author of the well known Biblical Concordance, was born in Aberdeen, Scotland. In 1772 he left for London, where he earned his living chiefly as a private tutor, bookseller, and corrector of learned works for the press. This occupation suggested his self-styled name of 'Alexander the Corrector' of the national morals, formally to become which he actually petitioned Parliament. In 1737 appeared his *Complete Concordance of the Holy Scriptures,* dedicated to Queen Caroline, who promised to 'remember him,' but died a few days later. During his later years he became mentally unbalanced and remained so until his death.

Cruelty, the wilful infliction of unnecessary pain, in its legal aspects, is confined chiefly to the question of divorce and to the treatment of children, the insane, and animals. As cause for divorce, cruelty includes not only physical violence, but also such conduct on the part of either husband or wife as to produce mental suffering sufficient to impair the health or defeat the legitimate ends of matrimony (see Divorce). Cruelty to children embraces both abuse of the child's body and corruption of its morals, and is punishable at common law as a criminal offense (see Children, Cruelty to). Cruelty to the insane has been largely eliminated through government provision and regulation of asylums. Cruelty to animals includes all acts or omissions which result in pain or death (see Cruelty to Animals).

Cruelty to Animals was first made the subject of preventive legislation in England in 1822; and in 1824 the Royal Society for the Prevention of Cruelty to Animals was formed. Under various statutes passed in England, cruelty to domestic animals is punishable by fine and imprisonment; in 1900 a Protection Act for wild animals in captivity was passed; and other acts prohibit bull baiting, dog fighting and cock fighting, regulate vivisection, and supervise the slaughter of cattle and their conveyance by rail.

In the United States, cruelty to animals is now punishable in most of the States by fines ranging up to $100, or imprisonment up to 60 days, or both. In 1866 the first preventive society, the *New York Society for the Prevention of Cruelty to Animals,* was chartered by the State legislature at the suggestion of Henry Bergh (q. v.), who was its first president for twenty-two years. The objects of the New York Society are to aid the police in the enforcement of existing laws relating to the protection of animals from wanton cruelty, and to carry on a propaganda for the enactment of further legislation with that end in view. It exercises supervision over horse and poultry markets, exhibitions of trained animals, and other possible occasions of abuse; it possesses a hospital with modern equipment and homes for stray animals; and its agents have police power. The Pennsylvania Society for the Prevention of Cruelty to Animals, founded in 1867, is noted for its endeavors to prevent cruelty by moral suasion and practical advice.

These two societies have been the model for the many affiliated societies that have since been formed in the United States and in other parts of America. Similar societies also exist in most of the countries of Europe, in South Africa, Australia, Mexico, Brazil, and the Argentine Republic.

Cruikshank, George (1792–1878), English caricaturist, was born in London, the son of Isaac Cruikshank, who, as well as his eldest son, Isaac Robert Cruikshank, was also a caricaturist. He was almost entirely self-taught and a publication, *The Scourge* (1811–16), affording scope for the display of his satiric genius, from that time forth he continued to pursue his vein with remarkable success. The exquisite series of colored etchings contributed to *The Humorist* (1819–21), and the etchings to the *Points of Humor* (1823–24), culminated in the etchings to *Peter Schlemihl* (1823), and to Grimm's *German Popular Stories* (1824–26). The little woodcuts contributed to the *Italian Tales* (1824), *Mornings at Bow Street* (1824–27), and Clark's *Three Courses and a Dessert* (1830), and the plates to Scott's *Demonology and Witchcraft* (1830), may be regarded as the last examples of his earlier and simpler method as an etcher. His plates in *Bentley's Miscellany* mark a third period in his art, in which he aimed at greater elaboration, introducing more complex effects of chiaroscuro. The finest of these are the series for Dickens' *Oliver Twist,* for Lever's *Arthur O'Leary,* for Maxwell's *History of the Irish Rebellion,* and for Ainsworth's *Jack Sheppard, The Tower of London,* and *The Miser's Daughter.* Among the best productions of his later years are the elaborate etchings for Brough's *Life of Sir John Falstaff,* published in 1858. His last illustration was the frontispiece to Mrs. Blewitt's *The Rose and the Lily* (1877). In his late years he devoted himself to oil painting, and in this province showed more humor than artistic power. His most important picture was *Worship of Bacchus* (1862), which was also engraved partly by his own hand, a vigorous protest against drunkenness; as also was the series of *The Bottle* (1847), which attained an immense circulation. Consult *Lives* by Jerrold, Bates, Stephens. and Marchmont; Reid's *Catalogue* of his engraved works.

Cruiser, in modern naval parlance a vessel of war in which battery power and armor are sacrificed to secure speed and fuel capacity. It is a term of only comparatively recent use. In the early days of sailing navies, a small, fast class of vessels was used for scouting and carrying dispatches. In the sixteenth century several of them were attached to each British fleet or squadron. They were called pinnaces or fly boats, and were about 50 tons burden. In the time of Charles I the size had increased to about 185 tons, and the craft were known as whelps.

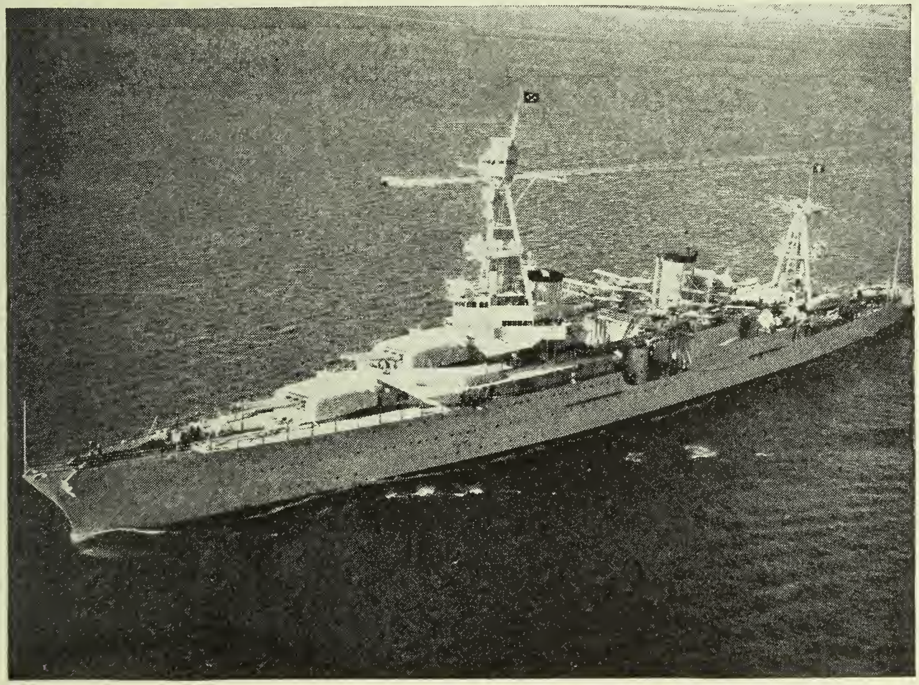
They were built for sweeps as well as sails, and carried 10 guns. In 1649, William Pett of Ratcliffe built the *Constant Warwick,* taking as his model a French frigate he had seen in the Thames. She was the first of English frigates, and was very fast until rebuilt and overgunned.

During the eighteenth century the frigates steadily improved in speed, handiness, and size. Their importance as scouts, as a screen to conceal the movements of the heavy ships, for conducting the less important operations of war, for convoy, and for operating against the enemy's commerce was fully understood. The maximum size increased from about 600 tons in 1700, to 1,600 tons in the 44-gun *Constitution* class laid down in 1796. But the great mass of frigates and cruisers were much smaller than these, and were called frigates, sloops of war, brigs, schooners, etc., according to their size and rig. The fast sailing cruiser continued in use until after 1840. The steam frigate *Demologos* or *Fulton* (the first) was built in 1814, but steam was not yet accepted by the naval world for fighting ships, and no other steam man-of-war was built until after 1830. From that time the sailing frigate began to disappear.

At the beginning of the Civil War a speed of twelve knots was very high for a man-of-war, and possessed by few of them. But the exigencies of the war demanded fast ships for various purposes, chiefly to capture blockade runners and commerce destroyers; and toward the close of the war several steam frigates of a very fast class were laid down. Only two or three had been completed when the war closed, and being made of insufficiently seasoned timber, they soon became unfit for service. The most notable of these vessels was the *Wampanoag.* Of about 4,000 tons displacement, she was by several knots the fastest war vessel of her time, and probably the fastest large ship of any kind, having developed a speed of nearly 18 knots for twenty-four hours. Her coal expenditure was not excessive for the power developed, even when compared with that of more modern machinery; but it was so much larger than the amount used by the older and slower steamers that the Navy Department, Congress, and the senior naval officers were appalled.

Following the *Wampanoag,* other nations began to build fast cruisers; but the authorities of those countries were unable to reconcile themselves to the consumption of so much coal, so that few very fast ships were continued in active service. Later, the still larger expenditure in the transatlantic passenger steamers accustomed people to high speed conditions, and the fast cruiser became an accepted fact. In the United States Navy, the first modern cruiser was the *Atlanta* (1884), of 16 knots, followed by the *Newark* class of 19 knots, the *Olympia* (1892) of 21.5 knots, and culminating in the *Columbia* (1892) and *Minneapolis* (1893) of 23 knots. These were the fastest cruisers then afloat, and their speed was not materially exceeded for fifteen years or more.

In the development of the man-of-war there have always been two opposing schools of design. One has advocated powerful ordnance, thick armor protection, and moderate speed; the other has stood for increased speed at the expense of armor, and even, to some extent, of ord-



Paul's Photos

THE U. S. S. HOUSTON, A HEAVY CRUISER

In this photograph the *Houston* is flying the President's flag at the mainmast, denoting that he is on board. The four-star flag of an Admiral is flying at the foremast.

nance. One of the early results of this divergence of thought was the evolution of the *armored cruiser,* a recent one is the *battle cruiser.* In the armored cruiser, armor protection was emphasized and the number and caliber of guns were reduced as necessary, while even speed was sacrificed to armor. The most efficient vessel of this type was the U. S. S. *Brooklyn,* and her design was further developed but not altogether improved in the *Scharnhorst, Gneisenau,* and *Blücher* of the German, and the *Cochrane* class of the British navy. The poorest and most inefficient types were the *Charleston* class (United States), *County* class (British), *Maryland* class (United States), *Drake* class (British), and similar types in other navies.

Coincident with the development of the *armored cruiser,* the *protected cruiser* appeared. The protection consisted in a curved deck, nearly flat amidships, and descending near the sides at an angle of about 45 degrees to a point several feet below the water line. The sloping sides were the heaviest part, and in some vessels reached a thickness of 6 inches. While allowing the easy destruction of the outside plating, which would admit some water in the triangular hollow at the sides, the armor of the deck forms a protection to the machinery and submerged hull equal to a belt about 40 per cent thicker. All fighting ships, battleships, and large cruisers of recent design have protective decks of greater or less thickness. In the case of battleships and cruisers of any kind which have armor belts, thick or thin, the slope of the protective deck is behind the belt, and adds much to the total resistance to penetration of the ship's vitals, for experiment has shown that a shell which has passed through hard armor that is not too thin, in proportion to the caliber of the projectile, is broken up on striking a second hard and tough plate placed at some distance back of the first.

Shortly before the World War Admiral Fisher developed for the British Navy the *battle cruiser,* which marked a tremendous advance over the armored cruiser. In this type, armor protection is relatively moderate, while the main battery guns are of the same caliber as those of contemporary battleships, and the number is nearly the same. The speed is very high, from 26 to 33 knots, and the radius of action is greater than that of battleships. To carry the heavy battery, develop the high speed, and possess the wide radius of action, great size is necessary, so that battle cruisers are considerably larger and much more expensive than contemporary battleships of more powerful battery and better protection. During the World War they proved valuable in some isolated actions, but vulnerable in heavy infighting, such as that at Jutland. The one battle cruiser built after that battle was equipped with armor of battleship standard. This vessel, the *Hood,* displaced 42,100 tons and was the largest warship ever built. The *Hood* and two smaller British battle cruisers, the *Renown* and the *Repulse,* proved valuable during the first eighteen months of the war which began in 1939; for some time they were the only British warships capable of both catching and outfighting the German 'pocket battleships.' Their activity undoubtedly contributed to the cessation of open seas raiding by the German warships. Later, the *Hood* took part in the Battle of Oran, in which major units of the French fleet were destroyed.

Official U. S. Navy Photograph

THE U. S. S. PHOENIX, A LIGHT CRUISER

Official U. S. Navy Photograph

THE U. S. S. BOISE, A LIGHT CRUISER

The development of the *battle cruiser* was believed at the time to have rendered the *armored cruiser* obsolete, and the *protected cruiser* never had amounted to any great importance in any navy, although the protected deck persists in all capital ships and some cruisers. Shortly before the World War, the naval powers developed the *light cruiser,* a vessel of from 2,000 to 9,700 tons, mounting guns from 5.5 to 8 inches in caliber. After the War vessels in this category were generally classified as light or heavy cruisers, the former including all warships carrying 6-inch guns and the latter 8-inch.

The Washington Arms Treaty of 1922 did not restrict the building of cruisers, but by classifying as capital ships all vessels of more than 10,000 tons or carrying guns of caliber greater than eight inches, limited cruisers to these figures. The first years after the Treaty saw efforts by all powers to cram as much speed and fire power into cruisers as was possible under the displacement limit. Protection was sacrificed, and the 10,000-ton treaty cruisers, packed with guns and machinery, were equipped with relatively fragile armor. The short-sightedness of this policy was apparent by 1933, and all naval powers increased the armor protection for cruisers. There was also a tendency, particularly in the British and French navies, to build smaller cruisers. Most of them were armored at the water line, and carried their guns in turrets instead of shields.

One of the most significant cruiser developments of the post-World War period was the German 'pocket battleship.' This type of vessel, in reality an armored cruiser, or small battle cruiser, was built to conform to the maximum tonnage limit of 10,000 set for German warships by the Versailles Treaty. Three pocket battleships were built; each mounted six 11-inch guns and eight 5.9-inch guns. This armament was heavier than that of ordinary cruisers and the pocket battleship's speed of 26 knots made them faster than existing battleships. Powered by Diesel engines, they had a cruising range of 16,000 miles, but their heavy armament and fuel capacity necessitated a reduction in armor protection. They could out-run vessels of heavier armament, however, and it was thought that their 11-inch guns would keep the guns of lighter warships out of range. In December, 1939, however, the *Graf Spee* was defeated by two British light cruisers and a heavy cruiser in a running battle off the coast of Uruguay. The battle between the *Spee* and the British cruisers *Achilles, Ajax* and *Exeter* illustrated the lack of sufficient armor protection in the *Spee,* although it is possible that under different handling the captain of the *Spee* might have sunk all three of his opponents. Commodore Harwood, the senior British captain, handled his ships in a masterful manner, keeping the three of them on widely separated bearings from the *Spee,* thus forcing the *Spee* to shift targets frequently, or to split her battery. The captain of the *Spee* apparently feared that the British cruisers would use their superior speed to escape from him, consequently he sacrificed the superior range which his guns possessed, and he sacrificed the superior accuracy of German gunfire at long range and closed in on his enemies time after time. The eight-inch and six-inch guns of the British cruisers penetrated the comparatively light armor of the German ship at the short ranges chosen by the *Spee.* Also, a shell from one of the British cruisers struck the German control station which was in a non-armored structure on the main deck. The hit on the German control station, combined with the good shooting of the more numerous British guns saved the British from probable destruction. The *Spee* also suffered from a defect in crew organization such that the captain apparently broke off the engagement because he believed at the time that his ship had been damaged much more severely than was actually the case.

The importance of armor protection for cruisers was demonstrated again in July, 1940, when the Italian light cruiser *Colleoni* was sunk by the Australian light cruiser *Sydney.* The *Colleoni* carried the same armament and was faster than the *Sydney;* but her armor was too light to stand the pounding of the British shells. In several other engagements between British and Italian ships it was clearly demonstrated that the Italians had made a grave error in emphasizing speed in their cruisers at the expense of gun power and armor protection. The British frequently administered severe defeats to Italian units.

Such a defect was not present in most cruisers laid down after 1934. In general a certain amount of speed was sacrificed for increased armor, better compartmentation, and space for more airplanes.

In May, 1941, the British battle cruiser *Hood* was sunk by the guns of the German battleship *Bismarck.* Many newspapers were disposed to account for this by the statement that the *Hood* lacked armor protection. In this instance such statements were not justified. The armor and other protection of the *Hood* amounted to nearly 14,000 tons. The ship was sunk at a range of 23,000 yards—greater by a full mile than any range noted at Jutland. Naval opinion takes the view that the *Hood* was sunk by accurate gunfire and that no other lesson can be drawn from her loss. In December, 1941, the British battle cruiser *Repulse* was sunk off the coast of Malaya by torpedoes launched from Japanese naval planes. The new British battleship *Prince of Wales* was lost in the same manner at the same time. The loss of the *Repulse* offers no new lesson as it is universally known that the under-water body of a ship offers the most vulnerable target. Strangely enough, however, the British themselves had given several brilliant examples of the value of torpedo planes earlier in the war.

The following list shows cruisers and battle cruisers lost by the powers from September 3, 1939 to December 31, 1941. British: *York,* bombed; *Effingham,* stranded; *Curlew,* bombed; *Calypso,* torpedoed; *Southampton,* bombed; *Bonaventure,* torpedoed; *Gloucester,* bombed; *Hood,* gunfire; *Repulse,* torpedoed; *Galatea,* torpedoed; *Fiji,* bombed; *Calcutta,* bombed; *Sydney,* gunfire; *Dunedin,* torpedoed; *Neptune,* mine. French: *La Tour d' Auvergne,* internal explosion. German: *Graf Spee,* scuttled; *Bluecher,* coastal guns; *Karlsruhe,* torpedoed; *Koenigsberg,* bombed. Greek: *Helle,* torpedoed. Italian: *Fiume,* gunfire; *Pola,* gunfire; *Zara,* gunfire; *Colleoni,* gunfire; *Bande Nere,* unknown. Great Britain had also lost about 15 armed merchant cruisers and Germany probably ten such ships.

Cruisers have long been among the most useful of naval vessels. Their speed and great cruising range make them valuable in time of war, and in peacetime their presence on the trade routes safeguards the merchant shipping of the world. The ceaseless activity of the cruisers of the sea powers was largely responsible during the 19th century for the suppression of piracy, gun-running, and slave trade. To the far-flung British Empire, linked together by the long sea lanes, cruisers are indispensable. Especially do the British Isles themselves depend upon the security of the trade routes for a constant supply of vital food and raw materials. Britain's large cruiser force provides this security, yet does not offer a menace to other nations; for, if it were concentrated for offensive operations, it would be easy for another power to cut the trade routes. The cruisers, therefore, are primarily a defensive force, both in peace and war.

Crumb - of - Bread Sponge (*Halichondria panicea*), a common British sponge, which covers much space on the shore rocks, where it forms a thick crust over stones, shells, weed, and even living crabs. The color varies, but is often whitish, yellow, or green. The surface of the colony is studded with numerous crater-like orifices, the *oscula* of the sponge.

Crusades, or the WARS OF THE CROSS (French *croisade*, Latin *crux*), religious wars carried on by the Christians of the West against the Mohammedans.

First Crusade.—The first crusade was undertaken to assert and guarantee the right of Christian pilgrims to journey to Jerusalem, which had been denied by the Turkish conquerors. The Arabs, who wrested the Holy Land from the Eastern empire in the seventh century, had placed no obstacle in the way of pilgrims; and although the Fatimite califs of Egypt, who conquered Syria in 980, had oppressed both pilgrims and native Syrian Christians, yet it was not till the Seljuk Turks overwhelmed the land in 1065 that Western Europe was deeply stirred. The emperor of the East in 1073, Manuel VII., appealed to Pope Gregory VII.; and his successor, Urban II., moved by the appeals of Peter the Hermit, brought the agitation to a practical issue. At a council held at Clermont-Ferrand in France, in 1095, it was decided to wage a holy war against the infidel. The Pope himself delivered a stirring address to a vast multitude of clergy and laymen, and as he proceeded, their emotion burst forth into cries of *Deus vult* ('God wills it'). *Deus vult*, by the injunction of Urban, was made the war cry of the expedition, and every one that embarked in it wore the sign of the cross, whence the name *Crusade*.

From all parts of Europe thousands upon thousands hurried to engage in the holy war. Previous to the setting out of the great hosts of European chivalry, four disorderly armies, amounting in all to 275,000 persons, had departed for Palestine. The first consisted of 20,000 foot, and was commanded by a Burgundian, Walter the Penniless. It marched through Hungary, but was cut to pieces by the natives of Bulgaria, only a few, among whom was Walter himself, escaping to Constantinople. The second, consisting of 40,000 men, women, and children, was led by Peter the Hermit. It followed the same route as its predecessor, and reached Constantinople greatly reduced in numbers. Here the remnants united, crossed the Bosporus, and were utterly defeated by the Turks at Nicæa, the capital of Bithynia. A third expedition of a similar kind composed of 15,000 Germans, led by a priest named Gottschalk, was massacred in Hungary; which also proved the grave of the fourth, a horde consisting of about 200,000 riffraff from France, England, Flanders, and Lorraine, who had swept along through Germany, committing horrible ravages, especially against the Jews, whom they murdered without mercy.

After these first tempestuous hordes came the organized armies of the first crusade, which marched in five distinct bodies to their rendezvous at Constantinople—the first starting in 1096, and the last not reaching its destination till the summer of 1097. The leaders of these armies were Godfrey of Bouillon, duke of Lorraine; Raymond of Toulouse; Robert of Normandy, the son of William the Conqueror; Bohemond, son of Guiscard, with whom was the famous Tancred; and Hugh the Great, count of Vermandois, brother of the king of France. After some time the crusaders crossed into Asia Minor, accompanied by Peter the Hermit. Here their first step was the capture of Nicæa, the capital of Sultan Soliman (June 24, 1097). Baldwin, brother of Godfrey, now crossed into Mesopotamia, where he obtained the principality of Edessa. The crusaders reached Syria, and laid siege to Antioch. At length, on June 3, 1098, Antioch was taken, and the inhabitants were massacred by the infuriated crusaders, who were in their turn besieged by an army of 200,000 sent by the Persian sultan. Once more famine and pestilence did their deadly work. Multitudes also deserted, and escaping over the walls, carried the news of the sad condition of the Christians back to Europe. But again victory crowned their efforts; on June 28, 1098, the Mohammedans were utterly routed, and the way to Jerusalem was opened.

On a summer morning in 1099, 40,000 crusaders, the remnant of the vast army which two years before had laid siege to Nicæa, obtained their first glimpse of Jerusalem. On July 15, after a siege of rather more than five weeks, the city was delivered from the hands of the infidel. Eight days after the capture of the city, Godfrey of Bouillon was elected king of Jerusalem. His kingdom, at first comprising little more than the city of Jerusalem, was extended by conquest until it included the whole of Palestine. The best part of Asia Minor was restored to the Greek empire, while Bohemond became prince of Antioch. During nearly fifty years the three Latin kingdoms of the East—Edessa, Antioch, and Jerusalem—greatly increased in size, power and wealth.

Second Crusade.—In 1144 the principality of Edessa was conquered by the emir of Mosul, whose son, Nur-ed-Din, advanced to destroy the Latin kingdom of Jerusalem. St. Bernard of Clairvaux preached the second crusade, and almost forced Louis VII. of France and Conrad III. of Germany to place themselves at its head (1147). An immense army crossed the Bosporus; but the Byzantine emperor, Manuel Comnenus, was hostile and treacherous, and the crusaders met nothing but disaster, the forces led by Conrad being cut to pieces by the sultan of Iconium. Then, after attempting (1148) the siege of Damascus, the broken remnants returned to Europe. But the death blow of the Latin kingdoms came from Egypt, where the famous Salah ed-Din, or Saladin, had made himself sultan. He invaded Palestine, disastrously routed the Christians at Tiberias, and after a short siege captured Jerusalem itself in October, 1187.

Third Crusade.—The above disaster spurred Europe to make another effort, and the third crusade is perhaps the most famous. Its leaders were Barbarossa, emperor of Germany, Philip of France, and Richard of England. Barbarossa was first in the field in 1189; but he was drowned in Pisidia (1190), and his forces were joined to the French and English armies in the siege of Acre, which, in spite of the efforts of Saladin, was reduced (July, 1191) after a siege of twenty-three months. The crusaders, however, were divided by mutual jealousies. Philip abandoned the cause, and Richard, after a series of romantic and valorous achievements, was content to make a truce (September, 1192) with Saladin on the basis of a right for pilgrims to visit Jerusalem without interference.

The ***Fourth Crusade*** is known as a pseudo-crusade, for the crusaders never reached the Holy Land at all, being diverted by the policy of Venice to attack the failing Byzantine empire, where they founded the Latin empire under Baldwin I. (q.v.) in 1204.

The leader of the ***Fifth Crusade*** (1228–9), the Emperor Frederick II., recovered, by a truce with the sultan of Egypt, possession of

Jerusalem, and indeed of great part of the Holy Land. But Jerusalem having been again wrested (1244) from the Christians by the Kharesmians (people of Khiva), who were expelled from their country by the Mongols, the sixth crusade was undertaken (1248-54) by (St.) Louis IX. of France. But turning aside to lay siege to Damietta in Egypt, he was surrounded by the Moslems, and, along with a large portion of his army, was taken prisoner. And though, after purchasing his freedom by a heavy ransom, he subsequently went on to Palestine, the expedition produced no material results. Hence, in 1270, Louis organized the seventh crusade; but again he turned aside, this time to conquer Tunis for his ambitious brother, Charles of Anjou, and died of disease under its walls. This crusade, in which Edward of England (afterwards Edward I.) took part, was the last effort, and the Holy Land was left in the hands of the infidel, although Acre, Antioch, and Tripoli remained for some time longer (till 1291) in possession of the Templars.

Amongst the most striking episodes of these great movements were what are known as the Children's Crusades. Of these there were two, both in 1212, the impelling idea in both cases being that children, who were innocent, would be able to accomplish what men, who were sinful, were unable, or were not permitted by God, to accomplish. In France a shepherd lad, Etienne or Stephen, a native of Cloyes, near Vendôme, announced that he was sent by God to crush the Saracens, God helping by working miracles; and so intense was the religious fervor and tension of the time that he was speedily joined by, it was estimated, 30,000 other children of both sexes. They embarked at Marseilles in seven vessels, of which two foundered off the coast of Sardinia, and the other five reached Alexandria, where, however, the children were seized and sold as slaves, and of these only a small number regained their liberty seventeen years later through the treaty which the Emperor Frederick II. made with Sultan el-Kamil of Egypt. At the same time as these events were happening, a boy named Nicholas started a similar propaganda in Germany, and gathered together some 20,000 children, with whom he crossed the Alps, arriving at Genoa on Aug. 25, 1212. There the archbishop of the city persuaded them to return, when many of them perished on the way, while others took service at the towns and villages through which they passed. The boy Nicholas, after taking part in the siege of Damietta (1219), returned to Cologne, where he subsequently lived.

The title of crusade was further applied to several other warlike undertakings of a semi-religious character, as to some of the wars against the Moors in Spain. The persecution of the Albigenses, and the activity of the Teutonic Knights against the heathen Prussians, were also officially termed crusades.

Apart from their own intrinsic importance, the crusades are historically interesting because of their effects upon the policy and progress of the West. In respect of the lasting and far-reaching consequences which they had for Europe, they may well be compared with the Reformation and the French Revolution. By attracting away many of the more lawless and adventurous nobles they contributed to the consolidation of modern European nations, and helped, through the common perils of the East, to create national sentiment. They also served to aggrandize the temporal power of the papacy; but ultimately, by broadening men's minds and introducing new ideas, encouraged the revolt against papal pretensions. On the economic side of life their influence was enormous. The crusaders, and Europe through them, were familiarized with a higher standard of comfort and of luxury; and the necessity of providing transport and of keeping up supplies contributed to the rise of the commercial republics of Italy. Trade and industry both received a great stimulus, which was not exhausted when the discoveries of Vasco da Gama and Columbus gave a new direction to economic activity. See Gibbon's *Decline and Fall of the Roman Empire* (1776-88); H. H. Milman's *Latin Christianity* (1854-5); Hallam's *Hist. of the Middle Ages* (1871); T. A. Archer and C. L. Kingsford's *Crusades* (1894); Stanley Lane-Poole's *Saladin* (1900); various books in German, especially *Geschichte des Königreichs Jerusalem* (1897) and *Geschichte der Kreuzzüge* (1898), by S. Röhricht; the great *Recueil des Historiens des Croisades* (1841, etc.); Rev. G. Z. Gray's *The Children's Crusades* (1870); Röhricht's *'Der Kinderkreuzzug'* in *Historische Zeitschrift* (1876); and, in addition, Sir Walter Scott's *Talisman* (1832) and *Count Robert of Paris* (1825).

Crusca, ACCADEMIA DELLA, an academy founded at Florence in 1582 for the purpose of purifying and cultivating the Tuscan language. It served as the model for the French Academy (see ACADEMY). The name of the Della Cruscan School is applied to a number of English residents in Florence who printed inferior sentimental poetry and prose in 1785. They came to England, and much of their work appeared in the *World* and the *Oracle,* and for a time was popular. Gifford, however, in his *Baviad* and *Mæviad* (1851), gave the stuff its death-blow by his unmerciful criticism. Among the Della Cruscans were Edward Topham, Mrs. Piozzi, and James Boswell.

Crusenstolpe, MAGNUS JAKOB (1795-1865), Swedish author and politician. Becoming one of the leading members of the opposition, he attacked the government in sharp, sarcastic articles, in his paper, *Ställningar och förhällanden,* until in 1838 he was condemned to three years' imprisonment for *lèse-majesté*—a sentence which led to bloody riots in Stockholm. In prison he began to write those curious books, half romance, half politico-historical memoir, with which his name is chiefly associated—*e.g. Morianen* (1840–4), *Karl Johan och Svenskarne* (1845–6), and *Huset Tessin* (1847–9). See A. Ahnfelt's *M. J. C. Lefnadsteckning* (1880–1).

Crusius, OTTO (1857), German Greek scholar, born at Hanover; studied in Leipzig, and has been professor at Tübingen (1886), Heidelberg (1898), and Munich (1903) successively. Among his works are *Beiträge zur griechischen Mythologie und Religionsgeschichte* (1886); *Untersuchungen zu den Mimiamben des Herondas* (1892), and an edition of the same (3d ed. 1901); *Die Delphischen Hymnen* (1894); a biography of *Erwin Rohde* (1902); an edition of *Babrios* (1897); and the fourth edition of Bergk and Hiller's *Anthologia Lyrica* (1897).

Crustacea, a class of arthropods, characterized by the fact that the head bears two pairs of antennæ or feelers, that the breathing organs are usually gills, and that the chitinous coat is more or less impregnated with carbonate of lime. So diverse are the animals included in the class that these are practically the only characters widely distributed among its members, and even to these exceptions occur. The appendages are typically biramose, and have two branches springing from a common base; and the abdomen is generally furnished with appendages—a point of contrast with insects. The eyes are compound, like those of insects. In spite of the fact that there are a few land crustaceans, we may say that they constitute the insects of water. Just as the removal of refuse from the surface of the ground may be said to be a great part of the function of insects,

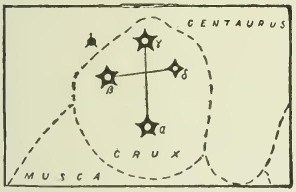
'CRUSADERS ON THE MARCH.' BY SIR JOHN GILBERT.

so the Crustacea are the scavengers of the sea. Similarly, just as insects form a very important part of the food of many land vertebrates, so the Crustacea constitute a great part of the food of fish. We may even pursue the parallel further, and say that just as insects prey as parasites not only upon other animals, but to a large extent upon each other, so in the sea one very often finds crustacean parasitic upon crustacean, while there are also a vast number of crustaceans parasitic upon other animals. Crustacea usually have an indirect life history, several larval stages often making their appearance before the adult form is reached.

Crustacea are divided into two main sets—the Entomostraca and the Malacostraca. The Entomostraca are small and simple, with a variable number of appendages, and no gastric mill. They include the following orders:—1. Phyllopoda—*e.g.* Apus, Artemia (brine shrimps). 2. Ostracoda—*e.g.* Cypris. 3. Copepoda—*e.g.* Cyclops and other water-fleas. 4. Cirripedia—*e.g.* the barnacles.

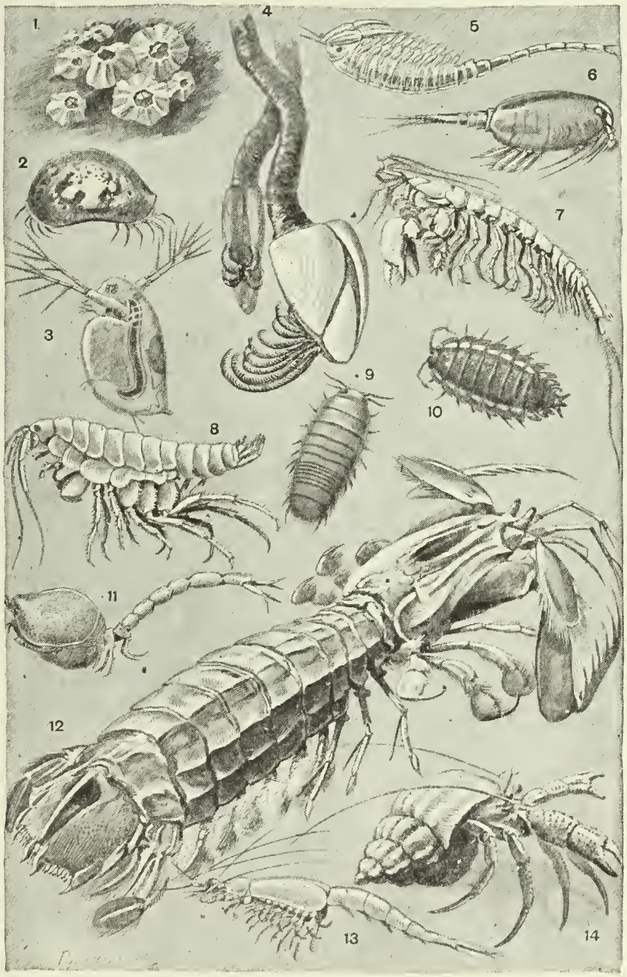
The Malacostraca, or higher Crustacea, have typically nineteen segments and pairs of appendages, there is a gastric mill and the body may reach a considerable size. The following orders are included:—1. Leptostraca, including a few primitive forms—*e.g.* Nebalia. 2. Arthrostraca, including (*a*) the Anisopoda (*b*) the Isopoda, (*c*) the Amphipoda. 3. Thoracostraca, with the following sub-orders: (*a*) Cumacea, (*b*) Stomatopoda, (*c*) Schizopoda, (*d*) Decapoda, including crabs, lobsters, hermit-crabs, and many others elsewhere described under their names.

In the Entomostraca, as contrasted with the Malacostraca, the first larval form is a simple unsegmented creature with only three pairs of appendages, called the nauplius. This larva is rare among the Malacostraca, in which the first stage in development is usually a segmented animal. See *Standard Natural History*, vol. ii. (1885); A. S. Packard's *Zöology* (1897).



The Southern Cross.

Crutched Friars, an order or friars which was instituted (or reformed) by Gerrard at Bologna, and confirmed by Alexander III., 1169. They are not to be confused with the Trinity Friars. They followed the Augustinian rule, and were known in England as 'the Cross-bearers' (crossed, crouched, or crutched), from the fact of their bearing a cross on the staves which they at first carried, and later a cross of scarlet on their habits. The color of the cross was changed to blue by Pope Pius II. (1460). They settled in London, Oxford, and Reigate, and at the Reformation had eleven houses in England, five in Scotland, and one in Ireland. They were suppressed in the United Kingdom in 1656. The site of their convent in London—between Jewry Street, Aldgate, and Mark Lane—is still known as Crutched Friars.



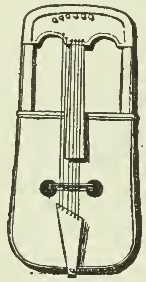
Types of the Lower Crustacea.

1. Balanus. 2. Cytherea lutea. 3. Dapania pulex. 4. Lepus anatifera. 5. Artemia salina. 6. Nebalia bipes. 7. Apocudes speciosus. 8. Orchestia Selkirki. 9. Gribble. 10. Woodlouse. 11. Cyclaspis pusilla. 12. Squilla nautis. 13. Mysis relictæ. 14. Hermit crab: 1, 4, 12, and 14 reduced about one-half; 2, 3, and 5 much magnified.

Crux, the Southern Cross, a remarkable group of southern stars included by Ptolemy as part of the Centaur. Its principal stars may be identified with the 'quattro stelle' located by Dante near the south pole (*Purg.* i. 23). They are arranged, not quite symmetrically, into a cross about 6° in length, the striking effect of which is enhanced by its erect position on the meridian. Three members of the quartette, α, β, and δ Crucis, of severally 1.0, 1.5, and 3.0 magnitude, and vividly white, yield spectra of the helium type; while γ Crucis is a glowing red star with a fluted spectrum. The Cross is situated in a brilliant section of the Milky Way, close to the 'Coal-sack.' Although visible, five thousand years ago, from the shores of the Baltic, it has long ceased to rise even in S. Europe.

Cruz, JUAN DE LA (1542–91), whose family name was Yepes, Spanish poet, born at Ontiveros (Old Castile). At the age of twenty-one he became a Carmelite monk at Medina del Campo, and assisted Santa Theresa in her attempts to reform the Carmelite order. He was persecuted for these efforts, was condemned in 1591, and imprisoned in the monastery of Ubeda. He was canonized in 1726. Juan de la Cruz wrote much in both prose and verse—his works, which are of a mystical nature, being characterized by great fervor, and by the harmony and beauty of their language. His *Obras Espirituales* appeared at Seville in 1703 (12th ed.), and were reprinted in 1849, forming the twenty-seventh volume of the *Biblioteca de Autores Españoles;* they have often been translated into German, French, and English. Amongst the English editions, the latest is the *Complete Works of St. John of the Cross* (2d ed. 1889). translated by David Lewis. See Rousselot's *Les Mystiques Espagnoles* (1867); David Lewis's *Life of St. John of the Cross* (1897).

Crwth, a stringed instrument played with a bow. It is of very ancient origin, being mentioned early in the 7th century; is now obsolete, but was used in Wales, Ireland, and Brittany until the 19th century. Originally it had three strings, but in later forms there were six, four of which were sounded by the bow, and the other two, at one side of the fingerboard, were plucked by the thumb of the performer. The sound-holes were circular, and the bridge, instead of being placed at right angles to the breast, was inclined towards the right; the left foot of the bridge passed through the sound-hole and rested on the back of the instrument, thus serving as a sound-post. The crwth figures prominently in Watts-Dunton's *Aylwin.*



Crwth.

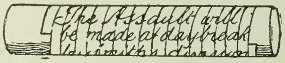
Cryolite, a pale gray or white mineral, sp. gr. 3, with a shimmering, somewhat pearly lustre, which occurs in large masses at Ivigtut, on the west coast of Greenland, and has been employed in the production of aluminium, alum, and caustic soda. It is a fluoride of aluminium and sodium, Na_3AlF_6. It was formerly the chief ore of the metal aluminium because of its easy metallurgical treatment, but its place is now largely taken by bauxite.

Cryophorus, or 'frost carrier,' is an instrument by which Wollaston demonstrated the loss of heat during evaporation. Two bulbs—one containing water, and the other water vapor—are connected by a tube, and exhausted of air. When the bulb containing the vapor is cooled, the vapor condenses, lowering the pressure below that of the vapor pressure of the water in the other bulb. Evaporation is thus set up, and as the heat required to vaporize the water is not supplied from the outside, it is taken from the water, which falls in temperature, and subsequently freezes. Equilibrium is only restored when one bulb becomes as cold as the other.

Crypt, subterranean vaulted structure directly beneath the floor of the choir or east arm of the church, is appropriated to the burial of the dead. There are four apsidal crypts in England, of which Canterbury Cathedral (1096) is a good example. Gloucester (1089), Worcester (1084), Winchester (1079), also are very beautiful, and the crypt of St. Mungo's Cathedral, Glasgow, is considered one of the finest examples extant. In the United States the crypt of the cathedral of St. John the Divine in New York was the first portion of the structure to be finished and was used for service.

Cryptogamia, the lowest of the two prime divisions of the kingdom of plants. The name was introduced by Linnæus in the *Systema Naturæ* (1740), to designate his twenty-fourth and last class of plants, containing the mosses, seaweeds, lichens, fungi, and ferns, in which the organs of sexual reproduction had not then been demonstrated, though he believed that such demonstration would eventually be made. They are contrasted with his Phænogamia — now more often called Phanerogamia—the flowering plants. The next step in their classification was taken by De Candolle, who distinguished them into two groups — the cellular cryptogams, consisting of the lower forms; and the vascular cryptogams, or ferns, horsetails, and club mosses, having stems, leaflike organs, roots, and true vascular bundles. Endlicher ignored the cryptogams as a prime division, grouping the single-celled plants, algæ and fungi, as Thallophyta: and the mosses, in which the plant-body shows segmentation into stem and leaf, together with all more highly organized plants, as Cormophyta. The name Cryptogamia, however, is still used in the Linnæan sense, but with clearer definition and with three subdivisions—Thallophyta (as defined above); Bryophyta (mosses and liverworts without true roots, and with conducting bundles of very simple structure); and Pteridophyta (ferns and their allies). The reproductive bodies of all these plants are single-celled bodies called spores, separated from the parent plant and giving rise to an independent organism. Hence the term Sporophyta, or spore plants, is sometimes employed instead of the Linnæan name.

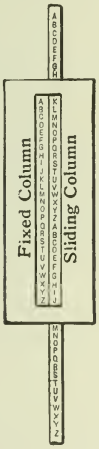
Cryptography is the art of writing in a secret manner, so that the meaning of what is written may be intelligible only to him who possesses the key to the cipher. Plutarch mentions a system used by the Greeks by means of the *scytala,* a small staff of wood, round which a long, narrow strip of parchment was wound, in spiral form, so that the edges of the parchment met, forming a continuous message, the Greek letters being cut in two. Ciphers were also extensively used among the Romans; Julius Cæsar used them occasionally. During the civil war in England many of the royalist papers were written in cipher, and some of them have only lately been read. Cryptography was also employed by conspirators, thieves, and others. Tramps in modern times chalk secret indications, for those who come after them, on gate-posts, walls, fences, freight-cars, and so forth. At the present day ciphers are frequently to be found in the 'personal' columns of newspapers, when the message is not intended for the general public. Edgar Allan Poe, who was especially clever in unriddling cryptograms, declared that human ingenuity could not invent a cipher which



Scytala.

human ingenuity could not solve. This is questionable, although experts have displayed wonderful skill in unravelling some of the most intricate.

Francis Bacon, who was a very zealous cryptographer, defines in *The Advancement of Learning* (1605) the requisites of a good cipher as being threefold: (1) that it be easy to write and read; (2) that it be difficult of detection; and (3) that it be void of suspicion—which means that the message be written in such a manner as not to raise the suspicion of a stranger that it is a secret message. In his biliteral cipher (rendered famous by its resuscitation by Mrs. Gallup in her *Biliteral Cipher of Sir Francis Bacon,* 1899) Bacon showed how the letters *a* and *b* could be made to do duty for the whole alphabet, by various modes of combining them. Among the numerous methods of cryptography are: writing with invisible ink, which becomes visible under the action of heat; the use of superfluous words, where the correspondents agree that only some of the words, at equal intervals apart, are necessary to form the message; by misplaced words; by vertical and diagonal reading; by artificial word-grouping; by transposing the letters; by substitution of letters; by counterpart tabulations, with changes at every letter in the message according to a prearranged plan; and by a printed key and code-book, without a knowledge of which the message is undecipherable. The two best ciphers ever invented are Hogg's secret code, and Sir Charles Wheatstone's cipher, both of which, although complicated in system, are rendered easy to work by the adoption of ingenious mechanical arrangements which relieve the operator of all mental effort. The apparatus for Hogg's secret code consists of a fixed column containing the letters of the alphabet, and a sliding column with these repeated, so that any letter on the latter can be brought opposite any one in the former. A key word is arranged between the sender and the receiver. This word is written as often as may be necessary over the message to be sent. Then the first letter of the key word on the sliding column is brought opposite A in the fixed column; the first letter of the message in the fixed column is found, and that opposite to it in the sliding column is written down. The second letter of the key is next brought opposite A, the second letter of the message observed, and that opposite to it on the sliding column is written down, and so on, thus:—



Hogg's Secret Code.

Key word, *Windsor;* message, 'Come at once.'

Key word... *Wind sor Win.*
Message..... Come at on ce.
Cryptogram. . Ywzh sh f j kr.

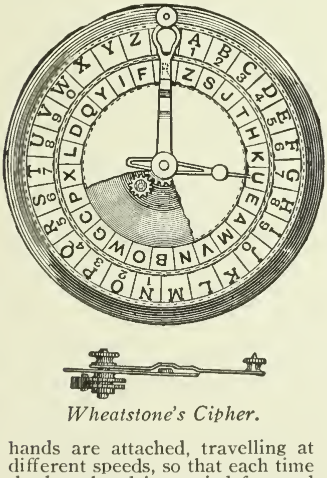
The principle of Wheatstone's instrument may be thus described:—A watch face has the alphabet inscribed around its outer margin in the usual order, plus a blank space; a second alphabet, constructed as hereafter described, is written on card or paper, and attached to the watch face within the first alphabet; this has no blank space, and consequently there are but twenty-six divisions as against twenty-seven in the outer ring. Two hands are attached, travelling at different speeds, so that each time the long hand is carried forward to the blank space at the end of a word, the short hand will have the inner ring of letters. A word is chosen as a key; in the example given it is 'English.' This is written down in separate letters, and the remaining letters of the alphabet are written in order beneath, thus:—

E N G L I S H
A B C D F J K
M O P Q R T U
V W X Y Z

These letters are now read downwards, giving this arrangement:—

EAMVNBOWGCPXLDQYIFR
ZSJTHKU

This cryptographic alphabet is written on the inner card of the instrument, beginning at a point previously agreed on (in the diagram seven spaces in advance of the outer alphabet—*i.e.*, with its first letter, E, opposite to the H of the outer alphabet). When a despatch is to be translated into cipher, the long hand is moved to that letter in the outer alphabet, and the letter to which the short hand points in the inner ring is written down, and so on for each letter of the first word. The long hand is then moved forward to the blank space, the effect of which is to cause the short hand to move on one letter, and thus provide a fresh starting-point for the second word. As there are no blanks in the inner alphabet, the space between two words is represented by a letter, and there is thus no break in the cipher message to give any clue to its meaning. See J. Falconer's *Cryptomengsis Patefacta* (1685), and Klüber's *Kryptographik* (1809), two works on cryptography which, though old, have never been excelled; and Fleissner's *Handbuch der Kryptographie* (1881) for newer forms. Compare also CODE, TELEGRAPHIC.



Wheatstone's Cipher.

Cryptomeria (*C. japonica*), in botany, belongs to the Coniferæ. It is a large, pyramidal, evergreen tree, with an upright, slender trunk, growing to a height of a hundred feet, and is a native of China and Japan. The variety most commonly cultivated is *C. elegans*, the foliage of which takes on a bronze color in autumn, and keeps that color till the following spring. It is hardy as far N. as New York, but is short lived; it is most interesting when young and is sometimes grown in pots.

Crystal Gazing. See DREAMING.

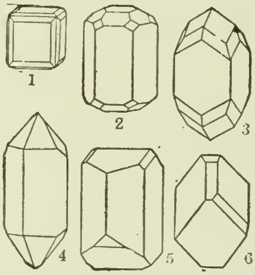
Crystalline Lens. See EYE.

Crystalline Rocks include all those whose component minerals are in more or less perfectly formed crystals, as distinct from the clastic or fragmental rocks, the ingredients of which are in broken, rounded fragments, and the organic rocks, which consist of the remains of animals or plants. The volcanic or igneous rocks are of this group, as also are the crystalline schists and the precipitates, such as rock salt, anhydrite, and gypsum, which have formed from the evaporation of saline solutions. The term, in fact, denotes rather the structure than the method of origin of its members, and embraces a large diversity of rock types. The igneous rocks are also known as *massive* crystalline, as distinguished from the *schistose* crystalline metamorphic rocks, which they resemble to a considerable extent in mineralogical composition, though differing in the relation of the minerals to one another. On this basis rocks are amorphous, crystalline, or clastic.

Crystallites. In the case of many solutions, crystallization tends to be set up when the solution cools; and if the liquid is viscous, the formation of crystals goes on under great difficulties, and imperfect forms of crystallization result. These are called crystallites. Some are small globules, others resemble rods, dumb-bells, stars, rosettes, etc.; and sometimes they are arranged to form skeletons, networks, or growths resembling fern leaves or 'frost flowers' on a window-pane. A great variety of names has been given to them by mineralogists and petrologists. See MICROLITHS.

Crystallography. When a substance passes into the solid condition, either from the liquid or the gaseous state, or from solution in another medium, it may assume one of two forms: It may solidify as an amorphous mass, such, for example, as dried gum, gelatine, white of egg, or ordinary window glass, or it may crystallize. The most perfect crystals are those which have been slowly formed. When crystallization goes on very rapidly, strange distorted crystals may form, and in other cases minute crystals are aggregated together to build up feathery growths or complex groupings like the frost flowers on a window pane. Crystallization is due to the tendency of the solid molecules, when free to arrange themselves in accordance with their mutual attractions, to take up a definite position relatively to one another—that is to say, to adopt certain characteristic methods of 'packing.' Familiar examples of crystals are to be found in crystallized sugar, coarse table salt, alum, washing soda. All these have formed from solution in water. Hoar frost consists of crystals which have been deposited by the cooling of water vapor, ice by the solidification of a liquid. Many rocks are crystalline, as, for example, granite and marble. Many metals, though apparently amorphous, consist really of very minute crystalline grains: this is the case with cast iron and zinc. The most perfect crystals are those of minerals, which have apparently been produced by the very slow evaporation or cooling of solutions in veins and cavities in the rocks, or by other very gradual and long-continued geological processes.

Natural crystals are always imperfect, and their faces are often rough, irregular, or covered by impurities; but none the less, however irregular in their development, the faces always meet in certain constant angles, and these angles are often characteristic of the substance to which the crystal belongs. This, which is one of the fundamental facts of crystallography, was first observed by Steno, and the angles of crystals are consequently among the most distinctive of their characters. The faces of a crystal may be divided into groups, each of which contains all those which obey a certain law, or have a certain definite relationship to one another. Thus all the faces of an octahedron, cube, or rhombic dodecahedron or rhombohedron are similar. But in a six-sided prism terminated by a six-sided point or pyramid there are faces of two kinds, each belonging to a distinct group, or simple form, though combined in one individual. For the classification of the faces into similar groups or 'forms' it is usual to consider their relation to the crystalline axes. These axes are imaginary lines drawn through the centre of the crystal, and they are always so placed that they are parallel to certain actual or possible crystalline edges. Crystals have been divided into six principal classes, according to the number and disposition of their axes. These classes are: (1) Cubic, also known as isometric or regular; (2) hexagonal; (3) tetragonal; (4) rhombic; (5) monoclinic; (6) triclinic.



Natural Crystals.

1, Fluorite; 2, beryl; 3, zircon; 4, topaz; 5, orthoclase; 6, axinite.

The faces of all known crystals can be classified and described by reference to these six systems of axes. A face may cut three of them in certain positions, and if the distances from the centre or crossing point be given for each of these axes, the disposition of the face is absolutely defined. But as in a natural crystal the faces may vary in size so long as the angles in which they meet one another remain constant, the direction of the face is all that is of importance, and consequently it is the ratio between the distances from the centre at which it intersects the axes, and not their absolute magnitude, that is to be considered. In other words, a face is not essentially changed by being displaced parallel to itself. In the first class the axes are of the same length; in the others, one or more of them differs in length from the rest. When one axis is of different length from the remainder (which are equal to one another), it is called the principal axis, and is assumed to be vertical in all figures and descriptions of the mineral.

In all the systems faces often occur which cut the three axes at unequal lengths. Thus in the cubic system there are forms in which the faces cut one axis at twice the distance from the centre at which it cuts the others. In such a case, as the three axes are of equal value in this system, other faces must exist which cut the other axes also at double distance from the centre. Hence twenty-four faces are requisite if such a form is to contain its complete number, instead of the eight faces which are all that is required to cut off *equal* lengths from the three axes. By varying the lengths of the intercepts in this way, an infinite variety of simple crystalline forms may be derived from the same set of axes, while still conforming to the laws of crystalline development. This is one great cause of the rich variety exhibited by crystals of certain minerals, such as calcite or tourmaline.

A kind of notation used in the description of crystals is founded on this fact, that any face is defined by the relative distances from the centre at which it meets the axes. One face cutting three axes at a certain distance may be regarded as the unit face, and its symbol will be 1 1 1. Another which cuts one axis at twice the distance at which the unit face does will be 2 1 1, while a third might be 2 3 1. This system of notation, usually written in algebraic form, as a:b:c, 2a:b:c, and 2a:3b:c, is known as Weiss's, and, although simple and easily learned, has been generally replaced by that of Miller, in which the reciprocals of these figures are used and known as indices. Thus Weiss a:b:c = 1 1 1 Miller; Weiss 2a:b:c = 1 2 2 Miller; Weiss 2a:3b:c = 3 2 6 Miller.

Miller's indices are now the favorite method of denoting crystalline faces and forms.

It is found by experience that the indices of a crystal face are always simple rational numbers, such as 326 or 160—never irrational fractions, and never very large. That is to say, the distances at which any new face meets the axes will always be found to be simple multiples or fractions of those at which the unit face cuts them. This is the second great fundamental law of crystallography, and is known as the principle of the rationality of the indices. As will be seen later, it is a direct consequence of the regular internal structure of crystalline bodies.

Crystals may also be considered as solid bodies bounded by plane faces which show a definite symmetry in their disposition, and may be classified into groups according to their planes and axes of symmetry. Thus a cube can be symmetrically divided by nine different planes. Of these, three are perpendicular to the faces, and pass through the middle of the edges; six others pass from corner to corner of the faces and *along* the edges. Each of these nine planes will divide a cube into two symmetrical halves. A rhombic crystal, on the other hand, can be divided symmetrically by only three planes, perpendicular to one another. If a crystal possesses an axis of symmetry, it may be rotated around that axis, and will, during a complete rotation, fall twice or oftener into such a position that its faces will be parallel to those it originally exhibited.

The study of the symmetry of crystals has been remarkably developed, and has led to many important discoveries. The six systems already enumerated are now generally replaced by thirty-two classes based on the various kinds of symmetry which theory has shown may be exhibited by solid bodies; but all of these are not as yet known to occur in actual crystals.

The internal molecular structure of crystalline bodies is not less important and significant than their external configuration, and is very closely related to it, being, in fact, its essential cause. All crystals have a regular internal structure, and a crystal may well be defined as a substance the elasticity of which is the same in all directions which are parallel to one another, while, as a rule, it is different in directions which are not parallel.

The behavior of crystalline bodies when light is passed through them varies greatly, and depends on the direction in which the ray is transmitted, as well as on the nature of the crystal itself. All cubic crystals are isotropic; all others are doubly refracting, and a ray of light transmitted in most directions is broken up into two, each polarized and following different paths. This is well known in the case of Iceland spar, which possesses this property in a remarkable degree. But in certain directions the transmitted light passes as a single ray—that is to say, when it travels parallel to an optic axis; and doubly refracting crystals are divided into uniaxial and biaxial, according as they have one or two such optic axes. Hexagonal and tetragonal crystals are uniaxial; rhombic, monoclinic, and triclinic are biaxial. The constancy of these physical characters is the basis of the microscopic study of crystalline rocks (see Petrology).

One of the most interesting branches of crystallography is the study of the behavior of different classes of crystals when attacked by a solvent. If the action is slow, and is stopped at a suitable point, little pits are found to have formed on the faces of the crystals, and these are bounded by faces which are so disposed that their symmetry corresponds to that of the face on which they lie. The molecules, in fact, have been detached in a manner which depends on the internal structure and arrangement of the particles which compose the crystal, and this is one of the many clear proofs of the importance of the physical standpoint in the investigation of this subject.

The computation of crystallographic constants based upon measurements of interfacial angles constitutes the field of Mathematical Crystallography. The precise form assumed by a substance crystallizing in any other than the regular system is an accurate indicator of its composition and identity. This is made much use of in mineral identification.

See Mineralogy. Consult Maskelyne's *Morphology of Crystals;* Lewis' *Crystallography;* Dana's *Mineralogy;* Williams' *Crystallography;* Miers' *Mineralogy;* Moses and Parsons' *Mineralogy, Crystallography, and Blowpipe Analysis;* Phillips' *Mineralogy;* Tutton's *Crystallography* (1922); *idem, Natural History of Crystals* (1924); Winchell's *Elements of Optical Mineralogy* (1928); P. Groth, *Introduction to Chemical Crystallography* (1906).

Crys'talloid, in botany, minute portions of the protoplasmic substance of cells which assume the form of crystals. They are usually colorless but sometimes act as vehicles of coloring matter, other than green, which can be removed from them. They are capable of absorbing water and swell greatly under the influence of certain solutions. They are oftenest found in oily seeds.

Crystalloid, the name given to those substances which when in solution will pass through vegetable parchment or animal membrane in dialysis, in distinction from colloids (q.v.), which will not do so. They include metallic salts, sugar, and oxalic acid. See Dialysis.

Crystallomancy. See Divination.

Crystal Palace, a vast structure of glass and iron, designed by Sir Joseph Paxton, and erected in Hyde Park, London, for the Great Exhibition of 1851. It was removed to Sydenham in 1854, and became a place of popular entertainment. In 1911 it was purchased by the first Earl of Plymouth to be held in trust for the British nation. The Imperial War Museum was opened here in 1920. See Exhibitions.

Csaba, chob'ä, or Békés Csaba, town, Hungary, 7 miles south of Békés. It has flour mills and distilleries and trade in cattle, corn, hemp, and wine. Pop. 49,300.

Csardas, chär'däsh (Hung. *Csárda,* a wayside inn), a Hungarian national dance in two movements—an *andante* and an *allegro*—both in the same key, and always in $\frac{4}{4}$ or $\frac{2}{4}$ time.

Csengery, chen'ge-ri, Anton (1822–80), Hungarian author and statesman. In 1845 he became a contributor to Kossuth's newspaper, *Pesti Hirlap,* and in 1848 a member of his revolutionary government. From 1861 he was a member of the Parliament and a warm supporter of the liberal leader Deák (q.v.). He did much for the economic development of Hungary, and was a founder and director of the national land credit institute. From his pen came some well-written historical studies. His complete *Works,* including a translation of Macaulay's *History of England,* appeared 1884 in 5 vols.

Csepel, island of Hungary, between two arms of the Danube, stretches 27 miles south of Budapest. It produces fruit and wine; formerly a favorite royal summer residence.

C.S.I., Companion of the Star of India. See Orders of Knighthood.

Csiky, chē'ki, Gregor, or Gergely (1842–91), Hungarian dramatist, distinguished for his lifelike portrayal of the simple incidents of modern life, was professor at the Temesvár Priests' College from 1870 to 1878, when he adopted evangelicism, and engaged in literary work. His best novels, *Arnold* and *Az Atlasz-Család* ('The Atlas Family'), were eclipsed by his plays, *Az Ellen állhatatlan* ('The Irresistible'), which gained the Hungarian Academy's prize, *A Proletárok* ('Proletariat'), *Buborckok* ('Bubbles'), *Két Szerelem* ('Two Loves'), *A Szégyenlös* ('The Bashful'), and *Athalia*. He also published translations of Sophocles and Plautus, and of standard works in English and French, all in masterly language.

Csokonay, chō'kō-noi, Vitéz Mihály (1773–1805), Hungarian poet, was for a time professor in the college at Debreczen, but for the most part devoted himself to literary pursuits. He derived his inspiration from the folk-songs of Hungary and made a valuable contribution to the development of national Hungarian poetry. His productions, characterized by rich language and easy versification, consist of satires, poems, comedies and odes, and were very popular. His complete works appeared in 1831 (4 vols.) and in 1924 (3 vols.). Consult Schwicker's *Geschichte der ungarischen Literatur.*

Csóma de Korös, chō'mä de kû'rûsh, Sándor (*c.* 1790–1842), Hungarian scholar and traveller. In 1820 he started in Eastern attire for Central Asia, in quest of the original home of his countrymen, the Magyars, and travelled through Persia and Afghanistan to Tibet. After years of privation and patient labor, he succeeded in compiling a grammar (1834) and dictionary (1835) of the Tibetan language. Returning to Calcutta, he saw his books through the press, and was appointed secretary of the Asiatic Society. He had scarcely started on a third journey to Tibet when he died of fever at Darjiling. Consult *Life* by Duka.

Csongrád, chon'gräd, town, Hungary, on the right bank of the Theiss, just above its confluence with the Körös; about 70 miles southeast of Budapest. Cattle raising, fishing, and the manufacture of wine and soap are important industries. Pop. (1910) 28,310.

Ctenophora, tē-nof'ō-r*a*, or comb bearers, a class of the Cœlenterata, comprising beautiful free-swimming marine animals, generally though not always ellipsoidal in form, and moving by the aid of eight 'combs' or rows of ciliated plates. They are provided with a well-developed jelly-like layer, 'mesogloea,' a mouth, and ectodermic gullet, and a sense organ at the pole opposite the mouth. All species except *Beroë* and its relatives have retractile tentacles bearing adhesive cells—*e.g., Cydippe* and the ribbon-shaped Venus' girdle (q.v.). Ctenophora are hermaphrodite, carnivorous in diet, extremely active in habit, and often phosphorescent. They are found at the surface of nearly all seas but are especially common in warmer regions.

Ctesias, tē'shi-*a*s, of Cnidus in Caria (fl. 400 B.C.), a Greek historian, who wrote a history of the Persian nation which professed to correct the account of Herodotus. As he had exceptional advantages from having been the physician of the Persian king Artaxerxes Mnemon, at whose court he lived seventeen years, his history would have been of great value, but only fragments and an abridgment in Photius remain. He also wrote a treatise on India. His fragments have been edited by Bähr (1824) and Gilmore (1888). Consult J. P. Mahaffy's *History of Greek Literature.*

Ctesibius, tē-sib'i-*u*s (*c.* 250 B.C.), a Greek to whom the invention of the clepsydra (q.v.), or water-clock, and of a hydraulic organ is attributed. He also discovered the elasticity of the air, and used air in the transmission of power.

Ctesiphon, tes'i-fon, now called Modain, ancient city of Assyria, on the east bank of the Tigris, about 25 miles southeast of Bagdad, and nearly opposite Seleucia. Between 37 and 32 B.C. it was the capital of the empire of the Parthian king Phraates IV. In 116 A.D. it was captured by the Roman emperor Trajan and in 199 by the Emperor Septimius Severus, who carried away 100,000 prisoners. It was besieged by Odenathus, husband of Zenobia, queen of Palmyra in 263, and was the scene of the defeat of the Persians by the Emperor Julian in 362. It was at that time the capital of the Sasanian dynasty, but was abandoned to the victorious Arabs by the last of this dynasty, Yezdigerd, in 637, and thereafter fell into decay.

During the World War Ctesiphon marked the limit of British advance in the ill-starred attempt of General Townshend to reach Bagdad (Nov. 21, 1915). See Europe, Great War of.

Cuanza, kwän'zä, the largest river in Angola, Portuguese West Africa, with a total course of 500 miles marked by frequent rapids during its descent from the Tala Mugongo plateau. From Dondo, 130 miles from the coast, small steamers ply to the mouth, some 20 miles south of Loanda. The Lucalla is its principal affluent.

Cu'ba, the largest and most westerly island of the West Indies, constituting the republic of Cuba, lies between lat. 19° 50' and 23° 10' N., and long. 74° 5' and 84° 57' W., occupying an advantageous position at the entrance to the Gulf of Mexico, 130 miles south of Florida, from which it is separated by Florida Straits. Its northern and western shores are washed by the Gulf of Mexico and the Atlantic Ocean, and its southern and eastern coasts by the Caribbean Sea. It is long and narrow in shape, curving upward to the north near the western end. From Cape Maysi, the most easterly point, to Cape San Antonio, the most westerly, the island measures nearly 800 miles; the width varies from 20 miles in the neighborhood of Havana to 90 miles in the eastern part. The area is 41,634 square miles, with adjacent islands, 44,164 square miles. The coast line, some 2,500 miles, is broken and irregular, with numerous bays, lagoons, coves and islets. There are many excellent harbors, more than fifty being ports of entry. The largest of the adjacent islands is the Isle of Pines (1,180 square miles), 35 miles to the south.

Topography.—The eastern portion of the island of Cuba is mountainous; the central part consists of gently sloping plains, well-drained and densely cultivated with sugar-cane; the western end is hilly, with fertile slopes and valleys devoted to the cultivation of tobacco, for which the island is famous. The highest point on the island is the Monte Turquino (8,320 feet) in the Sierra Maestra range, running east from Cape Cruz in the extreme south.

Rivers are numerous, many of them broad and beautiful, but only one, the Cauto, in the province of Oriente, is of commercial importance.

Climate.—Though it lies wholly within the tropics, Cuba is cooler than the other West Indian islands. The mean annual temperature at Havana is 77° F. in the interior of the island; on the southern coast it is higher, while in the mountains the average is lower and frosts are not unknown. The rainy season lasts from May to October, but the rainfall is not excessive. The island is sometimes visited by hurricanes of great violence, and earthquakes occur in the eastern districts. Since the introduction of sanitary measures following the occupation by the United States (see *History*), yellow fever, long a deadly scourge, has disappeared and Cuba has become one of the most healthful countries of the world.

Flora and Fauna.—The Cuban flora comprises over 5,000 species, including valuable forest woods, such as mahogany, cedar, lignum-vitae, sandalwood, ebony, and logwood, and a great variety of tropical fruits, flowers, and plants, which thrive luxuriantly in the rich soil.

Animals are few, but birds are numerous, including many songsters and some true game birds. The rivers, bays and seas abound in fish, crabs, shrimps, and lobsters; the manatee or sea-cow, serpents and other reptiles, including alligators, iguanas, and lizards are found. Insects are abundant and troublesome.

Mining.—Iron ore reserves are estimated at 3,221,000,000 tons, mainly in Oriente province, the chief mineral district. Rich copper mines lie in the Sierra de Cobre; gold and manganese are exported; marble, clay and mineral waters are valuable.

Agriculture and Industry.—Agriculture is the main industry. As the world's second largest sugar producer, Cuba's prosperity since the 18th century has depended upon this crop, of which most went to the United States. In return, Cuba has imported most of her food supplies, although capable of producing nearly all her needs. In 1924 the sugar market was over-supplied, and Cuban producers suffered severely. The government endeavored to promote diversification of agriculture and industry, but with small success. The Smoot-Hawley Tariff of 1930 further crippled the sugar trade; prices fell to less than half—the lowest in history, to 15 per cent less than cost. Cuba accepted the Chadbourne plan for sugar restriction in 1931, sacrificing more than any other sugar-producing country. During prosperous years the people developed a high standard of living, and Cuba was the fourth best customer of the United States.

American investors poured money into Cuba, which in 1933 aggregated almost $1,500,000,000; about $370,000,000 of this went into sugar. About $200,000,000 had been lent; American power interests had invested $125,000,000; communication companies held Cuban property worth more than $15,000,000, while American investments in Cuban railroads amounted to about $116,000,000. American banking interests had a stake of at least $100,000,000 in Cuba; oil companies, $9,000,000; and another $100,000,000 in other investments—tobacco, factories, etc.

Tobacco and its manufactures stood second to sugar; it is grown principally in the Vuelta-Abajo district near Pinar del Rio. Coffee growing has been an important industry for more than a century, and government has urged increased production.

Diversified farming, to offset the sugar and tobacco decline, has increased fruit and vegetable produce, notably pineapples, bananas, citrus, cocoanuts and potatoes. Cereals, sweet potatoes, cocoa, rice and mangoes are cultivated. Large tracts of forest, many privately owned, yield mahogany, cedar, dyewoods, fibers, gums, resins and oils. Cattle, mules, bees and honey add to Cuba's wealth; fishery products are valuable and sponges are exported.

The making of shoes, wearing apparel, furniture, construction materials, soap and paper is expanding; razor blades, paint, chocolate, candies, cheese, textiles, perfumes and stockings are manufactured under a high protective tariff.

Commerce.—In 1920, the heaviest year of trade with the United States, Cuban imports were $515,200,000 and exports $721,000,000. In 1932 these had fallen to $51,024,000 imports and $80,672,015 exports. In 1940 they were $81,041,970 and $104,905,434, respectively.

Population.—In 1931 the census showed 3,962,344, compared with 2,889,004 in the 1919 census. According to a census taken in 1943 the population of Cuba was 4,777,284. The chief cities are: Havana, the capital (568,913); Holguine (140,854); Camagüey (138,295); Santiago (107,125); Santa Clara (99,509); Sancti Spiritus (92,299); Cienfuegos (92,258); Matanzas (72,826); Guantánamo (68,372); Manzanillo (65,965); Pinar del Rio (64,823).

Army and Navy.—The Army has 895 officers and 15,450 men organized in 6 cavalry regiments, 4 infantry battalions, and 3 batteries with auxiliary services. The Navy has 2 escort vessels, 5 gunboats, and 1 armed transport, also about a dozen small coastguard vessels. The navy strength is 2,508 men and 130 officers. The Air Force has 116 men and 16 aircraft.

Government and Finance.—Since 1901 Cuba has been an independent republic with a President, Senate, and House of Representatives. The president is elected by indirect vote for four years and may serve only one term. The Cabinet consists of the Premier, the President's secretary, heads of 12 departments, and 3 ministers without portfolio. According to the provisions of a new constitution which came into force in October, 1940, the Cabinet is responsible to Congress. The House term is 4 years and the Senate 6 years. The Senate has 8 members from each province and the House one member per 35,000 inhabitants. Votes are granted to women.

The republic is divided into six provinces and 119 municipalities. Each province has a governor elected indirectly by the people, and a council. The municipalities are administered by mayors and elected councils.

The gold peso, equivalent to the American gold dollar, is the unit of value. Gold pieces of 20, 10, 5, 4, 2, and one peso are coined; silver pieces of one peso, 40 cents, 20 cents, and 10 cents, and nickel pieces of 5 cents, 2 cents, and 1 cent.

In April, 1931, the Cuban government engaged Prof. Edwin R. A. Seligman of Columbia University as economic adviser to reform the tax system. His recommendations were in general neglected.

History.—Cuba was discovered by Columbus on Oct. 28, 1492, and was at first believed by him to be part of the continental mainland. He found the island inhabited by mild, inoffensive tribes of Indians ruled by chiefs, or caciques, and who had religious beliefs in God and a future life. They had given the island the name it now bears, and subsequent attempts of Columbus to name it in honor of the Spanish royal family and of the Virgin Mary proved futile.

In 1512 an expedition of 300 Spaniards commanded by Diego Velasquez made a settlement at what is now the town of Baracoa on the northeast coast; in 1514 Santiago and Trinidad were founded, and a settlement was made on the southern coast known as San Cristobal de la Habana, whose inhabitants five years later removed to the site of the present capital on the northern coast. Their ability to exact labor from the Indians in cultivating the land tempted the colonists to establish slavery; after the natives had been almost exterminated, Negroes were brought to fill their places, and thus a traffic was begun which was not suppressed until 1845.

The early history of Cuban settlements was marked by many dangers. Havana was captured and destroyed by the French in 1538 and 1554, and was also attacked by Dutch and English buccaneers. Throughout the 16th century it was the chief Cuban center of great maritime activities, from which explorations of the mainland proceeded. It was captured by an English fleet in 1762; but by the Treaty of Paris was restored to Spain in 1763.

Spain from the first treated the island as a possession to be exploited for precious metals; and when these were not found, the same policy was followed in regard to the sugar-cane, tobacco, and other industries. Only Spaniards could trade with Cubans, and the appointment of autocratic captains-general put the island at the mercy of harsh rulers. Las Casas, who was made captain-general in 1790, was an illustrious exception, and successfully labored to promote good feeling towards the mother country. It was chiefly through his influence that Cuba was faithful to Spain in 1808, when Napoleon drove its monarch from the throne. But these results were effaced by rapacity and incompetence of succeeding captains-general. In 1825 a decree was issued granting the latter the summary powers of a military commander. Henceforth Spanish government was the jealous guardian of Cuba against two liberating forces: insurgents, and the outside sympathy and interest, mainly from the United States, which could not ignore the chronic misery and misgovernment of the island. Between 1825 and 1895 there were several insurrections and filibustering expeditions. In 1868 a rebellion against Spanish injustice and oppression broke out which ravaged the island for ten years. This was terminated by the Treaty of Zanjón, which not only restored the old oppressive conditions but also added the burden of the cost of the war to the already overtaxed islanders. In 1895 revolt again flamed up and became so formidable that General Campos was sent from Spain to subdue it. He failed and was succeeded by Weyler, who, in spite of the most extreme measures, also failed and was succeeded by General Blanco. For the protection of American interests the battleship *Maine* was sent in January, 1898, to Havana harbor and on February 15 it was blown to pieces.

United States interest in Cuba's fate had begun to be aroused as early as 1823 under President Monroe, and in 1848 had been directed toward a project of purchase and annexation, which, however, was declined by Spain. By the destruction of the *Maine* public opinion in the United States was strongly aroused, and on April 19 Congress passed a resolution which declared for the independence of the Cuban people. War with Spain followed (see Spanish-American War); the island was taken under American protection on Jan. 1, 1899, and placed under military control until May 20, 1902, when independent government was formally installed. On Feb. 21, 1901, a constitution was adopted modelled upon that of the United States, and the following December the first president of the republic, Estrada Palma, was elected. By accepting the Platt Amendment (June 12, 1901), Cuba remained under American suzerainty, not being permitted to make any foreign alliances without American consent, nor to negotiate loans for which it would be unable to pay. The harbor of Guantanamo was to be held by the United States as a naval base. Revolutions were not permitted, and the United States reserved the right to intervene for the maintenance of adequate government and the protection of life and property.

In 1903 a reciprocal commercial convention was concluded between the United States and Cuba. President Palma's opponents ascribed his re-election in 1906 to fraud, and an armed rebellion broke out. American Marines were landed at Havana and Secretary W. H. Taft was sent to investigate. Palma resigned Sept. 25, 1906, and Mr. Taft became provisional governor. The insurgents agreed to disarm, and President Theodore Roosevelt appointed Charles E. Magoon to act as governor (Oct. 9) until the government had been reestablished.

General José M. Gomez (1909–13) and General M. Menocal (1913–21) were constructive presidents. In February, 1917, a revolt headed by Gomez failed after drastic measures and warnings from Washington. Cuba was the first among the Latin-American nations to declare war on Germany, April 7, 1917. Dr. Alfredo Zayas' term (1921–25) was marked by a financial crisis due to the fall in the price of sugar and in 1923 a loan of $50,000,000 from the United States saved the republic. A revolution in 1924 broke down.

In 1924 General Gerardo Machado was elected president and attempted to improve the economic conditions by restricting sugar production, by a protective tariff to increase agricultural production in Cuba, and by public works, to reduce unemployment. In accordance with his policy not to borrow foreign money, he imposed certain new taxes to finance his program. In 1928 he violated his one-term pledge and manipulated legislation and elections so successfully as to become president of Cuba for a second term, by a constitutional amendment, for six years. This was declared illegal by Cuban courts. In 1927 Machado abandoned his opposition to foreign loans. Cuba's borrowings in the United States increased to $213,000,000 as compared with less than $100,000,000 in 1924. The population was reduced to starvation and vainly clamored for a debt moratorium and relief for distress. A revolt in August, 1931, was soon crushed, but terrorism continued despite martial law.

The struggle raged chiefly between the 'ABC'—an underground organization of 5,000 to 10,000 students of the University—and others, and a body of government storm troops, the 'Porra' (club, bludgeon), recruited largely from criminal elements. Students were ever a political force in Cuba. They opposed Machado's rule and the closing of their University; later they refused to return to school so long as Machado remained. The ABC was blamed for the assassination of the secret police head, the president of the Senate, the head of the Porra, and others. To the Porra were attributed torturings and killings under the *ley de fuga* (law of flight), which permitted the killing of prisoners attempting escape.

On Aug. 11, 1933, the Cuban army demanded Machado's resignation, and on the 13th Machado fled from Cuba. Dr. Carlos Manuel de Cespedes became provisional president. On September 1 a terrific hurricane devastated parts of north Cuba. While the President was away from the capital inspecting the havoc left by the storm, another military revolt broke out (Sept. 8) and de Cespedes was forced to resign. In 1934 the United States relinquished its guardianship of Cuba. The new constitution of 1940 was adopted in June, and in July Col. Fulgencio Batista was elected president. Solution of economic problems was the main concern of his administration. Dr. Ramon Grau San Martin was elected in June, 1944 to succeed Col. Batista. In the Second World War Cuba declared war on Japan Dec. 9, 1941, and on Germany Dec. 11.

Consult Beals, *Crime of Cuba* (1933); Terry, *Guide to Cuba* (1929); Verrill, *Cuba Past and Present* (1920); *Cuba of Today* (1931); Fitzgibbon, *Cuba and the United States, 1900–1935* (1935); bulletins of the Pan American Union.

Cubango (Okavango), river, Angola, Portuguese West Africa; rises near the sources of the

© *Ewing Galloway*

NEW CAPITOL OF CUBA, AT HAVANA

Copyright by Publishers Photo Service

SCENES IN CUBA

1. On the Hemp Fields of Cuba 2. Ploughing Field for Sugar Cane Culture

Cuanza, at an elevation of 5,900 feet, and flows southeast. It is much obstructed by rocks, and becomes lost in the basin of Lake Ngami (q. v.), where it is known as the Taukhe.

Cu'bature, the process of determining the volume of a solid. When not a simple matter of mensuration, this requires the methods of the differential and integral calculus. In this connection the important theorems of Pappus or Guldinus call for mention—*viz.*, if a solid be formed by the revolution of a closed curve about a line in its own plane not cutting the curve, (1) its volume is measured by the product of the area of curve into the length of path of centroid (or centre of mass) of the *area* of the curve; (2) its surface is measured by the product of the length of curve into the length of path of centroid of *perimeter* of the curve.

Cube, a regular solid bounded by six equal square plane faces, the opposite sides being parallel to each other. It is the particular case of a parallelopiped whose edges and angles are all equal. Its volume is measured by the cube of the length of the side, so that if the side be doubled in length, the volume is increased eight-fold. If the volume is known, the side is determined by extracting the cube root of the number measuring the volume.

Cu'bebs, or CUBEB PEPPER, the dried, unripe fruit of a climbing plant, *Piper cubeba*, a native of the Asiatic and Pacific islands. It is the *kababchini* of the Hindus, and the *kababah* of the Arabs. It is grayish-brown, wrinkled, and nearly globular, but tapering into a stalk at one end. It is of about the size of black pepper, and has a characteristic aromatic taste, less pungent than that of pepper. Cubebs is useful in diseases of the mucous membrane, in chronic catarrh, and in indigestion.

Cubism. See POST IMPRESSIONISM.

Cu'bit, an ancient measure of length, determined by the distance between the elbow and the tip of the middle finger (*cf.* Span, Palm, Foot). Used among various peoples, the cubit was the ordinary Hebrew unit of measurement, the exact length of which, however, it is impossible to determine. Most approximations make it lie between seventeen and eighteen inches.

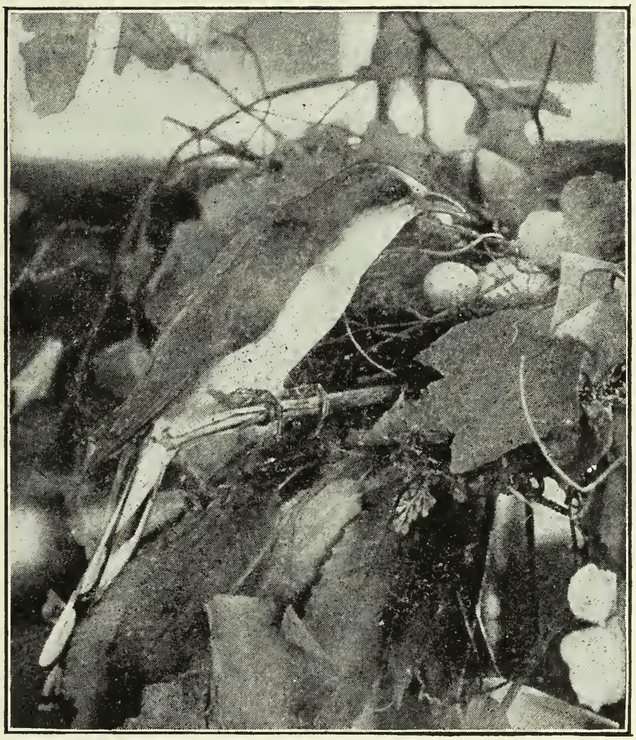
Cubitt, kū'bit, SIR WILLIAM (1785–1861), English civil engineer, was born in Dilham, Norfolk. He was apprenticed to a cabinet maker and worked his way from a humble position up to a large civil engineering business as constructor of canals (*e.g.* at Oxford), docks (*e.g.* Bute docks, Cardiff, and landing-stages at Liverpool), and railways (South-Eastern). He invented the treadmill, for the purpose of utilizing the labor of convicts.

Cucamas. See COCOMAS.

Cuchilla de Santa Ana. See URUGUAY.

Cuchilla Grande. See URUGUAY.

Cuchullin, ko͝o-ko͞o'lin, the chief heroic figure in the legendary history of Ireland, whose exploits are comparable to those of Hercules and the heroes of Greek mythology. Cuchullin is supposed to have derived his name from his killing a huge watch-dog belonging to a smith, and substituting himself as guardian of the latter's house. Among other miraculous feats of arms, legend credits Cuchullin with the defense of Ulster single-handed against the hordes of Medb, queen of Connaught. He was slain in his twenty-seventh year by Lugaid in revenge for the slaying of the latter's father Cūrōi Mac-Daire. Certain bare rocky hills with precipitous ravines in the island of Skye, Scotland, bear the name of the hero.



Photograph from American Museum of Natural History.

Yellow-billed Cuckoo.

Cucking-stool. See DUCKING-STOOL.

Cuckoo, ko͝ok'o͞o (*Cuculus*), a well-known genus of birds in the order Coccygomorphæ, and type of a large family (Cuculidæ). The common cuckoo (*Cuculus canorus*) is a widely distributed bird, breeding in summer in the northern parts of Europe and Asia, and migrating in winter to Africa, as far as the Cape, or to India. The cuckoo is slightly over a foot in length; the bill is as long as the head, slender and slightly curved; the wings are long and pointed; the tail long and rounded. The back is ashen gray, the under parts are whitish with undulating transverse brown lines, the tail is spotted with white above, and the root of the bill and the feet are yellow. The young birds are blackish, and mottled with yellow and gray. The bird arrives in Northern Europe in April or May, and leaves again in August or September.

Predominantly an arboreal bird, the cuckoo is rare in treeless districts. Like the other species of Cuculus, it is a shy, restless, unsocial bird. It is extremely valuable on account of its insatiable appetite for caterpillars. The female does not construct a nest, but lays her eggs singly on the ground, and conveys them in her bill to the nest of some other small bird, whose eggs resemble her own.

The young cuckoo ejects the rightful nestlings, and so appropriates the whole care and attention of the foster-parents, who do not seem aware of the imposition. The young cuckoos may stay until October, and then follow the parents southward. Not all cuckoos possess the parasitic habit, although it is very common.

The American cuckoos, of which there are a dozen or more species, are about a foot in length, are plain brownish-gray above and white or buff colored on the under parts. In habits they resemble their European prototypes except that they are not, as a rule, parasitic. They build frail nests of twigs placed in low trees or vines and lay large pale greenish-blue eggs. The most common species are the Yellow-billed Cuckoo (*Cocyzus Americanus*), sometimes called the 'rain crow,' and the Black-billed Cuckoo (*C. erythrophalmus*).

Cuckoo Bee, a name applied to the bees of the family Nomadidæ, which are parasitic in character, the female depositing her eggs in the nest burrow of another bee, upon whose food supplies the newly hatched larvæ feed.

Cuckoo Fly, a beautiful insect belonging to the family *Chrysididæ*, about half an inch in length, and of a brilliant metallic green color, with the abdomen often tipped with red. These insects deposit their eggs in the nests of solitary bees or wasps in the absence of the owners. The eggs are walled in by the eggs of the bees, and the newly-hatched larvæ either destroy the rightful owners or starve them out by devouring the food provided for them. Consult Kellogg's *American Insects.*

Cuckoo-pint. See ARUM.

Cuckoo Spit. See FROG-HOPPER.

Cu'cumber.—The common garden cucumber (*Cucumis sativus*), native to Southern Asia, has been in cultivation since the earliest times for its green cylindrical fruit, which is used for salads and pickles. The plant is a trailing annual, requiring a rich sandy loam for its best growth, and easily injured by frost. In field culture, after danger from frost is past, twelve to fifteen seeds are planted in hills 4 to 6 feet apart each way, and the young plants are thinned out to three or four after they are well up and free from insect pests. The fruit should be gathered while green and the plants will continue bearing for a long time. For pickles the cucumbers are picked when 3 to 4 inches long, a good average yield being 100 bushels per acre. For salad, cucumbers 5 to 7 inches long and an inch or more in diameter are usually chosen.

There are many varieties of cucumbers, but for table use and market the various strains of White Spine are most popular in America. Boston Pickling and Green Prolific are good pickling sorts. The Gherkin from the West Indies is a small spiny pickling cucumber (*C. anguria*).

Cucumbers are forced to a considerable extent in forcing houses during winter. In forcing, the plants are started in 3-inch pots and transferred to beds or benches at intervals of 2½ to 3 feet and trained to wire trellises. The day temperature of the forcing house is kept at 65° to 75° F., and the night temperature about 10 degrees lower.

Insect Pests and Diseases.—The striped and the spotted cucumber beetles are the most serious insect pests. As a means of control, trap crops like squashes are planted around the field and sprayed with paris green when the beetles become numerous. The cucumber plants may be protected during early growth with netting. Later, spraying with Bordeaux mixture is helpful.

A fungous disease known as Downy Mildew (*Plasmophora cubensis*) is a serious menace. Irregular yellow spots appear on the leaves, which soon shrivel up. Spraying with Bordeaux mixture is beneficial in such cases also. Scab, Stem Rot and Leaf Glaze are other fungous diseases to be guarded against.

Cucumis, kū'kū-mis, a genus of half-hardy trailing herbs belonging to the order Cucurbitaceæ. The flowers are monœcious, the short-stalked staminate ones being in fascicles or clusters, while the pistillate flowers are solitary. Among the species are *C. sativus*, the cucumber; *C. melo*, the melon; *C. anguria*, the West Indian gherkin; and *C. dipsaceus*, the hedgehog gourd.

Cu'curbita'ceæ, a natural order of climbing plants with solitary lateral tendrils. They bear fleshy, succulent fruits, many of which are of economic importance. The bryony, cucumber, melon, squash, pumpkin and vegetable marrow (qq. v.) are among the more important representatives.

Cucuta. See SAN JOSÉ DE CUCUTA.

Cud'ahy, city, Milwaukee county, Wisconsin, on Lake Michigan and on the Chicago and Northwestern Railroad; 5 miles south of Milwaukee. Industrial establishments include foundries, a meat-packing plant, a large rubber manufacturing plant and manufactures of machinery, automobile parts, gloves, and vinegar. Pop. (1910) 3,691; (1920) 6,725.

Cudbear, kud'bâr (*Lecanora tartarea*), a lichen occurring chiefly in Scotland and Sweden, and formerly celebrated for the purple dye which it yielded on treatment with ammonia.

Cuddapah, kud'a-pä, district and town, Madras, India. The district covers an area of 8,722 square miles, and has a population of 1,300,000. The town, capital of the district, exports cotton and indigo. Pop. 16,000.

Cuddalore, kud-a-lōr', KUDALUR, or GUDULUR, chief town, South Arcot district, Madras, India, 16 miles south of Pondicherry. It exports grain and manufactures oil, indigo, and sugar. It gives its name to two naval actions: (1) A drawn action, on April 29, 1758, between Vice-admiral George Pocock and Comte d'Aché, each with nine vessels; (2) the last of several engagements fought between Vice-admiral Sir Edward Hughes and the Bailli de Suffren, fought on June 20, 1783, and also indecisive. Pop. (1911) 56,574.

Cudweed, a name given to various members of the genus Gnaphalium, and also to *Antennaria dioica*, the mountain cudweed, a small plant, with composite flowers and 'everlasting' rosy involucre, which is common on mountain heaths. The stems and leaves are more or less covered with a whitish cottony down, while the heads of the flowers consist in great part, of dry involucral scales, and may be kept for a long time without much apparent change.

Cud'worth, RALPH (1617–88), one of the most prominent writers of the English philosophical school known as the Cambridge Platonists, was born in Aller, Somersetshire In 1645 he was appointed master of Clare Hall, and regius professor of Hebrew. In 1650 he was rector of North Cadbury, in Somersetshire, and in 1654 became master of Christ's College. In 1662 he was presented by Archbishop Sheldon to the rectory of Ashwell, Hertfordshire; and in 1678 he was installed prebendary of Gloucester. In 1642 he wrote *The True Nature of the Lord's Supper*, followed by *The Union of Christ and the Church Shadowed.* His *True Intellectual System of the Universe* appeared in 1678. In this treatise he sought to confute the philosophy of atheism, and to demonstrate that religion is possible only when it rests upon a moral basis, and upon the freedom of man as a being who is directly responsible for his own actions. In a sermon which he preached before the House of Commons, Cudworth insisted upon the connection of religion with life and morality, and laid the basis for a union between philosophy and religion. His *Treatise concerning Eternal and Immutable Morality* was published by Edward Chandler, Bishop of Durham, in 1731. See Cudworth's *Life* by Birch (1837-8); an abridgment of the *Intellectual System* by Wise (1706), and a Latin translation of it by Dr. Mosheim (1733); Tulloch's *Rational Theology in England* (1872); Dr. Martineau's *Types of Ethical Theory* (1885), and Lowrey's *The Philosophy of Ralph Cudworth* (1885).

Cuenca. (**1.**) Province, Spain, area about 6,636 sq. m., mainly mountains and valleys, covered to a great extent with forests. There is some little mining and marble quarrying, and agriculture is carried on in the valleys, but the province is one of the poorest and most backward in Spain. Pop. (1900) 249,696. (**2.**) City, cap. of above prov., 84 m. S.E. from Madrid by rail, alt. 3,000 ft., on the Jucar and its affluent Huescar, surrounded by mountains. A quaint, ancient city with a fine Gothic cathedral and a notable bridge over the Jucar. Pop. (1900) 10,756. (**3.**) Capital of dep. Azuay, Ecuador, in an inter-Andine basin watered by the Pante. It has a cathedral, several convent chapels, and a university. The environs are well cultivated, and have a temperature about 2° higher than Quito. Has sugar refineries. Alt. 8,640 ft. Pop. about 25,000.

Cuera. See COIRE.

Cuernavaca, tn., cap. of Morelos, Mexico, 40 m. S. of Mexico, on a mountain spur in a beautiful valley. It is the seat of an agricultural college, a literary institute and a hospital. Cortés captured it from the Indians, founded its church, and resided in it, as also did the Emperor Maximilian. Pop. (1910) 12,668.

Cuero, tn., Tex., co. seat of Dewitt co., 80 m. E.S.E. of San Antonio, on the Guadalupe R., and on the S. P. and the San An. and Ar. Pass R. Rs. Its manufactures include cotton, cottonseed oil, leather, machinery, oil and brooms. Pop. (1910) 3,109.

Cuesta, a term originating among American physiographers for a land form whose sides slope in opposite directions from a crest of relatively uniform level, one slope being much steeper than the other. Such forms are characteristically developed in the mature dissection of an emerged coastal plain. The upland on which L. Erie rests and the upper Niagara river flows is such a cuesta representing an ancient coastal plain. The escarpment of more than **200** feet facing N. throughout western New York is the steeper inner margin of this cuesta, and it was the plunging of the Niagara River over this precipice that originated Niagara Falls. See Davis 'On Drainage of Cuestas,' *Proc. Geologists' Assoc.*, xvi. (1899).

Cueva, JUAN DE LA (1550-1607), Spanish poet, was born at Seville. He wrote every kind of poetry, but is best in dramatic work, and must be considered as one of the founders of the Spanish national drama. Among his productions are *Obras* (1582), lyric and other poems; and *Primera Parte de las Comedias y Tragedias* (1588). He also wrote *El Exemplar Poetico*, a sort of *Ars Poetica*, the first of its kind in Spanish literature, in choice language, and containing some ingenious critical reflections.

Cuevas de Vera, tn., prov. Almeria, Spain, on Almanzora R., 43 m. N.E. of Almeria; owes its importance to the silver mines in the Sierra Almagrera, to the north of the river. Saltpetre is also obtained. The surrounding district is richly agricultural. Pop. (1900) 20,562.

Cui, CAESAR (1835), Russian soldier and musical composer, born at Vilna; studied at the military college of St. Petersburg, where he is now professor of fortification; but he is better known as a musical composer, being one of the leading members of the new Russian musical school. He has composed the operas *William Ratcliff* (1869), *The Prisoner of the Caucasus* (1883), *Angelo* (1876), *The Mandarin's Son* (1878), and *Le Flibustier* (1894), for the text of the comedy of Jean Richepin of the same name. He has written many songs and numerous compositions for violin and piano, and is, further, a distinguished but rather acrimonious musical critic—see, for instance, his *La Musique en Russie* (1881). See Countess de Mercy-Argenteau's *César Cui* (1888). died 1918

Cuirassier, a horse-soldier wearing a cuirass—a piece of armor consisting of a breast-plate and a back-plate, buckled or otherwise fastened together. The cuirass was originally made of leather, hence the name (Fr. *cuirasse*, from *cuir*, 'leather'). It succeeded the hauberk or coat of mail about the reign of Edward III., and has survived all other forms of defensive armor for the body. It is still worn by the British Household Cavalry, and various regiments of heavy cavalry of Continental Europe, but the name cuirassier is not now used, except for a few *corps d'élite*.

Cujas, JACQUES (1522-90), whose name was Latinized as CUJACIUS, French jurisconsult, and founder of the historic school of law, born at Toulouse. As a lecturer on Justinian, he consulted the originals, whereas other teachers had been content with commentaries. He became professor of law successively at Cahors (1554), Bourges (1555, again in 1559-66, and finally from 1575 to his death), and Valence (1557 and 1567-75); and students came from all parts of Europe to hear his discourses on the *Institutes,* among them being Joseph Scaliger and De Thou. See Berriat St. Prix's *Histoire du Droit Romain, suivie de l'Histoire de Cujas* (1821).

Culasi, or COLASI, pueb., Antique prov., Panay, Philippines, on the coast road, 47 m. N. of San José de Buenavista. It has fisheries. Rice, cacao, cocoanut oil, cotton, and abaca are produced. Pop. (1903) 10,966.

Culberson, CHARLES A. (1855), American legislator; born in Dadeville, Ala.; educated at the Va. Military Institute and Univ. of Va.; elected attorney-general of Texas in 1890 and 1892; governor in 1894 and 1896; U. S. Senator (Dem.) in 1899 and 1905. Died Mar. 19, 1925

Culdees, religious communities which spread over Ireland and Scotland from the 9th to the 12th century. Their origin was long a subject of dispute, but the problem has been practically solved during the last fifty years. In 747, St. Chrodigang, bishop of Metz, instituted a rule for secular priests, who till then had lived almost like laymen, under no monastic vows, and subject only to general canon law. This rule of St. Chrodigang was afterward enlarged and modified to include the anchorites. Brought to Ireland toward the end of the 8th century, the new rule very soon included all the Irish anchorites and priests not members of a monastery. To these associations the name of Culdees was applied, 'companion of God, being the Irish term for an anchorite. In Ireland the Culdees never attained importance, their convents being mostly mere appendages to the regular monasteries. In Scotland, King Nechtan's secession to Rome (717) was followed by the expulsion of the recalcitrant Columban monks, but the Roman clergy imported from Northumbria failed adequately to replace them. The Culdees, therefore, on arriving from Ireland, found a tract over which they could spread without fear of rivals. Under the reorganization of the Scottish Church, begun by St. Margaret and completed by her son David I., the Culdees became regular canons, or were absorbed into the religious orders. The word Culdee continued to be used for some time, but almost as synonymous with canon. Each Culdee monastery, governed by its own abbot, pursued its course practically independent of the rest. The richer succumbed to the usual corrupt influences of wealth; the poorer were steeped in ignorance and superstition. They continued to be a mixture of anchorites and priests, and lived in monasteries, but many of the clergy had wives. Their rule was not more stringent than that of their contemporaries, the secular canons of England. The office of abbot of the richer monasteries usually became hereditary in the family of some rich noble. For further information, see Reeves's *The Culdees of the British Islands* (1864); W. Skene's *Celtic Scotland*, vol. ii. (1887); Von Pflugk-Harttung's *'Die Kuldeer,'* in *Zeitschrift für Kirchengeschichte;* and H. Zimmer's *The Celtic Church in Britain and Ireland,* trans. by A. Meyer (1902).

Culiacan, tn. and episc. see, cap. of state of Sinaloa, Mexico, 170 m. N.W. of Durango on the Culiacan R. It is one of the oldest settlements in the New World, dating from 1531. It is connected by rail with its port Altata, from which the gold and silver ores of the Sinaloan mines are exported. Pop. (1910) 13,578.

Culin, STEWART (1858), American anthropologist, was born in Philadelphia, Pa., of Swedish descent, and received his education at Nazareth Hall, Pa. His friendship with Daniel G. Brinton brought about his interest in anthropology. He was appointed a curator of the Museum of Archæology at the University of Pennsylvania in 1889, and its director in 1892. He became a member and officer of several learned societies, and published his investigations as to Chinese games and other subjects in their publications and in the reports of the Bureau of Ethnology. He published separately *Korean Games* (1896) and *Chess and Playing Cards* (1896). D 8 Ap 29

Cullen, PAUL (1803–78), Irish cardinal and archbishop, born in Co. Kildare. Appointed successively vice-rector and rector of the Irish College in Rome, and rector of the Propaganda College, he averted confiscation of the property of the latter college during the revolution of 1848 by securing for it protection from the U. S. minister. In 1849 Pius IX. appointed Dr. Cullen archbishop of Armagh and primate of Ireland, and he was an obedient agent of Vatican policy. Appointed Archbishop of Dublin (1852), and created a cardinal (1866), he was the first Irishman to reach that dignity since the Reformation. Cardinal Cullen denounced secret associations, and incurred personal odium among some of his flock by aiding the British government in the suppression of Fenianism. A firm upholder of the rights of his church, and a learned theologian, he had no claim to distinction as preacher or writer. He died at Dublin.

Cullen, WILLIAM (1710–90), Scottish medical practitioner and professor, born at Hamilton, Lanarkshire. In 1740 he took his M.D. degree at Glasgow University, and settled in that city as a practitioner. At that time Glasgow had no regular 'medical school,' and Cullen began to deliver lectures, until a chair of medicine in connection with the university was founded for him; but after four years he was induced to move to Edinburgh (1755), as professor of chemistry, and was transferred in succession to the chairs of institutes of medicine and medicine. He also was the first to commence clinical lectures in the Edinburgh Royal Infirmary. Among his chief works are *First Lines of the Practice of Physic* (1777), *Institutions of Medicine* (1783), *Synopsis Nosologiæ Methodicæ* (1769), and *Treatise of the Materia Medica* (1789). See *Life* by Dr. J. Thomson (1832); with additions, Drs. W. Thomson and D. Craigie (1859).

Cullera, tn., prov. Valencia, Spain, on sea-coast, 3 m. S.E. of Sueca. The whole district, copiously irrigated by canals, produces vast crops of rice, oranges, and peanuts. Pop. (1900) 11,947.

Cullinan Diamond, largest known diamond, named after the chairman of the Premier (Transvaal) Diamond Mining Company, in whose mines it was discovered in January, 1905. Its length was $4\frac{1}{2}$ in.; height, $2\frac{1}{4}$ in.; breadth, $2\frac{1}{3}$ in.; and its girth $8\frac{3}{4}$ in., $9\frac{3}{4}$ in. The total weight uncut was $3.253\frac{3}{4}$ carats. It was cut (1908) into nine principal parts besides a quantity of 'ends,' the first (drop brilliant, $516\frac{1}{2}$ carats) and second (square brilliant, $309\frac{3}{16}$ carats) being the largest cut diamonds in existence. The Transvaal government paid $1,000,000 for the original stone, to present it to King Edward.

The Cullinan Diamond.
In the hand of one of the officials of the Premier Mine.

Culloden, or DRUMMOSSIE MUIR, battlefield, Scotland, with station on Highland Ry., 6 m. N.E. of Inverness. Here (Apr. 16, 1746) Prince Charles Edward was defeated by the Duke of Cumberland. The battle is commemorated by a cairn 20 ft. high, erected in 1881.

Cullom, SHELBY MOORE (1829), American political leader, born in Wayne co., Ky. He was taken by his father to Ill. in 1830, removed to Springfield, Ill., in 1853, and there studied and practised law. He was a member of the lower house of the state legislature (1856, 1860–1, 1872, and 1872–3), being speaker for two terms, was a Republican representative in Congress (1865–71), was chairman of the Ill. delegation to the Republican national conventions of 1872 and 1884, nominating Gen. Grant at the former; and was governor of Ill. (1877–83). In 1883 he succeeded David Davis as a member of the U. S. Senate, and was reelected in 1888, 1894, 1900, and 1907. In 1908 he was one of the commissioners appointed to draw up a system of laws for the Hawaiian Islands. died 1914

Cullum, GEORGE WASHINGTON (1809–92), American soldier, born in New York city. He graduated from West Point in 1833, was assigned to the engineer corps, and for several years was engaged in the construction of fortifications. He served as a captain of engineers (commissioned 1838) in the Mexican War, then taught practical military engineering at West Point, and at the outbreak of the Civil War was an aide-de-camp to Gen. Winfield Scott. With the rank of brigadier-general of volunteers (commissioned Nov., 1861), he was Gen. Halleck's chief-of-staff, and in 1865 was brevetted colonel, brigadier-general, and major-general for his services during the war. In 1861–4 he was also a member of the Sanitary Commission. From 1864 to 1866 he was superintendent of West Point, and in 1874 he was retired from active service. Through his marriage with the widow of Gen. Halleck he acquired a considerable fortune, and both he and his wife gave liberally to charities. In addition he gave $250,000 to West Point for the erection of a memorial hall. He edited a valuable *Biographical Register of the Officers and Grad-*

uates of the United States Military Academy at West Point (new ed. 1890). He also published *Campaigns of the War of* 1812–15, *against Great Britain, Sketched and Criticised* (1879).

Culm. See KULM.

Culmbach. See KULMBACH.

Culme-Seymour. See SEYMOUR, SIR MICHAEL CULME.

Cul'mina'tion, the position of a heavenly body when it crosses the meridian. This occurs twice a day, the greatest altitude being attained at upper culmination; the least, at lower culmination, twelve hours (approximately) later.

Culp, JULIA (1881–), Dutch contralto singer, was born in Gröningen, and made her first public appearance as a violinist at the age of fourteen. Later she studied singing in Amsterdam and Berlin and in 1901 made her début in Magdeburg. Tours through Germany, Austria, France, Spain, and Russia established her reputation as one of the most charming lieder singers of the day. In 1913 she made her first appearance in the United States which she has since visited frequently. She is an enthusiastic interpreter of the works of Hugo Wolf.

Cul'pa, Roman law term for such fault or carelessness as infers legal liability. It had three degrees—*culpa levis in abstracto*, which consisted in just failing to show that standard of care expected of an ordinary prudent man; *culpa levis in concreto*, which consisted in just failing to show that standard of care which the person in question ordinarily showed in the conduct of his own affairs; *culpa lata* or gross fault, the results of which approximated to those of intentional wrongdoing (*dolus*). The term is commonly used in modern law in the same sense.

Cul'peper, JOHN, one of the Carolina settlers, was born in England and became surveyor-general of the Carolinas, where in 1678 he organized an insurrection in the Albemarle colony (North Carolina) against the interference of the colonial government in elections and against the high taxes on commerce. Having established a government, Culpeper visited England to negotiate terms, and was tried for high treason, but escaped on a technicality. On his return to the Carolinas, he initiated the survey of what is now Charleston.

Culpeper, THOMAS (?–1719), Colonial governor of Virginia, was born in England, and received (1673) from King Charles II., with other grantees, the entire colony of Virginia for a period of thirty-one years. Two years afterward he bought the Earl of Arlington's rights between the Rappahannock and Potomac rivers, and was proclaimed governor for life. He came to Virginia in 1680, and during his three years' stay amnesties were granted for offences committed in 'Bacon's rebellion' (q. v.), and other measures of importance were passed. Returning to England in 1683 without permission, he was arrested, and for sundry reasons his commission was declared forfeited. He became very wealthy, and his vast estates in England and America descended to the son of his daughter, Lord Fairfax, the friend and patron of Washington.

Cultivated Plants. Fully five thousand years ago, millet, rice, sweet potatoes, and wheat were cultivated by the Chinese, and in the pyramid of Gizeh, probably six thousand years old, is a drawing representing figs, which were evidently cultivated in Egypt at that time. The origin of the various cultivated plants now grown in different countries has only recently been investigated with any care; and the native habitat of nearly every plant cultivated by man is now known, though many are extinct in a wild state. Examples of the latter are the chick-pea, bean, lentil, wheat, maize, tobacco, and sweet potato. It is sometimes a difficult question to determine whether a plant which appears to be native to a given country is really a native or has been first introduced into cultivation and then become naturalized.

Some plants are cultivated for their underground parts, as the radish, potato, artichoke, beetroot, turnip, carrot, onion, manioc, batata, and yam; many for their fruits, as the orange, lemon, apple, pear, plum, nuts of all kinds, olive, cucumber, gourd, and strawberry; some, again, for their leaves, as tea, sumach, leek, spinach, cabbage, lettuce, and parsley; a few for their edible flowers, as the clove, hop, and saffron; others for their seeds, as the oat, wheat, barley, maize, pea, rice, bean, and lentil; still others for their beauty and decorative value.

See AGRICULTURE; GARDENING.

Cultivation. See TILLAGE.

Cultivator, called also a grubber or scarifier, an agricultural implement used chiefly in the United States, to prepare soil for planting or to loosen it between rows of plants. The machine tears and pulverizes the soil by means of curved teeth so placed that they enter the ground obliquely as the cultivator is moved over the surface.

Culturkampf. See KULTURKAMPF.

Culverin. See GUNS.

Culvert, an arched, walled underground watercourse, usually of masonry or brick-work. It serves the purpose of conveying water under a canal, an embankment, or a roadway.

Cumacea. See CRUSTACEA.

Cumæ, kū'mē, ancient city of Italy, near the coast, west of Naples, was founded about 1050 B.C. It was one of the principal centres from which Greek civilization was disseminated through Southern Italy, and from it the Romans learned the use of the alphabet. After a hard struggle against the Etruscans, whose naval power was broken, off Cumæ, by King Hiero of Syracuse in 474 B.C., the city was besieged and taken by the Catanians in 417, and again by the Romans in 350 B.C. It fell into decay under the Roman emperors, though chosen as a place of residence by Cicero and other distinguished men. It was burned by the Saracens in the 9th century, and was finally destroyed by the Neapolitans, 1203. Near it are several caves, one of them the dwelling-place of the Cumæan sibyl, who gave the fateful Sibylline Books to Rome (see SIBYL).

Cumana, kōō-mä-nä', town, Venezuela, capital of the state of Sucre, is situated on the northern coast, at the entrance to the Gulf of Cariaco. The castle of San Antonio, overlooking the town from a height of 180 feet, and a college, are noteworthy features. The port, known as Puerto Sucre, is about half a mile from the town. Fruit of all kinds grows abundantly, and coffee, sugar, tobacco, hides, and beans are exported. Cumana was founded in 1521. It has suffered severely at various times from earthquakes and fire. Pop. 12,225.

Cumania, Hungary. See KUMANIA.

Cumarin. See COUMARIN.

Cum'berland, a sloop of the United States navy which was stationed (March 1862), at the mouth of the James River, along with the *Minnesota*, *Roanoke*, and *Congress*, for the purpose of destroying or capturing the rebel iron-clad frigate *Merrimac*. The iron-clad, however, was victorious, and the *Monitor* arriving the next day found the *Cumberland* with only her top-gallant masts above water. See MONITOR; HAMPTON ROADS.

Cumberland, maritime county in the northwestern part of England, bordering on Solway Firth and the Irish Sea, with an area of 973,086 acres. The surface is mostly mountainous, the highest point being Sea Fell (3,200 feet). The chief rivers are the Liddel, Esk, Line, Eden, and Derwent, and there are many picturesque lakes. Coal, iron, limestone, granite, slate, zinc, and lead occur in abundance. Dairying, cattle raising, fishing, and iron and steel manufacturing are the leading industries. Carlisle is the capital; other towns of importance are Whitehaven, Workington, Brampton, and Maryport. Pop. (1921) 273,037.

Cumberland, city, Maryland, second city of the State, county seat of Allegany county, on the Chesapeake and Ohio Canal and the Potomac River, and on the Baltimore and Ohio, the Cumberland and Pennsylvania, the Pennsylvania, and the Western Maryland Railroads, and local electric lines; 135 miles northwest of Baltimore. Its prosperity and rapid growth are due mainly to the traffic in coal from the tributary Cumberland region, and the iron ore, clay, shale, and glass sand found in the vicinity. The manufactures include tires, chemical products, dyes, tin plate, steel rails, flour, silk, glass, tile and lumber. According to the Federal Census of Manufactures for 1919, industrial establishments number 82, with $10,281,982 capital, and products valued at $15,842,210.

The city occupies the site of Fort Cumberland, constructed in 1733 by Governor Dinwiddie of Virginia. The place was laid out in 1785 and called Washington Town. In 1787 by an act of legislature the name became Cumberland and in 1816 it was incorporated as a town. This was the starting point of the Great National Road, often called the Cumberland Road, which was an important highway in opening up the West. It is now crossed at this point by the north and south Horse Shoe Trail. A free camp site for tourists is located 5 miles east of the city. Pop. (1900) 17,128; (1910) 21,839; (1920) 29,837.

Cumberland, town, Rhode Island, Providence county, on the New York, New Haven and Hartford Railroad; 12 miles northwest of Providence. A monument marks here the grave of William Blackstone, founder of the town of Boston and the first white settler in Rhode Island. After his differences with the Puritans in Boston he left that colony (1635), making his home on what is now known as Study Hill, Cumberland. The place was formerly a part of Massachusetts, but along with four other towns was annexed to Rhode Island in 1745–46. The manufacture of cotton is the chief industry. Pop. (1910) 10,107; (1920) 10,077.

Cumberland, ERNST AUGUST, DUKE OF (1845–), heir to the Hanoverian crown, was born in Hanover, the only son of King George V. of Hanover. He entered the Hanoverian army in 1862, was colonel of infantry in the Austrian army in 1866, and successively major-general, lieutenant-general, and general (1898) in the British army. In 1878 he married Princess Thyra, daughter of King Christian IX. of Denmark. On the death of his father (July 11, 1878) he proclaimed his right to the crown of Hanover, but finally abandoned the claim in 1892. On the death of Duke William of Brunswick (October 1884) without direct heir, the Duke of Cumberland became Duke of Brunswick-Lüneburg. In 1919 he was deprived of his English titles.

Died Nov. 14, 1923

Cumberland, RICHARD (1732–1811), English dramatist, poet, and essayist, was born in Cambridge. He was graduated from Trinity College, Cambridge, was befriended by Lord Halifax, and ultimately became secretary to the Board of Trade. He wrote a large number of plays, including *The Brothers* (a comedy, 1769) and *The West Indian* (considered his best; acted 1771); three novels of merit; two volumes of poems, and a collection of moral, literary, and familiar essays, entitled *The Observer, Anecdotes of Eminent Spanish Painters* (1782). Goldsmith overrated him by describing him as 'the Terence of England,' but Sheridan underrated him by satirizing him as Sir Fretful Plagiary in the *Critic*. The *Memoirs of Richard Cumberland, written by Himself,* appeared in 1806, and his posthumous dramatic *Works* were edited by Jansen in 1813.

Cumberland, RICHARD (1631–1718), English moral philosopher, a college friend of Pepys, was born in London. Owing to his reputation for Protestantism and learning, he was in 1691 appointed bishop of Peterborough by William III. As an author, Cumberland's fame rests especially on his *De Legibus Naturæ Disquisitio Philosophica* (1672), in which he opposed the doctrine of Hobbes (q. v.) and anticipated the utilitarian school in its enunciation of the public good as the end of morality. Consult Albee's *History of English Utilitarianism.*

Cumberland, WILLIAM AUGUSTUS, DUKE OF (1721–65), third son of George II., volunteered for service in Flanders, received a wound at Dettingen (1743), and was opposed to Marshal Saxe at Fontenoy (1745), where he sustained a reverse, but so crippled the foe that he could not pursue his advantage. The duke was next dispatched against Prince Charles Edward Stuart in Scotland, won a signal victory at Culloden (1746), and by his needless severities against the Highlanders earned for himself the title of 'the Butcher.' This was his last success. He was badly outwitted and defeated at Laeffelt by Marshal Saxe in 1747; and ten years later, after being defeated at Hastenbeck by D'Estrées, had to surrender with all his army at Kloster-Zeven.

Cumberland Gap, a pass in the Cumberland Mountains, at the western tip of Virginia, from which the boundary runs west, between Kentucky and Tennessee. At the narrowest places it is wide enough only for a roadway, above which the sides rise to a height of 500 feet. It was of great strategic importance in the Civil War. It was occupied by the Confederate General Zollicofer in 1861; by National forces under General Morgan in June, 1862; by General Bragg in October, 1862. In September 1863 it surrendered under the Confederate General Frazer to General Shackelford, and in April 1865 nearly 1,000 Confederate soldiers surrendered and were paroled here.

Cumberland Island, really a peninsula in the east of Baffin Land, Canada. It lies north of Cumberland Sound, and stretches in a southeasterly direction into Davis Strait.

Cumberland Mountains, a range of the Appalachian system in the Southern States. It extends southwest from West Virginia, forming the boundary between Kentucky and Virginia, crosses the eastern part of Tennessee as a broad plateau, and enters the northeast corner of Alabama. It attains its highest elevation, some 2,500 feet, in Kentucky, and has an average elevation of about 1,000 feet in the Tennessee plateau. It is drained chiefly by the Tennessee and Cumberland Rivers, and its sandstone formation incloses valuable deposits of coal and iron.

Cumberland Presbyterians. See PRESBYTERIANISM.

Cumberland River, a left bank tributary of the Ohio River, which it joins at Smithland, Ky. It rises in the Cumberland Mountains in Kentucky, and follows a general westerly course of 678 miles, describing a long arc in Tennessee, the chord of which is about the middle third of the boundary common to both States. The last part of its course runs parallel to the Tennessee River in Kentucky. The area of its drainage basin is 18,573 square miles. It is one of the chief tributaries of the Ohio River, and is navigable by small boats for 300 miles and by steamboats to Nashville.

Cumberland Road. See NATIONAL ROAD.

Cumberland University, an institution of learning for both sexes at Lebanon, Tennessee, chartered in 1843, under the control of the Cumberland Presbyterian Church. The institution was prosperous at the opening of the Civil War, during which the buildings and apparatus were destroyed and the endowment rendered worthless. It was revived in 1866, and now consists of a school of liberal arts, with undergraduate and graduate courses, and schools of law, with a summer session, engineering, theology, oratory and music. In 1905 it had 650 students, 45 instructors, a library of 21,000 volumes, and procuctive funds of $150,000.

Cumberland Valley, part of the Great Appalachian Valley, a continuation of the Shenandoah Valley of Virginia, extending across Maryland and into Pennsylvania to the Susquehanna R. It is famed for its fertility.

Cumbraes, Great and Little, two islands in Firth of Clyde, Scotland, 2¼ m. E. of Bute. Greatest length of the Great Cumbrae 3¾ m., with circumference of 10½ m. (See Millport.) The Little Cumbrae has a lighthouse.

Cumbrian Mountains, a group of mountains in Cumberland, England, extending also into Westmoreland and Lancashire. They are the mountains of the Lake District.

Cumin, or Cummin, is the fruit of an annual umbelliferous plant, *Cuminum cyminum,* which grows wild in the neighborhood of the Nile, along the Mediterranean coast, and in Arabia and India. The fruits are about a quarter of an inch in length, and bear some resemblance to caraways. The taste is bitter and aromatic, the aromatic properties being due to a volatile oil which constitutes about one-fortieth of the weight of the fruits.

Cumming, Constance Frederica Gordon- (1837), Scottish traveller, sister of R. G. Gordon-Cumming. She has travelled much, and has published interesting narratives, among which are: *From the Hebrides to the Himalayas* (1876); *A Lady's Cruise in a French Man-of-war* (1882); *Wanderings in China* (1885); *Granite Crags in California; Two Happy Years in Ceylon* (1891), etc. She is specially interested in furthering the numeral-type system for teaching reading and writing in Mandarin Chinese.

Cumming, John (1807–81), Scottish writer on prophecy, a native of Fintray, Aberdeenshire, became the popular minister of the National Scottish Church, Covent Garden, London (1832). As a controversialist, he attacked the seceders from the Established Church of Scotland at the Disruption (1843), also Roman Catholicism and papal aggression; and as a writer on prophecy sought to prove that the 'last vial' of the Apocalypse was to be poured out from 1848 to 1867. See George Eliot's essay on him, *Evangelical Teaching: Dr. Cumming.*

Cumming, Roualeyn George Gordon- (1820-66), Scottish lion-hunter, devoted himself to big-game hunting, chiefly in the interior of S. Africa (1843-8). An account of his experiences was published in his *Five Years of a Hunter's Life* (1850).

Cummings, Amos Jay (1841–1902), American journalist, was born at Conkling, N. Y., and worked as a compositor in the West and South and in the office of the N. Y. *Tribune.* He served as a volunteer in the Union army during the first half of the Civil War, and, returning to New York because of illness, joined the staff of the *Tribune*, becoming in succession night editor, city editor, and political editor of that paper. Subsequently he became a member of the editorial staff of the N. Y. *Sun.* He was elected to Congress from New York in 1886, and was reëlected until his death.

Cummings, Joseph (1817–90), American educator, born in Falmouth co., Me., and graduated (1840) at Wesleyan University. He joined the New England conference of the M. E. Church in 1846, and in 1857 became president of Wesleyan, retiring in 1875 as professor of mental philosophy and political economy. In 1881 he was elected president of Northwestern University, Ill.

Cummings, Thomas Seir (1804–94), American artist, was born in England, and was brought to New York as a child. He became one of the most expert miniature painters of his time. With other students he formed the N. Y. Drawing Association, organized as the National Academy of Design in 1826. He published *The Historic Annals of the National Academy, from its Foundation to* 1865 (1865).

Cummins, Albert Baird (1850), American legislator born in Carmichaels, Pa. He acquired an academical education and became chief engineer of the Cincinnati, Richmond and Ft. Wayne R. R. Admitted to the bar in 1874, he practised in Chicago in 1874–78. He was governor of Iowa in 1902–08, elected U. S. Senator (Rep.) to succeed the late William B. Allison in 1908 and re-elected in 1909.

Cummins, Maria Susanna (1827–66), American novelist, was born at Salem, Mass., and early began writing fiction for the periodicals. Her novel, *The Lamplighter* (1854), had great success.

Cumnor, vil. and par. in Berkshire, England, 5½ m. by road N.W. of Abingdon. Cumnor Hall (now destroyed) was famous as the place where Amy Robsart, wife of Robert Dudley, afterwards Earl of Leicester, met her untimely death. It is the Cumnor Place of Scott's *Kenilworth.*

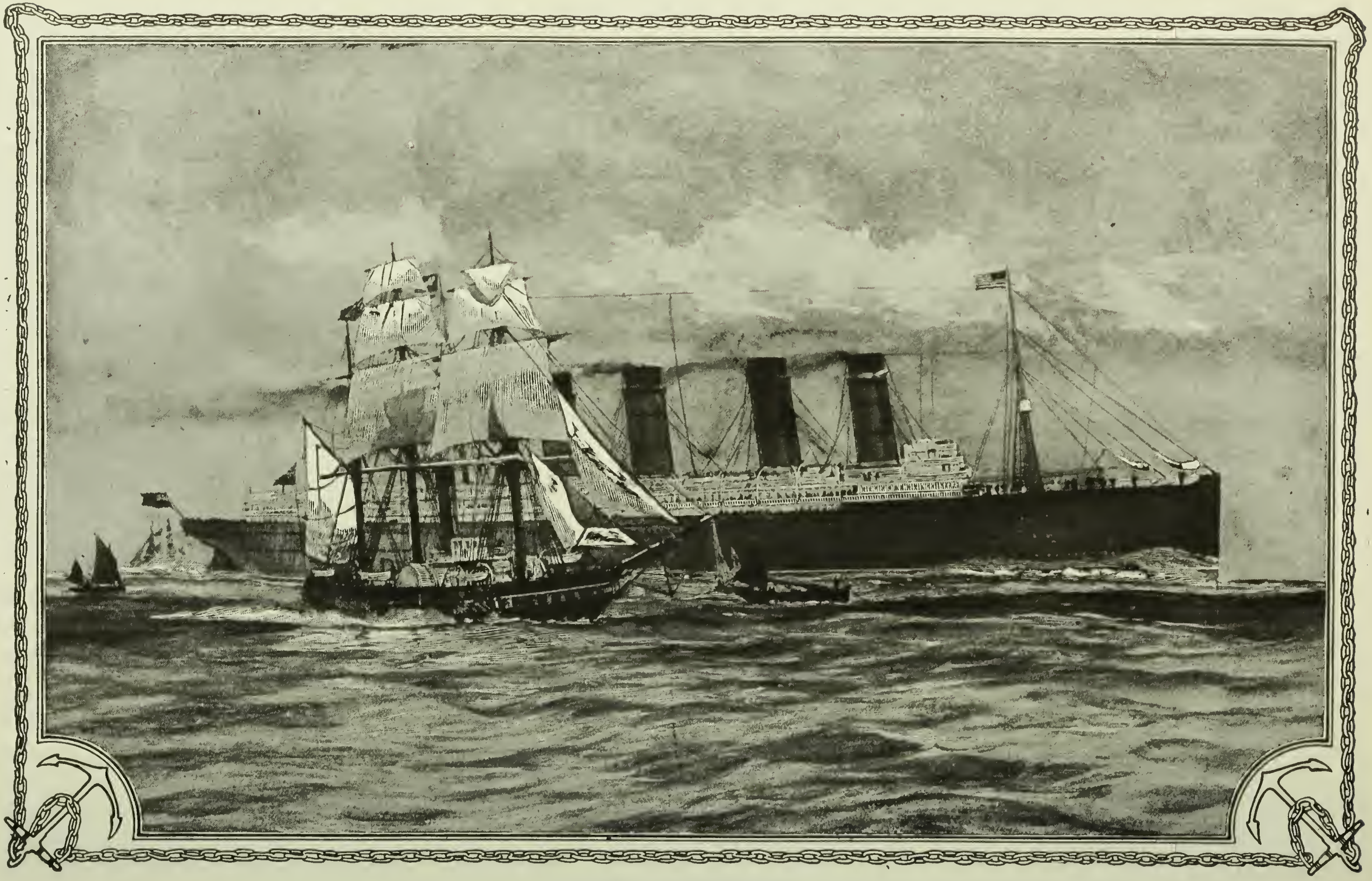
Cunard, Sir Samuel (1787–1865), Anglo-Canadian shipowner, born at Halifax, Nova Scotia. He went to England, and, with others, founded the British and North American Royal Mail Steam Packet Company (1839), which was (1878) taken over by the Cunard Steamship Company. Having obtained the government mail contract, Cunard, by the voyage of the *Britannia* (July, 1840), first established steam postal-communication between England and America.

Cunard Steamship Line. The Cunard Steamship Company was originally established in 1878, to take over the business of the British and North American Royal Mail Packet Company and the British and Foreign Steam Navigation Company, but actually dates from 1839, being the oldest passenger line between the U. S. and Great Britain. It now owns a score of vessels, including the giant 40,000-ton turbine steamers *Mauretania* and *Lusitania*, the two fastest steamers in ocean service, and the *Carmania* and *Caronia*, of 20,000 tons. In 1909 construction was begun on a new 600-foot, 20,000-ton turbine steamship, to be the equal of the *Lusitania* in speed. On August 15, 1909, the *Lucania*, which had been in the service seventeen years, was burned and sank at her dock in Liverpool. She was later raised and broken up. In the same year the *Etruria* and *Umbria*, once record-holders, were ordered out of commission. In 1903 the company agreed with the British Government to hold its fleet at the latter's disposal for twenty years. In return the Government gave the company a subsidy of £150,000 per annum.

Cunas (*Tulé*), a Central American people, formerly dominant in the Darien peninsula and the Lower Atrato valley. Here they still form an almost independent confederacy with the San Blas Indians. They are remarkable for the great length of their lank, glossy black hair, which, however, is cut short by the married women. Their language shows some affinity to that of the Caribs, with whom the Cunas are grouped by some ethnologists. See Brinton, *The American Race* (1901).

Cunaxa, tn., Babylonia, on the l. bk. of the Euphrates, notable for the battle (401 B.C.) between Artaxerxes Mnemon, king of Persia, and his rival brother, Cyrus the Younger, who fell in the fight. Xenophon tells the story in his *Anabasis.*

Cundinamarca, dep. of Colombia, extending from the Magdalena to the Orinoco. Its western

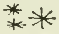
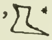
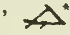
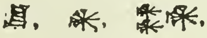
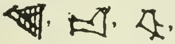
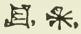
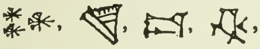
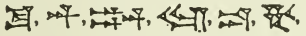
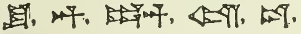


CUNARD STEAMSHIPS.

New turbine steamer *Lusitania* (launched 1906); and *Britannia* (1840), the first Cunard steamer to cross the Atlantic.

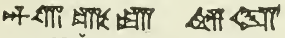
part is traversed by the cordilleras of the Andes, rising in the Nevada de Sumpaz and the Cruz Verde to 15,780 and 10,700 ft. respectively. The llanos to the east (the San Martin territory) occupy four-fifths of the area, and feed a narge number of cattle. On the rich and elevated savannas, as that of Bogotá, European crops are raised, and coffee, cocoa, sugar, tobacco, indigo, etc., are grown on the slopes of the Andes or the valley of the Magdalena. The department also contains salt, copper, and coal mines; and has a few industries, such as tanning, distilling, brewing, and brickmaking. Bogotá is the chief centre of importation. Area, 79,800 sq. m. Pop. 600,000.

Cuneiform, the name for the style of writing which was commonly in use, in ancient times, in Babylonia and Assyria. It was at first linear and hieroglyphic; but when the early users of the script entered Babylonia, they found themselves in a country abounding in clay; and instead of scratching the characters on the surface, they impressed them, line by line, with the edge of a stick cut perfectly straight, trying at first to maintain evenness in the lines thus formed. This, it is needless to say, is exceedingly difficult, the portion formed with the end of the stick or stilus—*i.e.* the tops of the upright strokes and the left-hand ends of the horizontal ones—having a tendency to become impressed deeper than the rest. As it was almost impossible to avoid this defect, lines thick at the top and on the left became the rule, giving birth to a series of characters formed of cones or wedges, called by the Akkadian and Semitic Babylonian users of the script 'fingers;' and this peculiarity became more pronounced as time went on. By the adoption of this system all curved lines naturally became straight, and the likeness to the original hieroglyphics was in most cases destroyed—so much so that the scribes themselves seem to have been ignorant of the origin of their script.

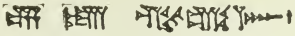
With what nation the cuneiform system of writing originated admits, in the opinion of most Assyriologists, of little or no doubt. The characters, as has been already stated, were originally hieroglyphics, and these have meanings agreeing with the words of the Akkadian language. Thus the character , *utu*, afterwards worn down to *ut*, and *û*, stands for 'light,' 'day,' 'the sun,' 'to be bright,' etc., and was apparently, in its first form, a picture of the sun. Its earliest form was that of a lozenge, the shape it naturally assumed when the attempt was made to represent a disc by means of straight lines or wedges. Other characters showing distinctly the hieroglyphic form are *šu*, 'the hand;' (a star), standing for 'heaven' (*ana*) and divine things (*dingir*);  (three times repeated), *mul*, 'a star,' also 'to shine;' , *lam*, 'a plough;'  (a foot), *gin*, 'to go;' , *ḫa* 'a fish;' , *še*, 'wheat;' and many others. These became  , and in the early wedge form;  , and in the later wedge form;  and in late Babylonian; and  , and in late Assyrian.*

The fall of the Assyrian empire took place before further modification set in, but a continuance of the tendency to simplification manifests itself in the Babylonian style of writing about the Persian period.

The Akkadian system of writing, as it has been handed down to us, was: to express all nouns and verbs by means of ideographs, certain characters, used syllabically, being employed to show the relations of case, and the subject, object (both direct and indirect), and number of the verbs. As the ideographs often stand for several words of similar meaning, a character used syllabically as 'phonetic complement' generally indicates which word to read. The method adopted will be clearly seen from the following:—



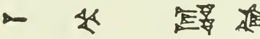
AN-ŠA-ga-ta IMI-qime
Heaven-midst-from wind-like



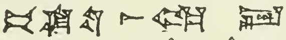
KALAMA-ta ZI-ga-meš
land-upon advancing-are-they,

† Late Assyrian characters (from the *Cuneiform Inscriptions of Western Asia*, vol. iv. [2d ed.], pl. 5, col. 2, line 30).

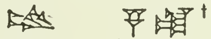
or, freely translated, 'They swoop down from the midst of heaven like wind upon the land.' The characters transcribed by capital letters show the roots. *Ga* is in both cases the phonetic complement, showing that the full form of the words to which it is attached are *šaga*, 'heart;' 'middle,' and *ziga*, 'to advance.' *Ta* is a postposition, meaning in the first case 'from,' and in the second case 'upon.' *Qime* is the postposition meaning 'like,' and *meš* indicates the plural of the verb *ziga*. When used in Semitic, Babylonian or Assyrian the system is similar, but differs on account of the different nature of the language for which it is employed. The following will furnish a fair example:—



INA MÂT AKKADI D.S.*
In the land of Akkad



bi-kî-tu INA ÊLI ÛMMI
weeping over the mother



ŠARRI ŠAKN-at.
of the king took place.

* D.S. = determinative suffix.

† Late Babylonian characters (from the Babylonian Chronicle, *Transactions of the Society of Biblical Archæology*, vol. vii., 1880, p. 159).

In this extract the words in capitals show those cuneiform characters which are used ideographically, transcribed by the Semitic words in their proper form (*ûmmi*, construct case; *šarri*, genitive), or provided with a phonetic complement (*šaknat*, verb in the third person singular, from *šakānu*, agreeing with *bikîtu*), which last, together with those composing the word *bikîtu*, is used with its ordinary syllabic value. It is to be noted, therefore, that the characters used in the latter way are in reality given with their pronunciation as old Akkadian words, used to form new words in Semitic Babylonian, and having absolutely no meaning in Akkadian as here arranged. On the other hand, the characters transcribed by capitals, pronounced with their values as Akkadian words (*aš kur Uri ki* instead of *ina mât Akkadi* D.S., and *aš muḫ ama lugala gar* instead of *ina êli ûmmi šarri šakn*), though they would individually have a meaning in Akkadian, and the phrase might even have been comprehensible to one speaking that language, as the signs are not arranged according to Akkadian grammar, they would naturally be meaningless in that language as a whole. Though texts containing a large number of ideographs are common, there are also large numbers of inscriptions written syllabically (like the word *bikîtu* above). Thus we have, spelled out, such phrases as *man-ma dib-bi-šu bi-'i-šu-tu i-dib-bu-bu* 'whoever speaks his evil words:' *šu-ul-la-' šal-lat ê-kur li-qa-a-ma bu-šu-šu*, carry off the spoil the temple, take also its goods,' etc. Numerous inscriptions are written in this way.

---

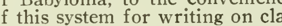
* The characters marked * are here given us in the oldest inscriptions—*i.e.*, in their proper position, as when the inscriptions read downwards, like the Chinese. Later the inscriptions were turned so that the left-hand side was at the bottom, and from that time they were read, like our own writing, from left to right.

The cuneiform system of writing spread first to Elam, which was in early times a Babylonian province. It was also used at an early date in Cappadocia and the neighborhood, spreading southward (or westward from Babylonia) to the E. Mediterranean coastlands generally. Assyria, having been a Babylonian colony, naturally adopted the script, and from the Assyrians the ancient Armenians borrowed it, somewhat modifying the form. It will thus be seen that it was the principal means of communication and the chief literary vehicle. By its means Babylonian literature must have become known, through the scribes, to the people of those districts generally, thus accounting for the traces of Babylonian religion and legends (*e.g.*, the myth of Tammuz, among others) which are found there. Whether the real extent of the influence of Babylonian literature will ever become fully known is doubtful. Of one thing there can be but little doubt, and that is, that numerous details of the earlier chapters of Genesis must have come from Babylonian sources—perhaps the stories of the creation and the flood, the details concerning Merodach (called in Genesis, Nimrod), the account of the tower of Babel, etc. Naturally these have come down to us strongly modified by the writer through whose hands they passed, so that if the Babylonian originals ever come to light we may expect to find them in a different form from that in which we now know them.

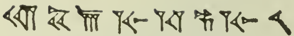
Before the incomparably simpler alphabet known as Phœnician the exceedingly complicated system of writing of the Babylonians and Assyrians was bound to give way. After the period to which the Tell-el-Amarna tablets belong (15th century B.C.) no native cuneiform inscriptions were, to all appearance, produced in Palestine and its neighborhood. The Aramaic form of the so-called Phœnician appears in Syria about the 8th century B.C., and spread to Babylonia and Assyria, but it never took the place of cuneiform so long as the independence of those countries lasted. When the script finally ceased to be used is unknown. The appearance of Aramaic in Babylonia does not begin before the end of the 6th or the beginning of the 5th century B.C.; but its progress, though sure, was probably slow, as the use of cuneiform is traceable almost until the advent of the Christian era.

The Cuneiform Writing of Persia.—The general opinion formerly was that this also was derived, like all other styles of cuneiform script, from that in use in Babylonia, and an attempt to explain the origin of the forms which it presents was made by Professor Oppert. His theory was that the ancient Persians chose a certain number of Babylonian characters, translated the words for which they stood into Persian, and then used the initial sound of these translated words as the Persian values of the characters, which they simplified, at the same time, by reducing the number of the wedges of which they were composed. This, however, is now regarded as impossible, and the origin of the alphabet of the old Persian scribes has still to be found. To all appearance it had an independent origin, the writing of the characters with wedge-shaped lines being due to Babylonian influence, and also, like the script of Babylonia, to the convenience of this system for writing on clay tablets, and its suitableness for monumental inscriptions.

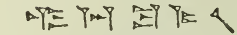
The great importance of old Persian cuneiform is that, being the simplest of the three scripts in use in the dominions of the Persian kings (Cyrus and his successors), it was the means whereby Grotefend, at the beginning of the 19th century, laid the foundation of cuneiform decipherment. Taking the words for Darius, Xerxes, 'great,' 'king,' etc., in the Persian inscriptions, he read into them their ancient Persian forms (of which the Zend gave indications), and, by comparing the consonants, found himself in possession of a portion of the Persian cuneiform alphabet. His first discovery was communicated to the Royal Society of Göttingen in the year 1802. As an illustration of his system and an example of this style of writing, some of the words by which he obtained such satisfactory results are given here:—



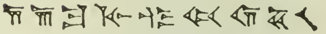
Kh-sh-y-a-r-sh-a
Xerxes.



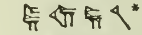
kh-sh-a-y(a)-t'-i-y(a)
king



v(a)-ş(a)-r-k(a)
great



D-a-r-y(a)-v(a)-h-u-sh
Darius'

*

p-u-tr(a)
son.

*The slanting wedges are division marks, and are peculiar to the Persian script.

The repetitions of the letters in the names will show how Grotefend was able to find the values of the characters; and though he was not right in every case, it was a noteworthy and most important discovery. Grotefend was followed by Burnouf (1836), a learned Zend scholar, Lassen (between 1836 and 1844), and others. The material acquired by Colonel (afterwards Major-general) Sir Henry Rawlinson when, in 1836-7, he took paper impressions of the great inscription of Darius at Behistun, gave him a great advantage over other scholars, adding many new words, and supplying the means, by comparing the names of people, places, etc., of translating the Babylonian and so-called Median or Scythic versions. In this work Rawlinson and the learned Dr. Hincks had great success.

See Spiegel's *Altpersische Keilinschriften* (1862, etc.); Rawlinson, in the *Journal of the Royal Asiatic Society* (1846); Oppert's *Le Peuple et la Langue des Mèdes* (1879); Weisbach's *Die Achämenideninschriften zweiter Art* (1890); Kossowicz's *Inscriptiones Paleo-Persicæ* (1872); Sayce's *Assyrian Grammar* (1875, etc.); Pinches' *Texts in the Babylonian Wedge-Writing* (1882); Amiaud and Mechinau's *Tableau Comparé des Ecritures Babylonienne et Assyrienne* (1887); Thureau Dangin's *Recherches sur l'Origine de l'Ecriture Cunéiforme* (1898); Delitzsch's '*Ueber die Ursprung der babylonischen Keilschriftzeichen*,' in *Sitzungsbericht der Königl. Sächs. Gesellschaft der Wissenschaften*, July, 1896; also as a volume (regarded as somewhat fanciful, though containing much important matter); Booth's *Discovery and Decipherment of the Trilingual Cuneiform Inscriptions* (1902); and papers in the *Transactions and Proceedings of the Society of Biblical Archæology*, and the *Journal of the Royal Asiatic Society*, by Houghton, Bertin, Ball, and others.

Note.—In the above article the old designation, Akkadian, has been retained; but scholars now prefer the word Sumerian, or the two terms together, Sumero-Akkadian.

Cunene, river in Angola, Portuguese W. Africa, rises on the plateau of Benguella at an altitude of 5,850 ft., and flows through Mossamedes to the frontier of German S.W. Africa, where it turns westward to the sea. In Mossamedes the river expands, and loses much of its water by infiltration; along the German border it is obstructed by rapids, and its mouth is full of sandbanks. Gold is washed by the natives in its middle course. Length 720 m., and area of its basin 42,800 sq. m.

Cuneo. Province of N. Italy, belonging to Piedmont; is bounded on the w. by the Cottian Alps, and on the s. by the Maritime Alps, and from both inclines n. between the upper Po and the Tanaro, having here an elevation of from 1,300 to 1,800 ft. Cattle-breeding is of great importance, and cheese is made. Other products: corn, hemp, flax, wine, fruit (especially chestnuts), silk, manufactured silk, cloth, and linen, hardware, marble, and iron. There are several mineral springs, as at Valdieri. Area, 2,868 sq. m. Pop. 36,150.

Cuneo. Town and episc. see of Italy, cap. of above prov., 55 m. by rail s. of Turin; has a (restored) cathedral, a large military hospital, a 12th-century church, and narrow streets, with medieval houses. The people make silk, cotton, and paper. Owing to its strategic position, commanding the passes over the Maritime Alps from Turin to Nice, Cuneo was formerly a fortified place of great strength, and was several times besieged. Pop. 20,592.

Cunha, Tristao da Cunha (1460–*c.* 1540), Portuguese navigator. In 1506, while in command of a Portuguese expedition to Africa and India, he discovered in the South Atlantic the island which bears his name; visited Madagascar, Mozambique, and the coast of Zanzibar, and distinguished himself in India. In 1514 he headed a deputation to Rome to Pope Leo x, to render him homage for the territories newly conquered by the Portuguese. He is celebrated in the tenth song of Camoenes's *Os Lusiadas.*

Cunningham, Sir Alan Gordon (1887–), brother of Lord Cunningham of Hyndhope (q. v.), British soldier, was educated at Cheltenham and Woolwich. He served in the First World War and in the Straits Settlements, achieving the rank of major general in 1938. At the outbreak of the Second World War he was commander of the Fifth Anti-Aircraft Division, and in 1940–41 commanded the East Africa Forces, in the latter year being transferred to the command of the Eighth Imperial Army in the Middle East. In 1943 he received the rank of lieutenant general. In the last phase of the war he took over the command of British forces in Northern Ireland, and in 1944–45 headed the Eastern Command.

Cunningham, Sir Alexander (1814–93), English writer on Indian archaeology, son of the poet Allan Cunningham, born in Westminster, reached the rank of major general (1861). His experience in India enabled him to produce some valuable books dealing with Indian architecture and statistics, among them *Archæological Survey of India* (1871). See Higginbotham's *Men whom India has Known* (1870–1).

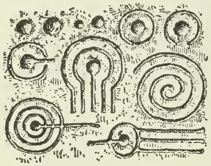
Cunningham, Allan (1784–1842), Scottish poet and biographer, was born in Keir parish, Dumfriesshire, and became a skilful stone-mason. He wrote most of the *Remains of Nithsdale and Galloway Song,* published by R. H. Cromek (1810). In 1813 he published *Songs Chiefly in the Rural Dialect of Scotland.* In 1822 he published his drama *Sir Marmaduke Maxwell,* and issued the same year *Traditional Tales of the English and Scottish Peasantry.* In 1825 he edited *The Songs of Scotland, Ancient and Modern* (4 vols.), followed by his *Lives of the Most Eminent British Painters, Sculptors, and Architects* (6 vols. 1829–33), a well-written and authoritative work, reissued in Bohn's Standard Library (3 vols., 1879). Cunningham next edited, with a biography, the works of Burns in 8 vols. (1834), and his *Life of Sir David Wilkie* appeared in 1843. Cunningham's songs have standard value. See D. Hogg's *Life of Cunningham* (1875); Lockhart's *Scott;* Sir W. Scott's *Journal* (Douglas ed. 1890) and his *Familiar Letters* (Douglas ed. 1894); Froude's *Carlyle* (1884); James Hogg's *Autobiography* (1822); Holland's *Memorials of Chantrey* (1851); Memoir in *British Painters* (1879); Maclise's *Portrait Gallery* (1883).

Cunningham, William (1805–61), Scottish divine, a native of Hamilton; as one of the leaders of the 'non-intrusion' party in the Church of Scotland 'came out' at the Disruption (1843), and was afterwards elected to a professorship, and after Chalmers's death (1847) to the principalship of the New (Free Church) College. He visited the U. S. in 1843 to collect information with regard to theological institutions in America. In 1842 he had received the degree of D.D. from Princeton College—his only degree. Cunningham was famous for rousing speeches and outspoken controversial pamphlets, and for his *Reformers and the Theology of the Reformation* (1862) and *Historic Theology* (1862). See *Life* by Rainy and Mackenzie.

Cunningham of Hyndhope, First Baron (Sir Andrew Browne Cunningham Bt.) (1883–), British admiral, was educated at Edinburgh Academy and at Stubbington House, Fareham, received his training on H.M.S. *Britannia,* and entered the Royal Navy in 1898. He served in the First World War (1915–18) but his outstanding service was in the Second World War which brought him the rank of Admiral of the Fleet in 1943. As Naval commander in chief of the expeditionary force off the North African Coast he participated in the Allied invasion of that territory in November 1942. Two years before he had routed the Italians at Taranto and in March 1941 won a notable victory in the Battle of the Ionian Sea. He headed the British Admiralty Delegation in Washington in 1942 and in 1943 became First Sea Lord and Chief of the Naval Staff. He was created a baronet in 1942 and raised to the peerage in 1945.

Cuoco, or Coco, Vincenzo (1770–1823), Italian historian, born at Civitá-Campomarano, kingdom of Naples; studied law, but turned his attention to history. He was compelled to leave Naples in 1799, owing to the hostility of the government to the intellectual classes, and went first to France and afterwards to Milan, where he published *Saggio Storico sulla Rivoluzione di Napoli* (1800), in which he describes the situation of the kingdom of Naples in 1799. In 1804 he published *Platone in Italia,* a history of Italy in the form of a novel, which had a great success. He returned to Naples in 1806. See D'Ayala's *Vita di Vincenzo Cuoco* (1865).

Cup-and-Ring Marks, a term in archaeology applied to certain designs found on rocks and stones in many parts of the world, produced by picking with sharp-pointed tools. The usual forms are *cups*—*i.e.,* deep saucer-like cavities varying from half an inch to three inches in diameter, accompanied by grooves one inch wide, which either surround the cup or proceed from it. The commonest forms are that of a single cup surrounded by a single ring, or a single cup surrounded by several concentric rings; a single cup connected radially with one or more concentric rings, or with other groups of rings; groups of cups connected by grooves, and groups of rings alone. Though these remarkable and as yet unexplained designs—in America known as petroglyphs—show a strong family likeness wheresoever found, the varieties of their arrangements are numerous. The earliest record of their discovery on rocks in Britain occurred in 1837, at N. Balfern, Wigtownshire; but in Brandenburg the *Näpfensteine* were known in 1751. Since the publication of Sir J. Y. Simpson's *Archaic Sculpturings of Cups and Circles* (1867) many observers have discovered fresh examples. That cup-and-ring marks are, in Britain at least, as ancient as the bronze age, is proved by their being found on the slabs composing cists of that period. They occur also upon the hardest diorites and granites, as well as upon the comparatively soft sandstones; and they are found upon vertically set stones, as well as on flat and sloping rock surfaces. No theory hitherto advanced explains their origin, purpose, or meaning.


Cup-and-Ring Markings.

Cupellation, a method of assaying gold and silver. The process depends on the fact that oxides of metals are soluble in litharge (PbO) when fused in contact with it; non-oxidizable metals being, however, insoluble. If, for example, it is desired to isolate the more precious metal from an alloy of silver and copper, the alloy is placed in a cupel or vessel of compressed bone ash, in immediate contact with a (larger) piece of lead. The cupel is then exposed to heat sufficient to fuse the metals. The lead is converted into litharge, absorbing the oxide of copper from the alloy, and itself being absorbed into the porous cupel. The silver is left in the form of a solid button of metal.

Cupid, the Roman god of love, equivalent to the Greek Eros, represented in painting and sculpture as a nude boy, winged, blind, and armed with a bow and quiver of arrows, which he aims at the hearts of lovers with the object of kindling their desires. He was fabled to be the son of Mercury and Venus. Cupid and Psyche form the subjects of an episode in the *Golden Ass* of Apuleius, representing the progress of the soul to perfection. The episode has also been made the subject of poems by Lafontaine and Mrs. Tighe, has been sung by William Morris in *The Earthly Paradise,* and dramatized by Molière.

Cupola, a concave or polygonal ceiling, originating in Roman and Byzantine architecture. It has many different phases of treatment, but in ecclesiastical architecture it has undergone very little variation. It is sometimes lit by windows in the upper section, and is nearly always decorated in relief and color. The conical or polygonal glass roof covering in many domestic buildings is called the cupola.

Cupping, in surgery, is a method, now little used, of drawing blood in cases of deep-seated congestion to the surface of the body (dry cupping), or of altogether removing it (wet cupping). Dry cupping is performed by heating the interior of a glass vessel, such as a tumbler, over a flame, or by burning inside it a piece of wool dipped in methylated spirit, and then swiftly applying the vessel to the affected part, which should be ready damped, so as to produce a vacuum or partial vacuum inside the former. This, through atmospheric pressure, causes the skin to lift and the serum to accumulate. Wet cupping is performed after dry cupping has brought blood to the surface. A set of knife-blades, released by means of a spring, emerges through openings in a flat metal plate, which is pressed against the part it is desired to treat. The dry-cupping glass, after being reheated, is then re-applied, and the partial vacuum draws blood. After the operation the wounds should be dressed antiseptically.

Cura, Venezuela, chief town of prov. Miranda, 55 m. s.w. of Carácas. Its situation at the head of a road through the inner range of the Caribbean mountains gives it importance as a strategic point, and as a trading station between Carácas and the llanos. Alt. 1,840 ft. Pop. 12,000.

Curaçao, an easily-prepared liqueur, many imitations of which are now on the market. It is manufactured chiefly in Holland and in Great Britain, from the essential oils and extracts of the peel of the Curaçao orange. The dried peel is pounded under water, allowed to stand for a time, and then distilled with fairly strong alcohol. Sugar is then added to sweeten, and to certain brands a small quantity of high-class rum, to improve the flavor and aroma. The alcoholic strength varies from 26 to 30 per cent. Three qualities—double-orange, white, and green—can be obtained.

Curaçao, W. Indies, a colony of the Netherlands, consisting of the islands of Curaçao (area, 210 sq. m.; pop. 75,587 in 1944), Bonaire (95 sq. m.; pop. 5,798), Aruba (69 sq. m.; pop. 39,318) —all three situated north of Venezuela—and the southern part of St. Martin (17 sq. m.; pop. 1,877), St. Eustatius (7 sq. m.; pop. 1,092), and Saba (5 sq. m.; pop. 1,194)—these three situated in the north of the Lesser Antilles. Total area, 403 sq. m.; pop. 124,866, of whom about one-half are Roman Catholics. Capital, Willemstad, on the south coast of Curaçao. The islands are arid, and not very productive; but they yield aloes, phosphate of lime, salt, divi-divi, sweet potatoes, and skins. Curaçao has belonged to the Netherlands since 1682.

Curare, Urari, or Woorali, is a dark-brown substance extracted from plants of the Strychnos species, and containing curarine—an intensely bitter yellowish powder—as its active principle. It paralyzes the motor nerves of the voluntary muscles, was widely used as an arrow poison by the Indians of the Orinoco and Amazon basins, and has been employed in experiments in vivisection, and medicinally to alleviate the spasms of tetanus.

Curassow, a name given to a number of large American game-birds belonging to the genus Crax. All are lark-colored birds, but the females have crests fringed with white, and mostly white or light-colored markings which are absent in the male. The commonest species is *C. alector,* which is as big as a turkey, nearly black, and excellent eating. These birds are sometimes kept as poultry in Brazil.

Curate, literally one who has the cure of souls. The title is applied in the Book of Common Prayer to all who are commissioned by episcopal authority to undertake a spiritual charge—'all bishops and curates'; but by the end of the 16th century the term was used rather of the 'substitutes,' or assistants of the parish priests. Its use is now practically confined to the Church of England and the Protestant Episcopal Church in America, where it denotes the assistant to the vicar or rector. In a few instances in England there are 'perpetual curacies' which are practically vicarages.

Curb, a ring of wood or iron which forms a base to the masonry of wells, shafts, or the piers of bridges. In wells a series of curbs may be employed, each being underpinned as the work proceeds downwards; or the earth may be cut away from under one curb so as to allow the weight of masonry above to sink it continually lower. The curbs for piers of bridges are usually of iron or steel, and are built up of two rings of plates, which meet at an angle to form a cutting edge downwards, and thus more easily penetrate the ground.

Curci, Carlo Maria (1809–91), Italian theological writer, learned, eloquent, and facile. Born at Naples, he founded (1850) the paper *Civiltà Cattolica* and wrote (1847) a trenchant answer to Gioberti's *Il Gesuita moderna.* A publication urging the reconciliation of the Holy See with Italy caused his expulsion from the Jesuit order by Leo xiii (1877). Two other books by him—*La Nuovo Italia* (1881) and *Il Vaticano Regio* (1883; Eng. trans. *Vaticanism as Seen from the Banks of the Tiber,* 1884)—were put on the index. He also adopted principles closely akin to Christian socialism, which led to his excommunication. But he retracted, obtained absolution from the pope, and, retiring to Careggi, he wrote his autobiography: *Memorie di Padre C. M. Curci* (1891).

Curé, one who has the cure of souls; the name commonly given to a Roman Catholic priest in France or in a French-speaking country. The word originally was an adjective meaning 'belonging to or having a cure.'

Curepipe, tn., Mauritius, on the central plateau; here is the principal sanatorium of the island. The town is connected by rail with Port Louis. Pop. (1944) 27,468.

Cures, anc. tn. of the Sabines, 25 m. N.E. of Rome, near the modern Corrèse. It is the reputed birthplace of Numa Pompilius and T. Tatius. The designation Quirites was acquired by the Romans after their union with the people of Cures.

Curetes, a name given to priests of Zeus in Crete; they are said to have watched over Zeus in his infancy.

Cureton, William (1808–64), English Syriac scholar, born at Westbury, Shropshire; was sub-librarian of the Bodleian (1834–37), and later assistant keeper of the British Museum manuscripts, until elected canon of Westminster (1850). Interested at first chiefly in Arabic, Cureton did his most valuable work as a Syriac scholar by his discoveries among the MSS. brought from the Nitrian valley to the British Museum of (1) the famous epistles of St. Ignatius to Polycarp, declared by Cureton (but denied by Lightfoot) to be the only original and genuine text, and (2) some fragments of a Syriac version of the gospels, which he believed to be an older and more accurate version than the Peshito. He published *The Festal Letters of Athanasius* (1848); *Corpus Ignatianum* (1849); *Ecclesiastical History of John of Ephesus* (1853); *Spicilegium Syriacum* (1855), etc.

Curfew was introduced from the Continent into England by William the Conqueror. It was merely a provision of martial law, not a deliberate measure of oppression. The curfew bell was rung at sunset in summer, and at eight o'clock in winter. At this bell all fires were put out and all lights extinguished, and the formal sounding of the curfew bell has continued in some districts to this day.

Curie, Eve (1904–), French editor and author, daughter of Marie and Pierre Curie, was born in Paris. She made several lecture tours of the United States and in 1942 visited the battlefronts of Libya, Russia, Burma, and China. She wrote a biography of her mother, *Mme Curie* (1937), and *Journey Among Warriors* (1943).

Curie, Pierre (1859–1906) and Sklodowska, his wife (1867–1934), discoverers of radium. Pierre was the son of a homeopathic practitioner at Fontenay-aux-Roses, near Paris, who distinguished himself in metallurgical and botanical research. Madame Curie (b. at Warsaw) was a pupil of Pierre Curie (before she married him) at the old Sorbonne in Paris, where he was professor of physics. The Curies, in 1898, while investigating Becquerel radiations from uranium, found some samples of pitchblende (from which the uranium is extracted) having four times the radioactivity of metallic uranium. Concluding that these radiations were due to some unknown element in the pitchblende, they undertook a careful search for it, and discovered a substance associated with bismuth, which it closely resembled in its chemical characteristics; to this Madame Curie gave the name 'polonium,' after her native land, Poland. In the same year in which polonium was discovered, the Curies and M. Bemont succeeded in isolating a second substance found in pitchblende; this was associated with barium, and possessed many of the characteristics of that substance, and to this they gave the name 'radium.' M. Curie became chief professor of physics in the faculty of sciences, Paris University, and on November 22, 1908, Madame Curie was appointed to be his successor in the university chair. Her great work *Traité de Radioactivité* was published in 1910. In 1911 she received the Nobel prize for chemistry. She made two visits to this country. In 1929 President Hoover presented her with $50,000 to purchase radium for her laboratory in Warsaw. Consult Eve Curie, *Madame Curie* (1937). See Radium.

Curio, Gaius Scribonius (*c.* 84–49 B.C.), son of Gaius Scribonius, consul in 76 B.C., and, like his father, a friend of Cicero. He was originally on the side of the aristocracy against Caesar; but when tribune in 50 B.C. he was brought over by the latter, who recognized his ability, and used his services in his contest with the senate. In 49 Caesar sent Curio as propraetor to Sicily, whence he expelled Cato; but having crossed over to Africa, he was killed by Juba and Attius Varus. He was married to the notorious Fulvia, who afterward became the wife of Mark Antony, and was himself a man of dissolute life.

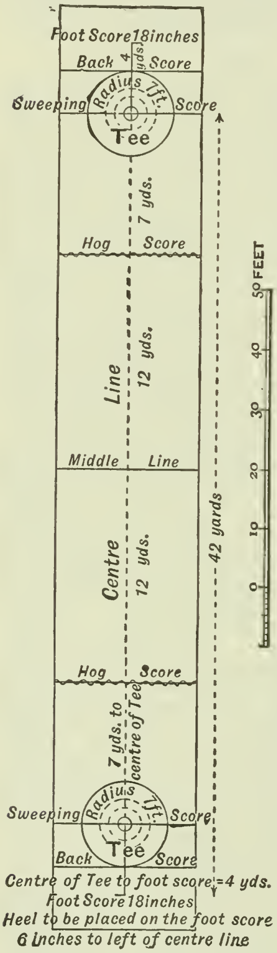
Curityba, or Curitiba, Brazil, cap. of Parana, on the high tableland. It contains match and other factories; and porcelain works have been established near the city. The Parana R. R. runs through it to the ports of Antonina and Paranagua. Alt. 3,000 ft. Pop. (1938) 125,874.

Curius, Manius Dentatus (d. 270 B.C.), a hero of the best days of the Roman republic. When consul for the first time he carried on war successfully against the Samnites (290 B.C.), and in his second consulship (275 B.C.) completely defeated Pyrrhus and drove him out of Italy. On retiring from office he returned to his small farm in the Sabine country, which he cultivated with his own hands. In 272 B.C. he was censor.

Curlew, a limicoline bird of the genus Numenius, with a long decurved bill and much elongated legs, which is found very frequently on the shore between tide marks. It breeds inland, on upland country, especially heaths or moors, the nest being open and unconcealed. The shrill cry and wary habits are familiar to all. The plumage is pale brown, with dark streaks and white markings, the body being largely white beneath. The common loud-whistling curlew of the interior United States is

N. longirostris, while two others, the Hudsonian and the Eskimo curlews, which breed in the Arctic regions, visit the Atlantic coast in winter. The most familiar European species are the whaup (*N. arcuata*) and the whimbrel (*N. phoeopus*).

Curling. For three centuries the home of curling has been in Scotland, where clubs are numbered by the hundred; but it is popular also in some parts of Canada, the United States, and a few other countries. Research has thrown little light upon the place of its birth, though everything points to a Flemish origin. It is believed to have been introduced into Scotland in the 16th century.



Plan of Curling Rink.

A 'rink' of smooth, keen ice having been chosen, the curler makes a tee at one end and a tee at the other end, forty yards apart, the tees being connected by a straight line drawn on the ice. From each tee, as center, a circle of seven feet radius is then drawn, as well as a touch line, at right angles to the center line, on the far side of each circle. Six inches from the point where the two lines meet, and to the *left* of the center line (looking towards the other tee), a circle of three inches radius is described at each end of the rink. On this tiny circle every right-handed player must place his left foot (whether he stands on the ice or a mat) when in the act of delivering the stone; and a similar circle must be drawn, if need be, on the *right* of the center line for the convenience of left-handed players. At a distance from each tee, usually reckoned as one-sixth of the length of the rink, a *wavy* line is drawn, which bears the name of the 'hog score'; and precisely at the center of the rink a *straight* line is drawn, called the 'middle line.' It is necessary to repeat everything (save the middle line) in duplicate, for the reason that the game is played from each end alternately. Every stone that does not cross the hog score is treated as 'dead,' and removed from the ice.

The rink having been prepared, the skip, or captain, makes up his team (four a side in matches), and play begins. Each player has a broom, and two curling stones which shall not be more than 36 inches in circumference or be more than ⅛ the circumference in height. There are eight ways in which scoring is made, and the highest possible score is 72. The first player on a side stands back of the tee, and sends the stone along the ice to the other tee, and the other players follow in turn. Every stone within the 7-foot circle is counted, and the highest score wins. The brooms are used to sweep clear the path of the stone, according to the captain's orders or the rules of the game. For details of rules, etc., see Spalding's Athletic Library on *Curling*.

Curran, CHARLES COURTNEY (1861–1942), American painter, was born at Hartford, Ky., and studied at Cincinnati, at the Art Students' League in New York, and at the Académie Julien in Paris, receiving honorable mention in the Salon of 1890. There is a graceful charm about his figure-pieces in the open air, particularly those of young girls. He devoted much attention to the painting of fanciful pictures of flowers, etc., with attendant sprites.

Curran, JOHN PHILPOT (1750–1817), Irish orator and politician, was born at Newmarket, Co. Cork, the son of Protestant parents. Called to the Irish bar (1775), he soon made his mark by his oratory, which was instinct with humor and pathos. He was engaged in many celebrated causes, becoming king's counsel in 1782. Returned to the Irish Parliament for Kilbeggan, Westmeath (1783), he was one of the leaders of the band of honest men under Grattan who opposed the Union. His sharp and ready tongue got him into numberless quarrels and duels. Curran deeply sympathized with his Catholic countrymen, and strongly advocated their claims. Domestic troubles now fell upon him in the elopement of his wife, and the untimely death of his daughter Sarah after the execution of her lover, the young and ill-fated Robert Emmet (1803). On the Whigs coming into power (1808), Curran was made master of the rolls in Ireland, but retired in 1814. He died in London, but was buried in Ireland. See the *Lives* by W. H. Curran (1819–1855), A Stephens (1817), and O'Regan (1817); also Phillips's *Curran and his Contemporaries* (1850); *Speeches,* etc., of Curran, by Davis (1855); and Lecky's *Leaders of Public Opinion in Ireland.*

Currant. The currant is a common bush-fruit, extensively grown in gardens in Europe, America, and in other countries having a temperate climate. The cultivated varieties grown in the United States belong to four species. The red and white varieties (*Ribes rubrum*) are the varieties chiefly grown for canning jelly, and dessert purposes. The European black currant is *R. nigrum.* This variety is not in favor with Americans, but is quite extensively used in Canada for culinary purposes. The native black American currant is *R. Americana.* This is similar to the European variety, but has smaller fruit. Another native black variety is *R. aureum.* Currants grow best in the cooler northern states. They succeed well in shade, and in the southern and western states are most successfully grown in such places. Varieties true to name are propagated by layers or cuttings. Rooted canes may also be separated from the mother plant. Currant cuttings are made about eight inches long from the ripened wood of the season's growth. In starting a new plantation one-year-old plants give the best results. Currants do best on a rather heavy, moist loam. Plants are set in rows about six feet apart and four feet distant in the row. They require frequent shallow cultivation during the growing season. They normally grow in a bushy form. In pruning, from four to eight canes should be maintained in each hill, all the three- or four-year-old canes being removed. The plants respond promptly to fertilizer, such as well-rotted barnyard manure. The most popular varieties of currants among the red sorts are Cherry, Fay, and Red Dutch; among the white, White Grape, White Imperial, and White Dutch.

The currant of commerce is a small raisin, which is an important product of the regions of the Eastern Mediterranean.

Cur'rency is comprised of those monetary elements which are customarily and lawfully acceptable in hand-to-hand exchange and over-the-counter payments. Under normal monetary conditions, in a nation having a metallic standard of value, the actual stock of currency is made up of a variety of coins and paper money. The primary determinants of the composition, size, denomination and artistic character of the several elements of the currency are convenience and safety in personal monetary transactions. It is also important that a monetary system shall provide at any time a volume of currency adequate in amount, but not in excess of the needs of trade. That is to say, the currency should be quantitatively elastic, increasing and decreasing in direct proportion to the current variations of business. A third essential of a satisfactory currency system is that it shall tend to sustain a stable level of average prices. It is for this reason that national currencies, in their unitary values, customarily are related to a metallic standard unit of value, either gold or silver, of lawfully defined weight and fineness.

The purchasing power of the coins and paper money of a currency based upon a metallic standard resides in the lawful provision that all elements of the currency shall be redeemable on demand in standard coin. Inasmuch as standard coins have a relatively constant and certain bullion value in every mart of the world, the redemption process imparts to all elements of the currency a like quality of constant and certain value.

In 1900 the United States, having experimented more than a century with a variety of currencies and monetary units, adopted the monometallic gold-standard system which was then universal among other great industrial and commercial nations. The Currency Act specifically defined the weight and fineness of the standard dollar as 25.8 grains gold, nine-tenths fine (23.22 grains pure), and provided that all other forms of lawful currency of the United States should be redeemable on demand at the United States Treasury in standard gold coins. The total stock of money at that time amounted to $2,366,220,000, of which 44 per cent was in gold. The sum actually in circulation was $2,081,000,000. The stock of gold coins, standard bars and silver held as a reserve in the Federal Treasury in support of the active currency was $855,000,000. At that time the currency of the country was peculiarly inelastic. The government issues of coins, and gold and silver certificates ($1,703,299,000), and Treasury Notes of 1863 ($346,681,000), were in no way related in amount to the changing needs of trade. The National Bank Notes ($309,640,000), issued against United States bonds owned by the banks, were likewise unresponsive to changing business requirements.

With the advent of the Federal Reserve Banking System (1913), Federal Reserve Notes were made a new element of the currency adding the much needed quality of elasticity. This was accomplished by concentrating the gold reserves of the National Banks in twelve regional Federal Reserve Banks and providing for the rediscounting of commercial paper by these banks. This 'eligible paper' immediately became available as security for the issue of Federal Reserve Notes in the proportion of 60 per cent eligible paper to 40 per cent gold. The United States Treasury undertook to redeem these notes at face value in standard gold on demand. Thus, the supply of bank currency was made directly proportional to the short-time needs of trade, as measured by the volume of funds currently required of local banks for legitimate merchandising, agricultural and manufacturing purposes.

In the popular conception of ***money,*** the functions and significant qualities of the ***standard of value*** and of the ***currency*** are often confused. The monetary ***standard of value***—a gold dollar, for example—is simply the value unit, or 'yard stick,' by which commercial values of goods and services are measured and expressed. The ***currency*** serves as a convenient medium of payment in the process of merchandising.

A second confusion of popular financial terminology is the frequent designation of bank checks and drafts as 'bank currency,' 'bank money' or 'credit currency.' In the United States, the use of bank checks and drafts constitutes more than 90 per cent of the total means of payment. These instruments have been so designed as to attain a high degree of convenience and safety in many types of business transactions and they have largely supplemented currency in modern business. The fact remains, however, that these very useful credit instruments lack many essential attributes of currency. They are not universally acceptable, or of certain value, or directly related to any official obligation of redemption, or a legal tender in any kind of payment, or of authorized governmental issue (the issue of currency is traditionally and constitutionally a sovereign function), and, finally, they would be quite useless and without value if currency could not readily be had in exchange for them.

Currency systems are of two generic classes—(1) ***Standard currencies,*** all elements of which are redeemable at face value on demand, in standard units of gold or silver of lawful weight and fineness, and consequently derive their purchasing power from the intrinsic value of the precious metal which they represent. (2) ***Irredeemable currencies,*** the elements of which are, by government mandate, legal tender and acceptable in payment of debts, but which are not redeemable at face value on demand in any valuable thing of legally specified quantity or quality.

There are certain difficulties which arise in respect of the maintenance and operation of standard currencies. Sometimes, as in the case of the United States for a period of sixteen years during and following the Civil War, a nation may find itself unable to secure a sufficient amount of precious metal to maintain a redeemable currency based thereon. It may even be, as was the case in Germany after the World War, that government revenues and the public credit are insufficient to finance immediate and imperative national needs. In either case the issue of irredeemable currency is necessary. What shall happen thereafter as regards its usefulness and stability is a matter of political action. In the case of the United States after the Civil War, an exceptionally rigorous fiscal policy restored the currency to gold par in 1879 and held it there until 1933. In the case of Germany, the irredeemable issues lost all value within five years resulting in national bankruptcy, the repudiation of all debts both public and private and, ultimately, the creation of a new currency system.

Historically, the management of currencies has customarily revolved around the political alternatives of continued inflation until depreciation is complete, or, as in France in 1926, restored redemption upon the basis of a devalued standard. Very rarely has the commendable example of the United States in 1879 been emulated.

A modern criticism of standard currencies has arisen from the observation that great or rapid price-changes create maladjustment of wealth and income and otherwise inflict hardship upon certain individuals and groups of the population, and simultaneously benefit other individuals and groups. It is therefore argued that the automatic price variations resulting from the uncertain operation of demand and supply upon the value of the standard metal and consequently affecting prices of other commodities should somehow be eliminated and a more stable price-level maintained. This has led to the formulation of a number of price-raising and price-leveling schemes. It is believed by some that prices could be stabilized by careful currency management and the cyclical extremes of speculation and depression avoided. These plans, for the most part, are derived from the ***quantity theory of prices*** which affirms that, other things remaining equal, ***the price level varies directly with the quantity of money and inversely with the volume of trade.*** Therefor, prices might be increased, decreased or stabilized by artificially controlling the ratio of the volume of money to the volume of trade. The plausibility of the quantity theory is fettered by the fact that 'other things' do not remain equal nor can they be effectively controlled. Nevertheless, in the United States, political measures have several times been undertaken to readjust an unfavorable price level by currency inflation, and on one notable occasion by a nation-wide reduction of industrial and farm production.

Managed Paper Currency.—This currency system, which in practice has always proved transitory, rests upon the theory of controlling the value of legal tender irredeemable paper money by suspending the circulation of gold and arbitrarily fixing the price in paper dollars for which gold must be sold to the government. More paper dollars being paid for gold, and foreign gold standard currencies, it is assumed that the level of commodity prices will rise, and *vice versa.* Additional paper currency necessary for the needs of trade is provided by direct government issue and excess issues may be retired through the banks in exchange for government bonds.

Credit Control of Prices.—In recognition of the fact that the role of bank credit tends to invalidate the quantity theory of prices, it is contended that falling prices may be checked by lowering bank discount and loan rates and increasing bank purchases of securities, especially government bonds. Conversely, rising prices may be checked by raising the bank rates and increasing open-market sales of securities. During the U. S. Government currency manipulations of 1933–35, a combination of paper currency and credit control was managed through the coöperation of the Federal Treasury and the Reserve Banks.

The Compensated Dollar.—An academic price stabilization plan advocated by Professor Irving Fisher, of Yale University. It is proposed that a gold-standard currency be established, but that, when the price-level for any reason tends to change, the amount of gold in which the currency dollar is redeemable shall be slightly increased or decreased, thus compensating the disturbing cause of price change and reëstablishing equilibrium of the price-level. This mechanism would also operate in effecting higher or lower prices when desired. The principal criticism of the Fisher 'rubber dollar' is that the technique of its operation is not sufficiently simple to inspire popular confidence and approval.

The Tabular Standard.—An academic scheme designed to eliminate the uncertainty of future values of deferred payments—bonds for example—resulting from price changes. It is proposed to make such contracts payable in equivalent 'purchasing power.' Consequently nominal payments of interest and principal sums would be increased or decreased in amounts proportionate to the price-level changes recorded by a standard system of index numbers. The weakness of the plan lies in the controversial nature of index numbers. See articles on: BANKING; COINAGE; GOLD AND GOLD STANDARD; SILVER; INFLATION AND DEFLATION; MONEY; PAPER MONEY.

Current, ELECTRIC. See ELECTRICITY, CURRENT.

Current River, a tributary of the Big Black River, rising in Texas County, Missouri. It flows in a southeasterly direction for over 200 miles through Missouri, and into Arkansas, where it joins the Big Black River, 5 miles east of Pocahontas. It is navigable to small boats.

Currents, ATMOSPHERIC. See METEOROLOGY.

Currents, OCEANIC. See OCEAN.

Curric'ulum, the course or range of studies pursued in an educational institution. No all-embracing answer has been found as to what should be included in curricula. Modern programs of curriculum making have grown largely out of the contributions of educational psychology as to the differences that exist among individuals and the fact that no curriculum is suitable for all. Modern educators, therefore, have concluded that courses of study should be varied to suit the purposes, locations, interests and capacities of pupils and should be based upon health, social, civic, occupational, economic and cultural activities.

Efforts to provide subject matter to fit individual differences led to the inclusion of more and more elements in the curriculum. A report of the U. S. Office of Education states that high schools in 1930 were teaching 250 subjects and the liberal arts colleges 11,733 as against nine subjects for the former in 1890 and 4,131 for the colleges in 1900. The American public school has provided courses of study especially suited to pupils who are handicapped, deficient, or retarded; it offers courses leading to the many professions and vocations; but it is criticised for failure to minister to the needs of embryo geniuses, for failure to foster creative self-expression. In short, curricula too often present systematic schemes for mass education with a utilitarian purpose.

The contrast between the American and the English theory of education is nowhere more apparent than in the curricula: the English believing that minds of the highest quality should be exercised upon materials which are not utilitarian so that their natural capacities to explore knowledge for its own sake may develop in an environment that is above utilitarian considerations. Thus the classical scholar in Britain has been honored in the intellectual world above the engineer—classical education including archæology, anthropology, numismatics, epigraphy, psychology, philology and geography.

The curriculum is the product of social evolution. In the United States the establishment of courses to cultivate the science of agriculture grew out of the lessons of the Civil War when the nation's food supply was in jeopardy. Institutions to cultivate the mechanic arts were the result of appeals from manufacturers and the U. S. Chamber of Commerce. Pupil demand is a very powerful influence in determining the content of the curriculum.

Curriculum making has been guided by changes in the theories of the purpose of education. The colonial Latin grammar schools and early academies were founded to prepare men for the Christian ministry and therefore emphasized Latin and Greek. In the latter half of the 19th century 'knowledge for its own sake' and mental discipline were desired and sanctioned the inclusion in the curriculum of a limited number of 'subjects' to be studied (memorized) from textbooks, which were encyclopedic. The disciplinary aim of education slowly gave place to the principle of maximal child growth at minimal expense as advocated by the dynamic psychologists. By 1930 colleges and secondary schools were still more largely organized on the former basis than on the latter. But in an increasing number of progressive and private centres, especially in elementary schools, the curriculum was controlled more by child spontaneity and self-expression than by regimentation. The tendency is to cut down the number of studies and expand the area covered by each. This re-departmentalization of the curriculum is an important tendency. It is now common to reorganize history, geography and civics to form a broad department known as 'Social Studies'; to include under the title 'General Mathematics' the study of arithmetic, business practice, constructive geometry, algebra, the function concept, graphic methods, statistics and mensuration. Physiology, hygiene, athletics, and physical training are grouped in one department; oral and written speech, reading and literature in another. The direction of all this is toward a new synthesis of knowledge and a departmentalism of the curriculum which will consist of a few broad integrations of child activities, readings, pupil research, etc.

Prior to 1850 the idea prevailed that all students should be trained along the same range of studies. A tradition that culture meant an understanding of European life made it obligatory to study European art, letters, languages and institutions while the materials of American self-expression were ignored. American literature was excluded. Then science came to occupy a strong position in the curriculum and in the 70's and 80's such subjects as manual arts and home making were introduced. After 1895 there was a marked decline in all branches of science which were then grouped under 'General Science' in the curriculum. Vocational studies gradually assumed importance and trade schools and schools of commerce were founded with public money.

As early as 1888 Charles W. Eliot addressed the National Education Association urging reform of the curriculum, because of the dominance of the college entrance requirements and the waste of student time resulting from the haphazard growth of the courses of study. In 1893 the Committee of Ten (on secondary education) and the Committee of Fifteen (on elementary education) were appointed to study the situation. Their reports urging uniformity of courses started a generation of committees, whose reports largely expressed fear of change. Curriculum-making was studied subject by subject, no committee viewing the school course of study as a whole. After 1920 several great American foundations granted money for surveys of school practice in curriculum-making. The prestige of the reports of these committees exerted a great influence. Such forward-looking cities as Winnetka, Ill., Denver, Col., Detroit, Los Angeles, St. Louis, were influenced by these reports. Many cities maintain permanent committees on curriculum making. State systems have based their syllabus upon these studies.

Legislation in regard to the curriculum has been enacted in each of the United States. The laws which effect its construction may be classified as laws which (1) provide for continuity in curriculum making, (2) specify the subject matter to be taught, and certain aspects of the organization of content, and (3) require State and county or district adoption of textbooks. The number of subjects and activities prescribed ranged in 1930 from five in Arizona to 29 in Wisconsin. The fundamental subjects, arithmetic, geography, English, penmanship, reading and spelling, were required in about half of the States. No requirements were specified in Delaware, Illinois, Michigan, Mississippi, Missouri, Oregon and West Virginia. Some laws relating to religious and ethical subjects were in effect in all States except West Virginia and Connecticut. The teaching of morals was required in seven States and manners in eight States. The teaching of sectarian doctrines was forbidden in approximately 40 States. In 1930 reading of the Bible was required in 11 States, permitted in five States, and generally considered as permissible in 20 States. In the 12 remaining States Bible reading is unlawful. Tennessee, Arkansas, Florida and Mississippi, in 1930, had laws prohibiting the teaching of the evolution theory.

Critics of the universities point out the disastrous consequences of the efforts to train all students to be specialists. Subjects are broken up into minute specializations so that a really first-class mind fails to receive a curriculum of homogeneous and related knowledge. The large number of courses offered in the colleges has led to the elective system in which the choice is left largely to the student himself. See EDUCATION; EDUCATION IN THE UNITED STATES; INDUSTRIAL EDUCATION; VOCATIONAL EDUCATION.

Consult U. S. Office of Education Bulletin (1931) No. 4 on *Current Practices in the Construction of State Courses of Study;* C. H. Judd, *Education and Social Progress* (1934); C. C. Trillingham, *The Organization and Administration of Curriculum Programs* (1934); *Yearbook of the National Society for the Study of Education* (1927).

Currie, SIR ARTHUR WILLIAM (1875–1933), Canadian soldier and administrator, was born at Napperton, Ont. In his youth he was a school teacher in Ontario, and later in Western Canada. Subsequently he became a real estate agent in Victoria, B. C., and served as lieutenant-colonel in a Militia Regiment of the Canadian Gordon Highlanders.

Upon outbreak of the World War he went to France in command of the 2nd Infantry Brigade of the Canadian Expeditionary Force, and thereafter he won rapid promotion. In 1915 he was given command of the 1st Canadian Division with the rank of Major-General, and in 1917 became commander of the Canadian Corps. At the end of the War he was promoted to General, and appointed Inspector-General and Principal Military Councillor.

Subsequently, although he was not even a university graduate, he was made principal of McGill University, Montreal, which owes much to his administrative abilities. He was a governor of Montreal General Hospital and the Royal Victoria Hospital, a director of the Bank of Montreal and a trustee of the Carnegie Foundation. Universities in Scotland, Canada and the United

States bestowed honorary degrees upon him.

Curry, Jabez Lamar Monroe (1825–1903), American lawyer and educator, was born in Lincoln County, Ga. He was graduated from Georgia University (1843), and from Harvard Law School (1845). He was a member of the Alabama legislature in 1847–55, of Congress in 1857–61, and subsequently of the Confederate Congress. He entered the Baptist ministry, and served as president of Howard College, Ala., in 1866–8; was professor of law at Richmond College, 1868–81; agent of the Peabody Fund, 1881–5; United States minister to Spain, 1885–8; and later chairman of the John F. Slater Fund. His published works include *Constitutional Government in Spain; William E. Gladstone* (1891); *Southern States of the American Union* (1894); *Civil History of the Government of the Confederate States, with some Personal Reminiscences* (1901).

Curry Powder, or Curry Paste, a compound of turmeric, coriander, pepper, ginger, and various spices used as a seasoning for a variety of dishes. It is largely used in the East.

Cur'sor, the family name of two famous Romans of the Papirian clan:—(1) Lucius Papirius Cursor, consul five times and dictator twice between the years 333 and 313 B.C. He was occupied chiefly in wars with the Samnites, over whom he gained great victories in 325 and 313, the latter success bringing the second Samnite War to a close. He is represented as a stern commander, feared and disliked by his troops. (2) Lucius Papirius Cursor, son of the above, and also distinguished for his victories over the Samnites in his consulship both in 293 and in 272 B.C., in which latter year he brought the third Samnite War to a successful end.

Cursor Mundi, kûr'sẽr mun'dī ('Courier of the World'), a long religious poem written in Northumbrian English about 1320 A.D., giving a metrical version of Old and New Testament history, with additions from mediæval legend and the apocryphal gospels.

Cur'tesy, in law, tenancy by curtesy is the life estate which a husband may enjoy in all his wife's real estate of which she was the absolute owner during the marriage, if she dies without having disposed of it by will or otherwise, and there has been issue born of the marriage. Curtesy attaches to equitable estates of the wife as well as to legal estates, unless the conveyance establishing the trust expressly excludes the husband. The requirements to entitle the husband to curtesy are: (1) legal marriage continuing till death of the wife; (2) seisin of an estate of inheritance by the wife; (3) issue born capable of inheriting. It is not necessary for the child to be living at the time of the mother's death, or even to have lived any appreciable time, if it was born alive.

Curtin, Andrew Gregg (1817–94), American public official, was born in Bellefonte, Pa. He was graduated from Dickinson College in 1837, was admitted to the bar in 1839, and soon gained a large practice. His interest, however, was primarily in politics, and he became one of the foremost leaders, first of the Whig, and later of the Republican Party, in the State. In 1854 he was chairman of the Whig Central Committee, and in 1855–8 was secretary of the commonwealth, and rendered services of lasting value to the public educational system of the State. He is remembered chiefly as governor of Pennsylvania (1861–6) during the trying Civil War period, and in this capacity gave efficient and valuable support to the national administration. By his ceaseless care for the sick and wounded soldiers, and the families of the dead, he earned the title, 'the soldier's friend.' After the war he was United States minister to Russia (1869–72); and was a Democratic member of the National House of Representatives (1881–7).

Curtin, Jeremiah (1840–1906), American author, was born in Milwaukee, Wis. He was graduated from Harvard in 1863, and was secretary of legation at St. Petersburg from 1864 to 1870. He was attached to the Bureau of Ethnology of the Smithsonian Institution from 1883 to 1891. He distinguished himself as a linguist and wrote extensively on folk-lore and myths, and conducted investigations relating to the Indian tribes of North America, but is best known through his translation of works of Sienkiewicz and Tolstoy.

Curtis, Benjamin Robbins (1809–74), American jurist, brother of George T. Curtis was born in Watertown, Mass. In 1851–7 he was an Associate Justice of the U. S. Supreme Court, his dissenting opinion in the Dred Scott case (q. v.) being probably the ablest and most cogent argument ever written against the decision of the court in that case. He was counsel in various well-known cases, and was one of President Johnson's counsel in the impeachment trial before the United States Senate. He published *Reports of Cases in the Circuit Courts of the United States* (1854); *Reports of Decisions of the Supreme Court* (1854).

Curtis, Charles (1860–1936), American public official, was born in North Topeka, Kan. His maternal grandmother was one-half Indian. His parents died when he was a young lad and he was brought up chiefly by his mother's people. He acquired a common-school education in Topeka, and was admitted to the bar in 1881. He was Representative in Congress in 1893–1907, and was elected U. S. Senator for the unexpired term of J. R. Burton. He was an unsuccessful candidate for reëlection in 1912, but was elected in 1913 and reëlected in 1920 and in 1926. In 1928 he was chosen Vice-President of the United States under President Hoover.

Curtis, Cyrus Hermann Kotzschmar (1850–1933), American publisher, was born in Portland, Me. He started his career at an early age selling newspapers, saved his earnings and purchased a small printing press, with which he issued a boys' paper. Moving to Boston, he became connected successively with *The Traveller's Guide, The Boston Times* and *The Boston Independent.* In 1872 he acquired sole ownership of *The People's Ledger,* which he moved to Philadelphia and eventually sold in 1878. The following year he founded *The Tribune and Farmer,* which became later *The Ladies' Home Journal* and proved to be the foundation of his great success.

The Curtis Publishing Company, formed in 1890, acquired *The Saturday Evening Post* seven years later, and to those two periodicals was eventually added *The Country Gentleman.* Curtis purchased *The Philadelphia Public Ledger* in 1913, *The Philadelphia Press* in 1920 and *The Philadelphia North American* in 1925. These papers, together with *The New York Evening Post* (bought in 1924), were published by the Curtis-Martin Newspapers, Inc., from 1925. The *Philadelphia Enquirer* was added to the group in 1930.

The Pennsylvania Society awarded him its gold medal in 1930, and similar recognition was conferred by the Harvard Graduate School of Business Administration. From the University of Philadelphia he received an honorary LL.D. in 1924. He held numerous directorships and was interested in various enterprises other than newspaper publishing. Curtis rejected all patent medicine advertisements.

Curtis, George Ticknor.

(1812–94), American lawyer and legal writer, was born at Watertown, Mass., and graduated (1832) at Harvard. He was admitted to the bar in Boston in 1836, and practised law in that city until 1862, serving several terms in the Massachusetts legislature, and being U. S. commissioner in Boston during much of this period. In this latter capacity, in 1851, he rendered the decision returning Thomas Sims, a fugitive slave, to his master, which brought Curtis much ill-will from the Abolitionists. He subsequently practised law in New York city and in Washington, acting as counsel in a number of important patent cases. He wrote much for the press, and in addition to his legal writings he was the author of *Lives of Daniel Webster* (1870) and *James Buchanan* (1883); *Creation or Evolution* (1887); *John Chambers*, a novel (1889); and the important *Constitutional History of the United States* (complete ed., 1896). His digests, commentaries, and other law books dealt with admiralty and patent law, with equity precedents, and with practice in the U. S. courts.

Curtis, GEORGE WILLIAM (1824–92), American author, was born in Providence, R. I., the son of a business man of that city, who wished him to follow a commercial life. George was educated at a school in Jamaica Plain, Mass., until his sixteenth year, when he was placed with an importing house in New York, to which city his father had removed. Discontented with his position, the lad and his older brother joined the Brook Farm community, where they remained during 1842–3, and afterward passed some time with a farmer at Concord, Mass. Curtis's life at Brook Farm and at Concord brought him into contact with the eminent group of writers connected with those places. In 1846 he visited Europe, living for some time in Germany and Italy, and afterward travelling through Egypt and Syria. During this period he acted as correspondent for the N. Y. *Tribune*, of whose editorial staff he became a member on his return to America in 1851. The publication of his *Nile Notes of a Howadji* (1851) and *The Howadji in Syria* (1852) brought him into prominence, and these books were followed, in 1852, by *Lotus-Eating*, a collection of letters describing his experiences at various American watering-places. The same year he became one of the editors of *Putnam's Monthly*, and on the failure of the firm which published it, in 1857, Mr. Curtis, being financially responsible, lost his savings and was occupied until 1873 in clearing away the indebtedness. He began work as a lecturer in 1853, and was one of the most popular of the old group of 'lyceum' lecturers. In 1853, also, he became associated with Messrs. Harper & Brothers, the publishers, as editor and author, maintaining this connection until his death, during which period he contributed the editorial section known as 'The Editor's Easy Chair' to *Harper's Monthly*. On the establishment of *Harper's Weekly* in 1857, he became chief editorial writer for that periodical, and vigorously supported the cause of the Union, in whose behalf he also was active on the platform. He was a delegate to several national conventions of the Republican party, but in 1884 bolted the nomination of Mr. Blaine, and thereafter took little interest in politics. He was prominent in the civil-service reform movement, and in 1871 was appointed by Pres. Grant one of the commissioners to draw up rules for the service, but, differing in his views from the President, resigned this position. In 1880 he became president of the N. Y. Civil Service League, which was afterward merged in a national organization. Mr. Curtis's literary writings were characterized by a graceful and flowing style, mingling humor and sentiment. His *Potiphar Papers* (1853), originally contributed to *Putnam's Monthly*, were an amiable satire on the fashionable follies of the day. Other works were *Prue and I* (1856); *Trumps*, a novel (1862); and *From the Easy Chair* (3 vols. 1892–4). He also edited the *Correspondence of John Lothrop Motley* (1889). Posthumous collections of his writings were *Orations and Addresses*, edited by Charles Eliot Norton (3 vols. 1893–4), and *Early Letters to John S. Dwight* (1898). See *Life*, by Edward Cary (1894).

Curtis, SAMUEL RYAN (1807–66), American soldier, was born near Champlain, N. Y., and was taken as a child to Ohio. He graduated (1831) at West Point, but resigned the next year and engaged in civil engineering and the practice of the law until the Mexican War, in which he served as colonel of an Ohio regiment. Subsequently he removed to Iowa, and was U. S. representative from that state from 1857 to 1861, when he resigned to take service in the Union army. He was commissioned brigadier-general of volunteers and gained a notable victory over Confederate forces at Pea Ridge, Ark., in March, 1862. He was promoted major-general, and was successively head of the department of the Missouri and of the department of Kansas, in the latter capacity helping in the defeat of Gen. Price in Oct., 1864. He was in command of the department of the Northwest at the close of the war, and afterward negotiated treaties with the Indians.

Curtis, WILLIAM ELLEROY (1850), American journalist, was born at Akron, O., and graduated (1871) at Western Reserve College. Joining the staff of the Chicago *Inter-Ocean* in 1873, he went to Washington in 1887 as correspondent of the Chicago *Record*, and later of the *Record-Herald*. He went to South and Central American countries on diplomatic missions, and was director of the Bureau of American Republics (1890–3). He wrote many books of travel, description, biography, and popular economics; among them, *Children of the Sun* (1882); *The Land of the Nihilist* (1887); *Trade and Transportation* (1889); *Yankees of the East* (1896); *The True Jefferson* (1901). died 1911

Curtiss, GLENN HAMMOND (1878), aviator, born at Hammondsport, N. Y. In a motorcycle of his own construction he made the fastest record for any vehicle on land. On July 17, 1908, at Hempstead Plains he made a record by flying 52 minutes. At Rheims he won the Gordon Bennett trophy and the Grand Prize for speed by flying 46 miles per hour. He uses a biplane of his own designing. DIED 1930

Curtiss, SAMUEL IVES (1840–1904), American Congregational clergyman and educator, born at Union, Ct. He studied at Amherst College, the Union Theological Seminary, Leipzig, and Berlin. At Leipzig he was in charge of the American Chapel (1874–8); then became professor of Biblical literature in the Chicago Theological Seminary. For fifteen years (1888–98, 1899–1903) he was president of the City Missionary Society of Chicago. He translated Bickell's *Hebrew Grammar*, and Delitzsch's *Messianic Prophecies* and *Old Testament History of Redemption*, and wrote many articles on Hebrew studies and Old Testament interpretation.

Curtis Turbine. See TURBINES.

Curtius, ERNST (1814–96), German classical philologist and scholar, born at Lübeck. He went (1839) to Greece, first with Professor Brandis, then with the archæologist O. Müller. In 1844 he became tutor to the Crown Prince of Prussia, afterward Frederick III. After holding appointments at Berlin, he was appointed professor of classical philology at Göttingen, but returned to Berlin in 1868 as professor of ancient history. He wrote many works, among which are his *Classical Studies* (1840); *Peloponnesos*, dealing with Greek traditions, history, and remains (1851); *Griechische Geschichte* (1857–62; Eng. trans. by A. W. Ward, 1868-73); *Ephesos* (1874). See Fr. Curtius's *Ernst Curtius, in Lebensbild* (1903), and Gurlitt's *Erinnerungen an E. Curtis* (1902).

Curtius, Georg (1820–85), German philologist and Greek scholar, brother of Ernst Curtius; born at Lübeck; became professor of classical philology at Prague (1851), Kiel (1854), and Leipzig (1862). He excelled in comparative philology, his books on the subject being standard works. Among the best of his works are his *Griechische Schulgrammatik* (1852; Eng. trans. 1863; with *Illustrations,* 1863; Eng. trans. 1870); *Grundzüge der Griechischen Etymologie* (1858–62; Eng. trans. 1875); and *Das Verbum der Griechischen Sprache* (1873-6; Eng. trans. 1880). He also wrote on the Homeric tradition. See Windisch's *Georg Curtius* (1887).

Curtius, Marcus, according to the early Roman story, a noble youth who, on horseback and in full armor, leaped into a chasm which had opened in the Forum and could not be filled up. The augurs having said that the thing on which Rome's greatness was based must be cast into it, Curtius replied that a brave citizen was the city's best treasure, and so sacrificed himself for the benefit of his country.

Curtius, Rufus Quintus, a Roman historian of Alexander the Great; he lived probably in the 1st or 2d century A.D. His history consisted originally of ten books; but the first two are lost, and portions are missing from the others. It shows admiration for its hero; and though based on good sources, yet, owing to its author's ignorance of geography, tactics, and historical criticism, has not much weight as an independent authority, although it is pleasant reading. Ed.: Dosson (Fr. 1895), Vogel (Ger. 1887). Eng. trans. by Crosby (1858). See Dosson's *Etude sur Quinte Curce* (1887).

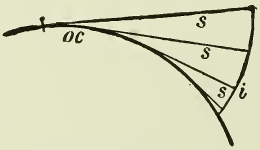
Curule Chair, the Roman state chair, was ornamented with ivory, and had curved, crossed legs. Until its assumption by the emperors, it was reserved for the 'curule magistrates'—*viz.* consuls, prætors, curule ædiles, censors, the *flamen dialis,* and the dictator and his deputies.

Curvature. See Curve, Mirrors, Surface.

Curvature of the Spine. See Spine.

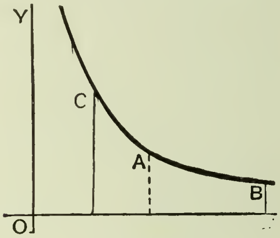
Curve, as ordinarily understood, is any continuous line which is neither straight nor built up of straight parts. Its characteristic property is curvature, which may be broadly defined as change of direction—more accurately as change of direction per unit length of arc, supposed to be described by a point moving along it. (See Calculus, Infinitesimal, for a general illustration.) The circle and conic sections are the simplest types of plane curve. Any straight line drawn through a circle or other conic section cannot meet the curve in more than two points. These are therefore curves of the second degree. A curve of the third degree may be cut in three points by a straight line, and so on for plane curves of higher degree. But obviously we may have curves which are not confined to one plane—for example, a spiral of corkscrew form. Such curves used to be called 'curves of double curvature,' but the modern name of 'tortuous curve' is much to be preferred. In a tortuous curve the curvature at any point is determined in exactly the same way as in a plane curve. Any three points on the curve determine a plane, and as these three points are taken closer and closer, this plane approximates closer and closer to what is known as the osculating plane in the neighborhood of the middle of the three contiguous points, and the curvature is determined by the change of direction as we pass from the first to the third point in this plane. But as we move along the curve, the aspect in space of the osculating plane changes; and it is this change the rate of which per unit length of arc measures the *tortuosity* of the curve.

Imagine an inextensible string to be laid along any plane curve and gradually uncoiled in a tense state. The end of the string will trace out a curve which is called the *involute* of the original curve. Since at every instant the involute is being described by the end of the straight part of the string rotating about the point where it leaves the original curve, the curvature of the involute will be the same as that of a circle of radius equal to the length of this straight part. The centre of this circle is for the moment the so-called centre of curvature of the involute at the point corresponding. But every curve has a similar centre of curvature at each point. Hence every plane curve is the involute of some other curve, and this latter curve is called the *evolute* of the former. Thus every curve is the evolute of its involute, and the involute of its evolute. The cycloid is a curve whose involute and evolute are similar cycloids.



Involute of a Curve.
oc, Original curve; *s,* string at different stages; *i,* involute.

Curve-tracing. Any algebraic relation between two quantities which are subject to continuous change can be represented as a plane curve. For example, the pressure and volume of a given mass of gas at constant temperature are connected according to Boyle's law, which asserts that the pressure is inversely as the volume. In algebraic form the product $pv = c$, a constant quantity. This relation may be represented graphically as a curve in the following manner: Draw two lines OX, OY at right angles to one another, and let volumes be measured along the one and pressures along the other. Since c is a known and constant number, for every chosen value of v there must be a definite value of p. If we measure a length along OX equal to the particular volume, and then measure upward a length parallel to OY equal to the corresponding value of the pressure, we arrive at a definite point, which we may call A (see figure). Let now the volume be doubled, so that the pressure will be halved. Carrying out the same process as in the former case, we arrive at a second point B. Similarly we readily find the point C, which gives the relation when the volume is half the original volume, and the pressure consequently double the original pressure. The points A, B, C represent states of the gas; and if we suppose the gas to pass continuously from the state C to the state B by appropriate changes of volume and pressure, we shall pass through a series of points lying on a definite curve. The formula $pv = c$ is said to be the equation of this curve, and this curve represents graphically the law contained in the formula. All similar laws giving the relation between two varying quan-



Curve-tracing.

tities can be represented by curves drawn in this way by the method of Cartesian co-ordinates. (See Co-ordinates.) In this direction curve-tracing has one of its most important practical uses.

When the equation between the two variables is complicated, this point-by-point method of tracing the curve becomes very laborious, and cannot indeed be completely carried out. It is usually possible to determine a few points with which are associated such values of the variables as lead to a great simplification of the equation. Then basing on the general analytical theory of curves, we are able to gain certain information as to the general trend of the various branches of the curve, and as to the existence of what are known as singularities—such as double points where two branches cross, points of inflection, maximum and minimum points, cusps, and so on. The systematic study of curve-tracing forms part of a mathematical training.

Curwen, John (1816–80), promulgator of the tonic sol-fa system of music (see Tonic Sol-fa System), which he advocated first in the *Independent Magazine* (1842), in Cassell's *Popular Educator* (1850), and by lectures. That it might be taught effectively, Curwen wrote his *Grammar of Vocal Music* (1843) and his *People's Service of Song* (1850). He founded the Tonic Sol-fa College at Plaistow, Essex, in 1875. During the Civil War in the U. S. Curwen strongly advocated the cause of the North, published tracts on the subject, and organized the first Freed Slaves' Aid Society in England. See *Memorials of John Curwen* (1882).

Curzola. (1.) The ancient *Corcyra Nigra* (in Slavonic, *Korcul*), seapt. and episc. see of Austria, chief tn. of the island of Curzola, on the n. coast. The houses are mostly built of marble, and there is a good (Gothic) cathedral. Here, in 1298, the Genoese took prisoners the Venetian admiral Andrea Dandolo and the traveller Marco Polo. Pop. (1900) 6,486. (2.) Island of the Adriatic, belonging to Austria, situated just s. of lat. 43° n. on the Dalmatian coast. Its surface is mountainous, the area being 100 sq. m. Grapes, olives, and almonds are grown, limestone is quarried, and fishing is carried on. Pop. (1900) 18,749.

Curzon, George Nathaniel, Lord Curzon of Kedleston (1859), English statesman, born at Kedleston. He entered the House of Commons in 1886 as member for Southport, which he won for the Conservative party. He was under-secretary for India 1891–92, and in 1895 became under-secretary for foreign affairs, and remained in this position until his translation (1898) to the vice-regal chair at Calcutta. As viceroy of India he embarked upon wide and comprehensive schemes of reform, and, that he might have a fuller opportunity of carrying them out to a successful end, his tenure of the office was in August, 1903, extended for two years. In the preceding March he presided over the brilliant durbar held at Delhi to celebrate the accession of Edward vii. as emperor of India, and received the chain of the Royal Victorian Order as a personal memento. The British mission to Tibet was the chief event of his rule during 1904. (See Tibet). In 1904 he was made Lord Warden of the Cinque Ports, but resigned in the following year. In June, 1905, Lord Kitchener denounced the system of dual control in the Indian army, and his view, though opposed by Lord Curzon, was supported by the home government. Thereupon Lord Curzon threatened resignation, but subsequently certain concessions made the step unnecessary. Again, a few weeks afterward, Lord Curzon protested against Gen. Kitchener's programme for the reorganization in a way which would divest the civil authorities of control of the military forces in India, and when the home government supported Kitchener, the viceroy resigned (Aug. 12, 1905), and was succeeded by the Earl of Minto. In 1908 he was elected a representative peer of Ireland and seated in the House of Lords. He has received the gold medal of the Royal Geog. Soc., and is an F.R.S. He has written *Russia in Central Asia* (1889); *Persia and the Persian Question* (1892); and *Problems of the Far East* (1894). See Lipsett's *Lord Curzon in India* (1903). Lady Curzon (d. 1906) was a daughter of the late L. Z. Leiter of Chicago, Ill. Died Mar. 20, 1925

Cusa, Alexander. See Alexander, John, Prince of Roumania.

Cusa, Nicolaus of, whose proper name was Chrypffs (1401-64), German theologian and cardinal, born at Cusa or Kues, on the Moselle, of humble parentage. He became in 1424 doctor of law at Padua, but took orders, and rose to be archdeacon of Liège, and in that capacity assisted at the Congress of Basel (1431). He was charged with important missions by the Pope, and created cardinal in 1448. His principal work was *De Docta Ignorantia*. In 1436 he proposed the reform of the Julian calendar; he also defined the rotation of the earth around the sun, etc., and directly influenced Giordano Bruno. His works were first published in 1476. See Scharpff's *Der Kardinal und Bischof Nikolaus von Cusa* (1871); Glossner's *N. von Cusa und Marius Nizolius als Vorläufer der neuern Philosophie* (1891).

Cusani-Confalioneri, Marquis (1862), Italian statesman; a noble of Milan. He has held several diplomatic posts in Europe and at Montevideo in S. America. He was Italian Minister to Switzerland, 1907–9; became Ambassador to the United States in 1910.

Cuscus, a marsupial of the genus Phalanger. All are about the size of a cat, have a thick coat, prehensile tail, are arboreal, and live in the East Indian Archipelago. From the Australian phalangers (genus Trichosurus) they differ in the fact that the distal half of the tail is entirely naked.

Cushat, or Cushie Doo. A Scotch name for the wood pigeon. See Ring Dove.

Cushing, Caleb (1800–79), American politician and lawyer, born in Salisbury, Mass. He graduated at Harvard in 1817, was admitted to the bar (1822), and was immediately successful as a lawyer. His historical and legal articles in the *North American Review* attracted attention, and he was several times elected to the state legislature. After visiting Europe, he published *Reminiscences of Spain* (1833) and a *Historical and Political Review of the Revolution in France* (1833). He was a prominent Whig representative in Congress (1835–43), and at the time of the split in the Whig party, following the accession of Pres. Tyler, he supported the president, and eventually joined the Democratic party. As U. S. Commissioner to China (1843–5) he concluded the first treaty of the United States with that country (1844). He advocated the Mexican war (1846–8), and led a Mass. regiment to Mexico, becoming brigadier-general, but saw no active service. He was appointed judge of the supreme court of Massachusetts (1852), was attorney-general of the United States (1853–7), presided over the Democratic national conventions at Charleston and Baltimore in 1860, and was appointed one of three commissioners to codify and revise the laws of Congress (1866). In the *Alabama* case before the Geneva tribunal of arbitration (1871) he was one of the United States counsel, and in 1873 published a work entitled *The Treaty of Washington*, essentially an attack on the British arbitrator, Sir Alexander Cockburn. In 1874–7 Cushing was U. S. minister to Spain. He also wrote *The Practical Principles of Political Economy* (1826) and *The Growth and Territorial*

Progress of the United States (1829); see *Memorial of C. Cushing* (1880).

Cushing, Frank Hamilton (1857–1900), American ethnologist, born at Northeast, Pa. After studying for a time at Cornell University he became connected with the bureau of ethnology, and in 1879 went among the Zuñi Indians of New Mexico, with whom he spent three years. Through his studies of the history, language, and folklore of the Pueblo Indians he became an authority in that field. In 1881 he discovered and excavated the ruins of the seven cities of Cibola, discovered buried cities of Southern Arizona in 1888, and in 1895 extensive remains on the coast of Florida, to which he conducted the Pepper-Hearst expedition in 1896. Among his writings are *The Myths of Creation; The Arrow; Preliminary Report of the Pepper-Hearst Expedition on the Ancient Key-Dwellers of Florida;* and numerous reports and monographs on prehistoric tribes.

Cushing, Luther Stearns (1803–56), American legal writer, was born at Lunenburg, Mass., and graduated (1826) at the Harvard Law School. With Charles Sumner and George S. Hilliard he was for some time co-editor of the Boston *American Jurist and Law Magazine*, and from 1832 to 1846 he was clerk of the Mass. house of representatives. He served four years as common pleas judge at Boston, and in 1850 was appointed reporter of the Mass. supreme court, holding office until his death. Besides his reports, he published several special treatises, an *Introduction to the Study of Roman Civil Law* (1854), and, particularly, his *Manual of Parliamentary Practice* (1845), which became the standard guide for deliberative bodies in the United States.

Cushing, Thomas (1725–88), American revolutionary leader, born in Boston, Mass. He graduated at Harvard in 1744, engaged successfully in commerce, was speaker of the lower house of the Mass. general court (1767–74), and in the years preceding the Revolutionary War was an active Whig or Patriot, belonging to the conservative rather than to the radical element. He was far, however, from having the ability and force of character of such men as Samuel and John Adams, and his importance was much overestimated in contemporary England. He was a member of the Mass. Provincial Congress (1774) and of the Continental Congress (1774–6), was commissary-general of Mass. (1775), and was lieutenant-governor (1779–88), acting as governor in 1788.

Cushing, William Barker (1842–74), American naval officer, born at Delafield, Wis. He was educated at the U. S. Naval Academy (1857–61), and served in the U. S. Navy during the Civil War. He was selected to carry out various enterprises for which a special degree of daring and alertness was required, and is remembered chiefly for his destruction, on the night of Oct. 27, 1864, of the formidable ironclad Confederate ram *Albemarle*—one of the most remarkable exploits of the war. He approached this vessel in a small launch, and, though discovered and under terrific fire, accomplished his object by discharging a torpedo under the *Albemarle's* hull, he and two others of his crew of fifteen effecting an almost miraculous escape. For this he was made a lieutenant-commander, and soon afterward further distinguished himself in the attack on Fort Fisher. In 1872 he became a commander.

Cushman, Charlotte Saunders (1816–76), American actress, was born at Boston, Mass., of Pilgrim stock. She was trained for the operatic stage, and made appearances in Boston and New Orleans, but, her voice failing, she decided to become an actress, and made her début as Lady Macbeth in New Orleans in 1835. After brief engagements in New York and Albany, Miss Cushman played leading parts at the Park Theatre, New York, from 1837 to 1840, establishing herself as a mistress of her art. In 1844 she made a successful tour of the Northern states with Macready, and later in the same year appeared in London, where she greatly impressed playgoers, including judges like Dickens and G. H. Lewes. While there she occasionally played in male parts, with her sister, Susan Webb (1822–59), as leading lady. Miss Cushman was at her best in the characters of Rosalind, Romeo, Meg Merrilies, Portia, and Lady Macbeth, with which latter character her name became associated. As she grew older, she abandoned the comedy parts and devoted herself to tragedy. She lived many years in London, performing in that city and in the provinces, and passing her winters in Rome. She visited the United States several times to fill engagements, and returned to that country finally in 1871, after which she appeared chiefly in dramatic readings. At her farewell performance in New York, in 1875, the occasion was marked by formal proceedings in which William Cullen Bryant and other distinguished persons took part. See Emma Stebbins's *Charlotte Cushman, and Memories of her Life* (1878) and Clement's *Charlotte Cushman* (1882).

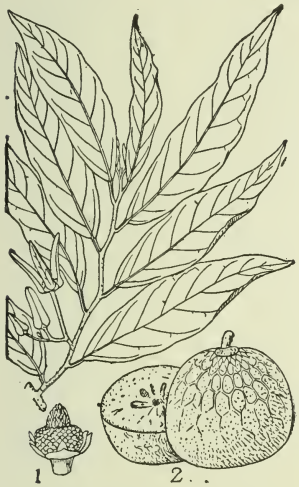
Cushman, Robert (*c.* 1580–1625), an English merchant, one of the founders of the Plymouth colony in America. He joined the Pilgrims in Holland, and with John Carver acted as the agent of the Leyden congregation in England to collect supplies for the voyage to America and arrange terms with the 'merchant adventurers' of the London company. He himself emigrated to Plymouth in the *Fortune* (1621), but subsequently returned to England as the representative of the colonists. He was, says Bradford, 'as their right hand man with their friends ye adventurers, and for diverce years had done & agitated all their bussines with them to ther great advantage.'

Cusk, an inferior sort of cod (*Brosmius brosme*) found near rocky shores and shallows in the N. Atlantic, and little used in the United States. The same name is sometimes given to the turbot of Lake Ontario.

Cusp (*cuspis*), a projecting point dividing the window head of the lancet light (Early Perpendicular) into a form resembling a trefoil leaf. When the window is decorated with two cusps, it is called cinquefoil; when pierced by a cusped circle above, it is called quatrefoil.

Cust, Robert Needham (1821–),1909 Indian official and writer, born at Cockayne-Hatley, Bedfordshire, served many years in the Indian civil service, being engaged in the settlement of the Punjab after the Mutiny and elected as member of the viceroy's legislative council and home secretary to the government of India. He has written *Linguistic and Oriental Essays* (6 series, 1880-1901, etc.); *The Modern Languages of Africa* (1883); *Clouds on the Horizon* (1890); and works on Evangelization and Missions (1894-6).

Custard Apples, or Anonas, are a genus of tropical evergreen shrubs and trees, with sweet-scented leaves and fleshy edible fruit. They are mostly natives of Central and S. America, and are occasionally grown under glass. They are not difficult to propagate by means of ripened cuttings or by seed. Among the species are the sour-sop (*A. muricata*), which grows large, conical, green, rough-skinned fruit, with white juicy pulp, possessing a tart flavor; the sweet-sop or sugar apple (*A. squamosa*), which bears yellowish oval fruit, with warty processes over its surface, and with delicious sweet yellow pulp; *A. reticulata*, the bullock's-heart or custard apple, which bears smooth, roundlish, yellow fruit, with sweet, soft pulp within; and *A. cherimolia*, the Cherimoya or Jamaica Apple, whose fruit is large and somewhat apple-like in appearance. *Asimina triloba*, the papaw tree of the warmer parts of North America, and *A. palustris*, the Dog or Alligator Apple of the West Indies, may also be mentioned.



Custard Apple (*Anona reticulata*).
1, Flower, three outer petals removed; 2, fruit and section.

Custer, George Armstrong (1839–76), American soldier, was born at New Rumley, O., and was graduated from West Point (1861). He entered the army as a second lieutenant in the Fifth U. S. Cavalry, and fought in the first Battle of Bull Run. His energy and gallantry in action brought him quick promotion in the Army of the Potomac, in all of whose battles, save one, he participated. He was repeatedly brevetted in both the regular and volunteer services, being promoted brevet major of volunteers after the Battle of Gettysburg, in which he commanded a brigade of Michigan cavalry, and brevet colonel (regular) and major-general (volunteers) after the second Battle of Winchester. He fought gallantly at Cedar Creek; and as a member of Sheridan's corps, was present at Waynesboro, Dinwiddie, Five Forks, and other battles. He was later promoted brevet major-general in the regular army (March 13, 1865) for gallant and meritorious services.

After the war Custer served in the West, principally engaged in suppressing uprisings of the Indians. He took part in General Hancock's expedition against the Cheyenne Indians (1868), and against the Sioux in Dakota (1873). In 1876 he and his regiment took part in the campaign begun by Sheridan against Sitting Bull (q. v.), then in the Yellowstone region with about 6,000 Indians. The plan involved the concentration of three expeditions under Generals Crook, Terry, and Gibbon, Custer's command forming part of Terry's force. Terry and Gibbon having joined forces, and the Indians having been located on the Little Big Horn River, Custer was sent in advance with his command to prevent their escape to the eastward. By hard riding Custer arrived a day before the designated time, and seeing but one Indian village, divided his forces, and charged at the head of 277 men, only to be surrounded by Sitting Bull's entire force and shot down with his company to the last man; while his other detachments maintained a stand with difficulty until Terry's arrival. Custer was found in the centre of his troops, the Indians having refrained from mutilating his body out of respect for his bravery.

General Custer was the *beau idéal* of a soldier, tall and handsome in figure and appearance, dashing in battle, and tender in his dealings with those weaker than himself. He published a volume of reminiscences, *My Life on the Plains* (1874). Consult Mrs. Custer's *Boots and Saddles; or, Life with General Custer in Dakota;* Whittaker's *Life of Gen. George A. Custer;* C. T. Brady's *Custer of the Cavalry* (1914).

Custine, ko͞o'stēn', Adam Phillipe, Count de (1740–93), French general, was born in Metz. He entered the army at an early age, became a colonel, and was present at the surrender of Yorktown, Va., in 1781. In 1789 he was elected to the States-General, and in 1792 led the French Army of the Lower Rhine against Spires, Worms, and Mainz. In 1793 his failure to relieve Mainz resulted in its recapture by the Allies, whereupon he was denounced by the Jacobins as a counter-revolutionist, arrested, and taken to Paris, where he was condemned and executed.

Custis, George Washington Parke (1781–1857), American writer, was born at Mount Airy, Md. He was the adopted son of George Washington, and the grandson of Mrs. Washington by her first marriage. He published several plays, now forgotten, and is remembered chiefly for his *Recollections and Private Memoirs of Washington* (published with a memoir of the author by his daughter, 1860), in which many traditional but unverifiable stories are told concerning Washington.

Custom, in the widest legal sense, may be said to include all rules of law not directly derived from acts of the legislature. In a narrower sense, custom denotes a popular usage which under certain conditions may be a source of law. When an American or English court decides in accordance with a usage, what it does is to hold that the usage is actually law, the requisite conditions having been fulfilled. The question whether these conditions have actually been fulfilled comes then to be merely one of fact.

The conditions generally required by the English and American courts in order that a custom may have legal force are: (1) it must be long standing; (2) uninterrupted, that is to say, not merely upheld at one time while repudiated at another; (3) regarded not as optional, but as binding; (4) reasonable; and (5) not contrary to any recognized rule of law. See Common Law.

Custom House, an office established by the government in a port of entry for the collection of customs duties and the clearance of vessels. In the United States custom houses are under the jurisdiction of the Secretary of the Treasury, each custom house being in charge of a *collector of customs*, appointed by the President with the approval of the Senate, and charged with the enforcement of the customs regulations. Every incoming vessel is subject to the authority of the collector, all imported merchandise must be entered in his office, and all duties are levied by him.

Regulations for the custom house examination of baggage are most minute. Every person entering the United States is required to make a declaration and entry of his personal baggage. Returning residents of the United States must declare all articles acquired abroad, whether by purchase or otherwise, and whether dutiable or free of duty; but exemption is allowed by customs officers of articles aggregating not over $100 in value, if suitable for personal or household use or as souvenirs or curios, provided the articles are not bought on commission for another person nor intended for sale. All wearing apparel and personal and household effects taken out of the United States by residents are also admitted free of duty, without regard to their value, upon establishment of their identity. If, however, they have been remodelled, repaired, or improved abroad, the cost of such remodelling, repairing, or improvement is subject to duty.

Non-residents of the United States must declare all articles in their baggage or on their persons which do not constitute wearing apparel, articles of personal adornment, toilet articles, or similar personal effects, whether intended for their personal use or for others, and all articles of wearing apparel and other personal effects when not owned by them, or when intended for other persons or for sale. Household effects imported as baggage must be declared; but if shown to the satisfaction of the customs officers to have been actually owned and used abroad not less than one year, and not intended for any other person nor for sale, such effects will be admitted free of duty. Each passenger over eighteen years of age may also bring in free of duty 50 cigars, 300 cigarettes, or smoking tabacco not exceeding three pounds, if for the *bona fide* use of such passenger, but these too must be declared.

After the baggage has been landed the declaration is verified by examination, dutiable articles are passed to the appraiser, or the officer acting as such, for valuation, and the rate of duty is determined accordingly. Passengers dissatisfied with values placed upon dutiable articles by the customs officers on the pier may demand a re-examination, application for which should be made to the officers in charge immediately. Appeal from the decision of the local appraiser may be made to the Board of General Appraisers, which is a last resort on questions of value, but from which appeal may be taken on questions of procedure or classification to the Court of Customs Appeals (see CUSTOMS APPEALS, U. S. COURT OF).

Customs Appeals, U. S. Court of, a court created by the Payne-Aldrich Tariff Act of 1909 to 'exercise exclusive appellate jurisdiction to review by appeal the final decisions by a board of general appraisers in all cases as to the construction of the law and the facts respecting the classification of merchandise and the rate of duty imposed thereupon under such classifications, and the fees and charges connected therewith, and all appealable questions as to the jurisdiction of said board, and all appealable questions as to the laws and regulations governing the collection of the customs revenues.'

The Court consists of a presiding judge and four associate judges appointed by the President, with the advice and consent of the Senate. Its decrees are final except in questions involving the construction of the U. S. Constitution or treaties made pursuant thereto, and in any other cases when the Attorney-General, before decision is rendered, shall file with the court a certificate to the effect that the case is of such importance as to render expedient its review by the Supreme Court.

Customs Duties. The term 'customs' was anciently used in a wide sense for customary payments or dues of many kinds, whether regal, episcopal, or ecclesiastical, until in process of time it was restricted to the duties payable, either upon the exportation or importation, or carriage coastwise, of certain articles of commerce. For the history of such duties, see TARIFF.

Customs Union, often called by its German name of *Zollverein,* is a commercial league entered into by different states, by which reciprocal free trade and a uniform tariff on articles imported from outside are agreed upon. The most conspicuous example of a league of this kind was that formed between the different German states in 1834, which continued till the political union of 1871. Similar schemes have been proposed for America, Central Europe, and, of late years, the British Empire. Customs unions usually accompany the formation of federations, as, for example, in the case of the Commonwealth of Australia and of the South African Union. See TARIFF.

Custos Rotulorum, kus'tos rot-ū-lō'rum, in England, is an officer appointed by the crown in each county, nominally for the purpose of *keeping the rolls* or records of the sessions held by the justices of the peace. Either the lord-lieutenant, as is usually the case, or some other county magnate holds this office, which is purely honorary, the clerk of the peace having the actual custody of these records.

Custozza, ko͞o-stōd'zȧ, village, Italy, 11 miles southwest of Verona, where in 1848, and again in 1866, the Austrians defeated the Italians.

Cutaneous Sensations are sensations aroused by adequate stimulus of the skin, without accompanying stimulation of the joints, tendons, muscles, or other sense organs. Their physiological basis is apparently to be found in the different sets of nerve endings irregularly distributed over the area of the skin, giving rise to especially sensitive spots designated as pressure spots, heat spots, etc.

Various sensations have been classified under this heading, including hardness, roughness, weight, heat, cold, pain, pressure, tickling, pricking, and tingling. Of these only four—pressure, cold, heat, and pain—are strictly cutaneous. Pressure spots are abundant over all the hairy surfaces of the body, one occurring over each hair follicle. They are also found distributed in lines and groups over the hairless areas, especially the tips of the fingers and palms of the hands (see TOUCH). Cold and heat spots are less numerous. They give rise to sensations of varying intensity, but cold spots are unaffected by heat, and heat spots by cold. Pain spots are the most closely distributed of all, and the sensations arising from their stimulation are the most delicate.

Cüstrin. See KÜSTRIN.

Cut-and-Cover, a method sometimes employed in constructing subways, where it is not possible to have open cuttings. It consists in first digging a trench to the requisite depth. The sides of the trench are then walled up, and a roof constructed. Earth is next filled in over and behind the arch thus formed, and the surface of the ground restored. See TUNNELS.

Cutch. See CATECHU.

Cutch, kuch, or KACHH, feudatory state in Gujarat, Bombay, India. Except along the south coast line, the territory is treeless, barren, and rocky. Numerous streams are formed during the rainy season, but the porous nature of the soil makes the storage of water difficult. The mineral products are coal, iron, and alum. Area, 6,500 square miles. Pop. (1911) 513,529.

Cutch, *Runn* or *Rann of,* is an arm of the sea during the southwest monsoon, which contracts into a shallow lake during the dry season. The Great Rann, on the north of the peninsula of Cutch, has an area of about 7,000 square miles, and the Eastern Rann an area of 2,000 square miles.

Cuthbert, town, Georgia, county seat of Randolph county, on the Central of Georgia and the Georgia, Florida, and Alabama Railroads; 110 miles southwest of Macon. It is the seat of Andrew Female College and the Southwest Georgia Agricultural College. Industries include cotton products, ice, and fertilizers. Pop. (1900) 2,641; (1910) 3,210.

Cuthbert, ST. (?635–687), English saint, born, as is now generally believed, in Northumbria. Joining the confraternity of Old Melrose (651), he became prior under the first abbot St. Eata, followed him when he was transferred to Ripon, and subsequently to Lindisfarne. Desiring a severer life, St. Cuthbert became an anchorite, and left Lindisfarne (676) for a lonely hut on one of the Farne Islands. In 684, at the request of Ecgfrid, king of Northumbria, he unwillingly left his cell, and became bishop of Hexham—a post subsequently exchanged for that of Lindisfarne; but again he returned to his hermitage (686), where a year later he died. Cuthbert was one of the strictest of ascetics. He fulfilled the popular ideal of piety, and became one of the greatest saints of North England. For centuries his shrine at Durham—where his remains found their last resting-place in 1104—became a great centre of pilgrimage. In 1826 his grave was opened. See Bede's *Life of St. Cuthbert* (trans. Stevenson, 1887), and his *Eccles. Hist.*, bk. iv., ch. 26–32; J. Raine's *St. Cuthbert* (1828); C. Eyre's *Hist. of St. Cuthbert* (1849); A. C. Fryer's *Cuthbert of Lindisfarne* (1880).

Cutlas, CUTLASS, or COURTELAS. The English form *curtal-axe,* exemplified in *As You Like It,* **I. 3,** originated in a misapprehension of *courtelas,* a cutting weapon used by sailors; has a flat, wide, slightly-curved blade, and is better adapted for cutting than for thrusting. It was at one time employed by sailors on vessels of war as a weapon in the hand-to-hand fighting of boarding.

Cutler, MANASSEH (1742–1823), American clergyman and legislator, born at Killingly, Conn. He graduated at Yale in 1765, engaged in the whaling business at Edgartown, Mass., was admitted to the Mass. bar, and after 1771 was pastor of a Congregational Church at what is now Hamilton, Mass. During a part of the Revolutionary War he was chaplain of a Mass. regiment, and subsequently, as a member of the second Ohio company, took a conspicuous part in bringing about the organization and settlement of the Northwest Territory (q.v.); negotiating, on behalf of the company, the purchase of an immense tract of land from Congress, taking part in the drafting of the famous Ordinance of 1787—some writers credit him with being the principal author of that document—and being one of the founders of Marietta, O., in 1788. Returning to Mass., he was a member of the lower house of the General Court, and, as a Federalist, of the national House of Representatives (1801–5). He was a man of unusual versatility—among other things he was a practising physician—and was in particular a scientist of considerable attainments. Consult W. P. and J. P. Cutler, *Life, Journals and Correspondence of Manasseh Cutler* (2 vols., 1888); and Poole, *The Ordinance of* 1787 *and Dr. Manasseh Cutler as an Agent in its Formation* (1876).

Cutlery, originally cutting implements of every shape and description. In modern use the term has been both widened (*e.g.* to include forks) and restricted (*e.g.* by the exclusion of many kinds of edged tools, such as saws, chisels, etc.) in its application. Thus we have domestic cutlery—knives and forks, pocket-knives, razors, scissors, etc.—and tool cutlery, covering surgical instruments, special knives (*e.g.* pruning-hooks, sickles, etc.), but excluding carpenters' tools, etc. Sword cutlery, formerly the highest branch of the art in popular estimation, has always been kept distinct. The centre of the trade in Great Britain has always been Sheffield, which, as early as the 14th century, was famous for its cutlery, as shown by allusions in Chaucer. In the U. S. the manufacture of cutlery is carried on largely in New England and the Eastern states, and high grades of articles have been developed which rival those imported. For processes of manufacture see KNIVES AND FORKS, RAZORS, SCISSORS, SURGICAL INSTRUMENTS, SWORDS.

Cutlips, a fish, one of the suckers (*Lagochila lacera*) of the lower Mississippi Valley, of little use, whose mouth has a divided lower lip, so that the fish is also called ‘hare-lip,’ ‘rabbit-mouth,’ and May sucker.

Cuttack, cap. of a district in Orissa, Bengal, India, situated at the apex of the delta of the Mahanadi. Its position as the entrance to the hill territory to the west, and as the centre of the Orissa canal system, gives it military and commercial importance. It is noted for its filigree work in gold and silver. Pop. (1901) 51,364.

Cutter, a small vessel with a single mast, a mainsail, a fore-staysail, and a jib set to bowsprit end. The name is generally given in the U. S. to sloop yachts of deep draught and comparatively small beam, though the term ‘revenue cutter’ is applied to the vessels of the U. S. Revenue Cutter Service, a number of which are steam vessels of substantial size. See REVENUE CUTTER SERVICE, and YACHT.

Cutter, GEORGE WASHINGTON (1801–65), American poet, was born in Massachusetts, and practised law in Kentucky until the opening of the Mexican War, in which he served as captain of a company raised by himself. He afterward became known as a political orator, and was given a clerkship in the Treasury Department at Washington, where he died. ‘The Song of Steam’ and ‘E Pluribus Unum’ are the best known of his poems, which were published as *Buena Vista, and Other Poems* (1848), *The Song of Steam, and Other Poems* (1857), and *Poems, National and Patriotic* (1857).

Cutting, ROBERT FULTON (1852-), American politician, born in New York, and graduated from Columbia College in 1878. He is a director in various business corporations, and has taken active part in the politics and sociological work of New York city, as president of the Citizens' Union, the Association for Improving the Condition of the Poor, and the New York Trade Schools. DIED SEPT. 21, 1934

Cuttings of a plant are parts which are separated from the parent by means of the knife, and are capable, when placed under suitable conditions, of developing into individuals resembling the parent plant. These conditions usually include a moist atmosphere and a porous soil, and in most cases bottom heat. Stem cuttings are composed either of hard ripe wood or of soft green wood. The latter are sometimes known as slips. Geraniums, carnations, and coleuses are among the plants usually propagated by means of soft wood cuttings. They should be most carefully selected, and should be neither too soft nor too old. Mr. Bailey suggests a very good test of the suitability of a green shoot for the purpose of propagation by cuttings. If upon being bent the shoot snaps off squarely so as to hang together with only a bit of bark, it is in proper condition; but if it bends or simply crushes, it is either too old or too young for good results. The cuttings are usually cut below a bud, though in some plants this is not necessary. They are planted in moist sand, and placed in a propagating frame, or elsewhere if the atmosphere can be kept from becoming dry. In propagating brush fruits and most trees, hardwood cuttings are usually chosen. These are best taken in early autumn and with a length of about six inches. They are best stored in the sand for the winter, and planted in the spring. Cuttings may also be obtained from the thick leaves of several plants—for instance, gloxinias and begonias. By pegging down the leaf of a rex begonia on moist sand in a propagating frame by means of little wooden pegs, many plants will be found to arise from the various injured points. Gloxinias may be propagated by planting the leaf-stalk in sand, the blade of the leaf being left erect above the soil. Many underground stems, tubers, and roots may be divided, and the parts used as cuttings for propagating purposes. Bouvardias, horse-radish, dahlias, and dracænas are among the plants that are easily increased in this way. To secure the greatest amount of success with cuttings, a well-drained sandy soil is essential, and bottom heat is usually desirable.

Cuttles, or CUTTLE-FISH, a term sometimes used as synonymous with Cephalopoda, and sometimes restricted to certain of the forms with two gills and ten arms, as, for example, *Sepia* *officinalis*, the common cuttle or squid. Cuttles undoubtedly grow to a great size, and their strong parrot-like jaws and toothed suckers form weapons not to be despised; but such terrible forms as the 'kraken' of Victor Hugo's tales are mythical. Cuttles are greatly relished as food by many fishes, and by many of the toothed whales—*e.g.* the cachalot—and their power of rapid swimming is a means of defence against such foes. All are largely ground-feeders. Many swim slowly forwards by means of the fins borne by the body, or by rowing movements of the arms; but the power of swift, sympathetic color-change and the lurking habits suggest that most rely upon stalking their prey, rather than on overtaking it by swift movements. Cuttles are widely distributed in the oceans of the world, especially in deep water. The largest occur in the shallow waters about Newfoundland. In many instances the flesh is eaten, the ink of the ink-bag is used to some extent to furnish the pigment sepia, the 'cuttle-bone' is used as a polishing material, and finally cuttles are often used as bait. Zoologically they are of much interest as being highly specialized animals, and because their past history, owing to the abundance of fossil forms, has been worked out in much detail. See A. H. Cooke's *Molluska* (1895).

Cuttyhunk, the most S.W. of the Elizabeth Islands, off Buzzard's Bay, Mass. The lighthouse on the S.W. point is in lat. 41° 24′ 52″ N. and long. 70° 57′ W. It was the site of a temporary settlement in 1602, the earliest in New England.

Cutworm, the name of various caterpillars, mostly of noctuid moths, which hibernate under ground, and in the spring eat the stems of grain plants and vegetables. Where numerous they are very destructive in gardens, cutting down more than they devour. Careful cultivation reduces the harm done.

Cuvier, GEORGES LÉOPOLD CHRÉTIEN FRÉDÉRIC DAGOBERT (1769-1832), French anatomist, who not only did much himself to advance zoology, but also founded a school which had a salient influence on the subsequent development of the science. Born at Montbéliard, at eighteen he became a tutor in a family near Caen, and there became interested in the living animals of the shore, and in the fossils in the rocks. He also became acquainted with Geoffroy St.-Hilaire, who, though a little younger than Cuvier, was already professor of vertebrate zoology at the Museum of Natural History in Paris. He invited Cuvier to Paris, where the latter became first assistant, and later professor in the Jardin des Plantes. Thenceforth, in spite of national unrest, Cuvier devoted himself whole-heartedly to work. Our admiration for his tireless industry is increased when we learn that he also did much for the improvement and extension of national education in France, and interested himself in the welfare of the French Protestant Church. Cuvier was first and foremost a great anatomist, dissecting an enormous number of animals, many for the first time. His great book on the animal kingdom, *Le Règne Animal* (first published in 1816), summarized his observations, and for a long period was the standard book on zoology. Again, on his study of anatomy he based a classification of animals which, although too simple—it contained but four great divisions—yet marked a great advance. Further, he emphasized, perhaps over-emphasized, the correlation of parts in the animal organism—*i.e.* he insisted much on the unity of the organism. Finally, he founded the modern science of palæontology, studying especially the Tertiary mammals of the Paris basin. Briefly stated, these were some of Cuvier's most important contributions to zoological science. On the negative side we must put the fact that, as was to be expected from the purely analytic character of his mind, he was the bitter opponent of all forms of speculation, and especially of the dawning evolutionism of his contemporaries, as was manifested in his controversies with Lamarck, with his old friend Geoffroy St.-Hilaire, and with others. He was ennobled by Louis Philippe, becoming Baron Cuvier. He died suddenly in Paris of paralysis in 1832. He published *Rapport Historique sur les Sciences Naturelles* (1810), *Mémoire pour servir à l'Histoire et à l'Anatomie des Mollusques* (1816), *Recherches sur les Ossements Fossiles des Quadrupèdes* (1812), *Histoire Naturelle des Animaux* (1798-9), etc. See Haeckel's *Natürliche Schöpfungs Geschichte* (1868; Eng. trans. 1892); Lee's *Memoirs of Baron Cuvier* (1833); Carus's *Geschichte der Zoologie* (1864); J. A. Thomson's *Science of Life* (1899).

Cuxhaven, tn. in the territory of Hamburg, Germany, at the S. side of the mouth of the Elbe, 71 m. by rail N.W. of Hamburg, with a port, built in 1892-5, capable of berthing the largest ocean steamers, the depth alongside the quay being 26½ ft. at low water. The Hamburg-American line transferred a great part of their staff from Hamburg to Cuxhaven in 1901. Pop. (1900) 6,898.

Cuyaba, cap. of Matto Grosso, Brazil, about 2 m. from the Cuyaba R., whither steamers ascend by the Paraguay from Argentina. The palaces of the governor and bishop, the hospital, churches and arsenal are the chief buildings. Alt. 660 ft. Pop. 18,000.

Cuyahoga Falls, vil., Summit co., O., 29 m. S.S.E. of Cleveland, on the Cuyahoga R., and on the B. and O. and the Cle., Akron and Col. R.Rs. The manufactures include machinery, forgings and castings, rivets, sewer pipes, wire, wire nails, paper, and paper bags. Pop. (1910) 4,020.

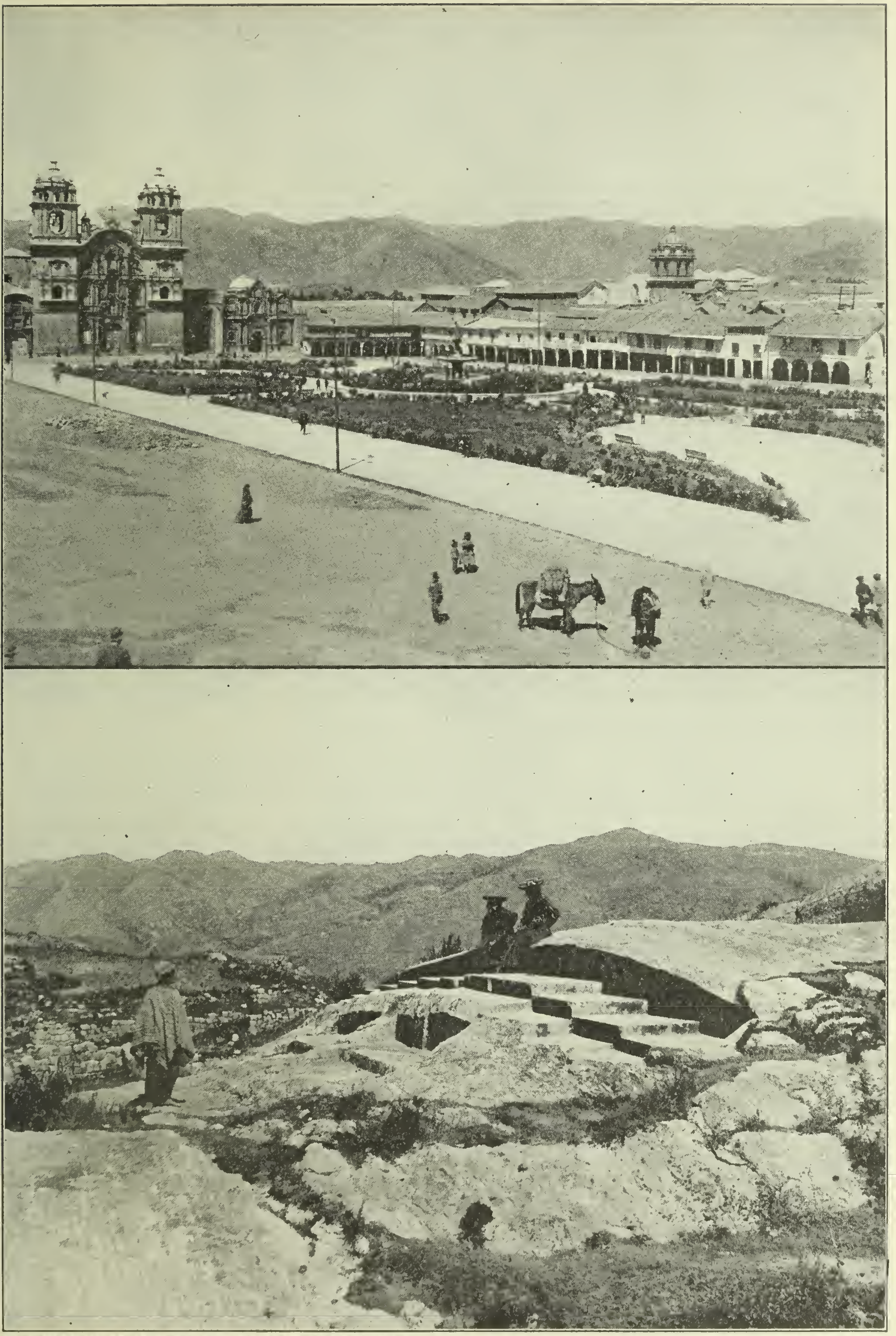
Cuyapo, pueb., Nueva Seija prov., Luzon, Philippines, is 33 m. N.W. of San Isidro, and near the line of the Manila-Dagupan R.R. Pop. (1903) 16,292.

Cuyler, THEODORE LEDYARD (1822-1909), American Presbyterian clergyman, born at Aurora, N. Y. He studied at Princeton, and was ordained in 1848. He held charges in New Jersey and New York, and in 1860 became pastor of the Lafayette Avenue Presbyterian Church of Brooklyn, N. Y., resigning in 1890 to become a minister at large. He was a prolific writer of religious works and of articles in religious papers, and was active in philanthropic, civic, and temperance movements.

Cuyo. (1.) Pueb., Philippines, cap. of Paragua prov., 257 m. S. of Manila, on S.W. shore of Cuyo I. It is well built, has a fort and a good anchorage, and is a port of call for Manila steamers. Pop. (1903) 12,773. (2.) Isl., Philippines, largest of its group. It is 8 m. long and 5 m. wide, fertile and has two volcanic cones 830 ft. and 608 ft. high.

Cuyos, The, isl. group, Paragua prov., Philippines, in N. part of the Sulu Sea, about equidistant from Mindoro, Paragua and Panay, and centrally situated in the archipelago. There are 47 isls., aggregating 63 sq. m., of volcanic and coral origin. There are no forests on account of the exposed position of the islands, and Cuyo is the only one that is fertile. The chief occupation is the gathering of turtles, pearls, trepang and edible birds' nests, though small quantities of wine, cloth, bamboo, cocoanut oil, wax and chocolate are exported.

Cuyp, ALBERT (1620-91), Dutch painter, born at Dordrecht, and learned painting from his father, Jakob Gerritsz Cuyp (1575-1649), a painter of realistic but unimaginative pastoral scenes and of good portraits. Albert has been called 'the Dutch Claude,' because he



Copyright by E. M. Newman, from Publishers Photo Service

CUZCO, PERU

The upper photograph shows the main plaza of the city, with the University at the left. The lower shows the ancient Inca throne carved out of the solid mountainside, facing the rising sun and overlooking the great Inca fortress that protected Cuzco from attack.

was the first among the Dutchmen to set the sun in the sky. He is celebrated for his pastoral scenes, executed with striking simplicity. His most frequent effect is of the sun rising through vapor, and according to Ruskin, 'for expression of effects of yellow sunlight, parts might be chosen out of the good pictures of Cuyp which have never been equalled in art.' England first recognized his genius, and possesses most of his works. Examples may be seen in the National Gallery, Wallace Collection (London), Dulwich, Dublin, and Bedford College, London. He is represented also in collections in Paris, Berlin, and Rotterdam, and the Metropolitan Museum, New York City. Consult Timothy Cole's *Old Dutch and Flemish Masters*.

Cuyuni River, British Guiana, a branch of the Essequibo (q. v.).

Cuzco, ko͞os'kō, city and episcopal see, Peru, capital of the department of Cuzco, is situated on a plain over 11,000 feet above sea level; 360 miles southeast of Lima. It is built on the ruins of the ancient Inca city of Cuzco founded in the eleventh century and practically destroyed by Pizarro in 1536. The Friary of Santo Domingo occupies the site of the magnificent Temple of the Sun, and the handsome cathedral that of an ancient covered hall. Cuzco has a university and a meteorological station. Maize, barley, coffee, cocoa, coca, and sugar cane are grown and quantities of coca leaves are exported. The population, which is mostly Indian, numbers about 30,000. (See illustration on page 511.)

Cuzco, department in the southeastern part of Peru, with an area of 156,270 square miles. It is bounded on the north by Loreto and Brazil, on the east by Puno and Madre de Dios, on the south by Arequipa and on the west by Junin, Ayachucho and Apurimac. It is watered by the Apurimac, Urubamba, Paucartambo and Purus Rivers. Agriculture is the leading industry, coffee, sugar, cocoa, and coca being the chief products. Copper, coal, gold, and iron occur, and there is a home industry in weaving and knitting. Pop. about 450,000.

Cyanamid, a commercial nitrogenous fertilizer of which the principal ingredient is calcium cyanide (see CALCIUM). It contains 60 per cent of lime (calcium), and, like nitrate of calcium, is specially adapted to soils deficient in that element. Its action is less rapid than that of nitrate of sodium (Chile saltpeter), but is continuous and lasts longer. It dissolves more slowly when wet, and good results are obtained even with heavy rains. Satisfactory results have been obtained by mixing cyanamid containing from 18 to 20 per cent of nitrogen with other fertilizers, such as phosphates and potash, but it should not be mixed with superphosphates.

Cyane, sī'ȧ-nē, in Greek legend, a Sicilian nymph, the playmate of Persephone. She wept herself into a fountain from grief when her playmate was carried away by Pluto.

Cyaneæ Rupes, sī-ā'ni-ē-ro͞o'-pēz, the Cyanean rocks, were two rocky islets which stood, according to Greek legend, in the Black Sea, not far from the mouth of the Bosporus. They are also called Planetæ, the 'wandering' or 'striking' islands, and the Symplegades, 'those which dash together.' The Argonauts (q. v.) passed them safely in their quest of the golden fleece.

Cyan'ic Acid, NCOH, is a strongly acid liquid (sp. gr. 1.14 at 0° c.) that polymerizes to solid products if allowed to rise above 0° c., and which gives rise to two isomeric classes of derivatives. Its ammonium salt gives urea when heated, the first so-called 'organic' compound being prepared in this way from inorganic sources by Wöhler in 1828.

Cyanide of Potassium. See POTASSIUM.

Cyanide Process. See GOLD.

Cyanides. See HYDROCYANIC ACID.

Cyanite, sī'*a*-nīt, KYANITE, DIASTHENE, or SAPPARE, a sky-blue mineral, forming elongated, flat, blade-like crystals, with a perfect cleavage. It is a silicate of alumina, like andalusite, chiastolite, and sillimanite (qq. v.), and is usually found in such rocks as gneiss or mica schist. If abundant, it may give name to the rock, as cyanite schist. Good specimens are found in Switzerland (the St. Gotthard region) and in the United States (Chesterfield, Mass., and Bakersfield, N. C.). It is sometimes cut as a gem, but is in general too soft for this purpose.

Cyanogen, sī-an'ō-jen, $(CN)_2$, a gas prepared by heating mercuric cyanide. It is colorless, soluble in water, and has an odor similar to that of bitter almonds. It liquefies at about –20° c., and freezes at –34.4° c. It burns in air with a purple flame, and is very poisonous. Cyanogen is chiefly important from occurring as an acid radical in a series of salts known as the cyanides, in which it plays a part not unlike a halogen. Hydrogen cyanide, or prussic acid, is employed in medicine, and, like most of the cyanides, is a deadly poison. (See HYDROCYANIC ACID). Potassium cyanide (q. v.), or more commonly sodium cyanide, is very largely used in dissolving out the minute particles of gold from its ores (see GOLD). Cyanogen is also notable in forming complex acid radicals with iron and other metals, such as the ferrocyanides and ferricyanides.

Cyanometer, si-*a*-nom'*e*-ter, an instrument invented by Saussure for comparing the various shades of the sky. It consists of a circle of paper divided into sections tinted with blue and numbered from 0° to 52°, varying from the color of solid indigo gradually through the whole series to colorless at zero. The card is held in such a way that a full light falls on the pattern, and it is then turned until the tint of some number is decided on as the nearest to that of the sky.

Cy'anophy'ceæ, one of the four great groups of Algæ, known also as the BLUE or BLUE-GREEN ALGÆ. *Anabæna* is a familiar example. See ALGÆ.

Cycas revoluta (with old and new crown)

Cyanosis, sī-*a*-nō'sis, or CYANOPATHY, a blueness of the surface of the body, particularly of certain parts, due to a deoxidized condition of the blood. Temporary partial cyanosis occurs in cases of extreme cold, when the superficial arterioles become constricted, and so prevent free circulation in the extremities and exposed parts. Cyanosis as a pathological condition is due to some organic defect, often congenital, which prevents or retards the complete oxidation of the blood. In some cases the foramen ovale remains open, so that a portion of the blood reaches the left auricle of the heart, and is driven on through the arteries without entering the lungs to be re-oxygenated. The same result may arise from a perforation which allows blood to pass directly from the right to the left ventricle. The congenital malformation of the heart that is usually associated with cyanosis is often accompanied also by a clubbing or broadening of the extremities of the fingers and toes. General nutrition is, of course, affected by the circulation of the impure blood. Congenital cyanosis tends to shorten the lives of those who suffer from it; inflammatory diseases, such as pneumonia, are particularly fatal in such individuals. Cyanosis may occur also from circulatory failure in acquired heart disease and as a result of obstruction in the pulmonary artery or in the lungs themselves. It is a common symptom in severe cases of pneumonia, in which it is due chiefly to changes in the blood itself.

Cy'anu'ric Acid, a chemical compound, $C_3H_3N_3O_3$, formed by heating urea until it ceases to give off ammonia. The residue is then dissolved in boiling water and the filtrate left to crystallize on cooling. The crystals are purified by dissolving in hot H_2SO_4 and dropping in HNO_3 until the solution is colorless and ceases to effervesce. There are also other methods of preparing the acid, such as the use of chlorine gas, cyanuric chloride, or cyanuric bromide. It is a colorless crystalline substance slightly soluble in water and when heated yields ordinary cyanic acid.

Cyathea. See TREE FERNS.

Cyaxares, sī-ak'sa-rēz, king of Media (reigned 634–594 B.C.), was probably the founder of the Median empire. He was the son of Phraortes, and warred against the Assyrians, Scythians, and Lydians.

Cybele, sib'e-lē, a goddess whose worship was widespread in Asia Minor. She was regarded as the mother of the gods, as the bringer of civilization, and as the protectress of cities, and was represented as adorned with a turreted crown like a city wall. Her worship was noisy and clamorous, her chariot being drawn by lions and attended by the Corybantes dressed in full armor and playing on horns and cymbals. The Greeks identified her with Rhea (q. v.), the earth goddess.

Cyc'ada'ceæ, a natural order of small palm-like trees or shrubs found in the tropical and temperate regions of America and Asia and in Southern Africa and in Australia, occupying a place between the flowering plants and cryptogams. There are nine genera and nearly 100 species. In the Cycadaceæ the stem, which is externally covered with leaf-scars, may be so short that the crown of leaves rises little above the surface of the ground; more frequently, however, it reaches a height of a few feet, then resembling a tree-fern; and in exceptional cases (*e.g. Cycas media* of Australia) may attain a height of 50 or 60 feet. The stems are unbranched, and the leaves are pinnate, usually closely rolled up when in bud. The female flowers are merely inconspicuous ovules; the male flowers are arranged in cones.

Cyclamen

Four of the nine genera are found only in the Western Hemisphere, namely *Zamia* (q. v.), a West Indian genus which furnishes a kind of arrowroot; *Dioon* and *Ceratozamia*, occurring in Mexico and Central America; and *Microcycas* in Cuba. The Eastern genera include *Cycas* (q. v.); *Macrozamia* and *Bowenia* belonging to Australia; *Encephalartos* (q. v.), to which belongs the South African bread tree (see KAFFIR BREAD); and Stangeria, also South African.

Cycas, si'kas, a genus of palmlike evergreen trees belonging to the order Cycadaceæ, and grown in greenhouses and window gardens. They have cylindrical, usually unbranched stems, terminating in a crown of handsome deeply cut pinnate leaves. The best known species is *C. revoluta*, the sago palm of China and Japan, which usually grows about six feet high, and has long and recurved leaves, with stiff, dark green, shining pinnæ. Other species are *C. circinalis*, from the Moluccas, which has longer leaves and a taller stem than *C. revoluta;* and *C. media*, an Australian tree, which grows as high as 50 feet, with leaves 4 feet in length. Cycas are cultivated similarly to all palm tree varieties, requiring plenty of room, heat, and moisture. They like a rich, light, well-drained soil, and are easily propagated either by seeds or by suckers.

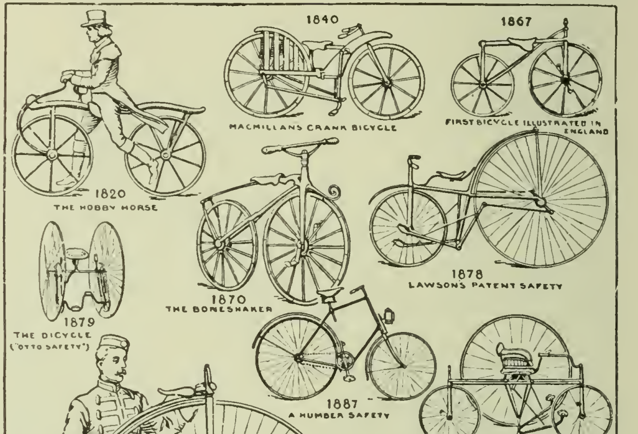
Cyclades, sik'la-dēz, a number of islands of the Grecian Archipelago (q. v.), extending in a semi-circle from the extremities of Attica and Eubœa towards the coast of Asia Minor. There are about 20 large and 200 small islands, the chief being Syra Andros, Tenos, Naxos, Kea, Melos, Delos, Serpho, and Thera. The total area of the group is about 1040 square miles. They are generally mountainous, poorly watered, and with the exception of Naxos, rather unproductive. Marble, limestone, sulphur, and manganese occur abundantly. Wine, fruit, and tobacco are the chief exports. Hermopolis is the capital. Pop. (1920) 122,347.

Cyclamen, sik'la-men, a genus of perennial herbaceous plants, belonging to the order Primulaceæ. They are dwarf-growing plants, with flat, turnip-like tubers, broad radical leaves, and flowers distinguished by their five recurved petals. European cyclamens, which are not hardy in the Eastern United States, are *C. europæum*, which bears bright red, fragrant flowers and cordate leaves in autumn, and *C. neapolitanum*, with pink flowers in late summer, followed by thin, cordate leaves in autumn. The greenhouse cyclamens are *C. latifolium*, also known as *C. persicum*, with white and purple flowers and co-existent leaves in spring. From this species many beautiful varieties have been derived, which come fairly true from seed. Seeds are sown in light, carefully prepared soil in autumn, the seeds being but lightly covered with earth. A little warmth is necessary, and the young plants should be moved from small pots to large ones as they grow. The corm should be about half buried in the soil. Good drainage, plenty of air, a little but not too much warmth, and an abundance of water are the other chief factors in successful culture. The old name of sow-bread is given to the cyclamens because of the fondness of swine for the acrid corms. (See illustration on page 513).

Cyclas, sī'klas, a genus of minute bivalve molluscs, the members of which are common in rivers. There is a special brood-chamber at the base of the gills, in which the young are reared.

Cycle (Gr. 'circle'), in chronology, a certain period of series of numbers, which regularly proceed from the first to the last, and then return again to the first, and so circulate perpetually. The solar cycle is a period of twenty-eight years, in which the same days of the week recur, and the Sunday or dominical letter recurs in the same order. The lunar cycle is a period of nineteen years, in which the new or full moon recurs on the same days of the month. It is also called the golden number, and the metonic cycle, after its discoverer Meton. The cycle of induction is a period of fifteen years, in use among the Romans, commencing with the third year B.C. It has no connection with the celestial motions. See CALENDAR.

Cycling, the use of a bicycle or a tricycle as a means of locomotion. As early as 1808 a two-wheeled vehicle had appeared in Paris, with a connecting bar carved into some faint resemblance to a horse, whence it was called 'hobby-horse.' History is silent as to its inventor; but an improved form was made at Mannheim in 1818, by Baron von Drais, a German, and introduced in London in 1819, being variously known as the 'draisine' or 'draisnene,' 'pedestrian's curricle,' 'pedestrian's accelerator,' and 'dandy-horse.' Both these machines were propelled by the feet. Kirkpatrick Macmillan, a Scotch blacksmith, was the first to make it possible to preserve a continuity of motion on a balanced vehicle without touching the ground with the feet. By affixing to the dandy-horse cranks connected to long levers that acted upon the rear wheel centre, he made it possible to ride a two-wheeled single-track machine. The precise date of this invention has not been determined, but it was not later than 1840, and probably somewhat earlier. The fame of Macmillan, who died in 1878, was unfortunately posthumous only; indeed, even in 1889 a copy of his machine, made by Gavin Dalziel in 1846, was exhibited at a London cycle show, and gained for Dalziel the title of the inventor of the safety bicycle. It was not until 1892 that Macmillan's claims were definitively established.



The Evolution of the Bicycle

Later cranks and pedals were fitted to the front wheel of a dandy-horse by Pierre Lallement of Paris (c. 1864), and in 1869 the idea was adopted in England, as the 'boneshaker,' which developed into the high bicycle. Tricycles of innumerable shapes and sizes were constructed on this plan, but all eventually gave place to the safety type, produced by J. K. Starley. This was a reversion to the rear-driving principle, with the substitution of a chain for the levers of Macmillan. The invention of the pneumatic tire by J. B. Dunlop in 1888 insured the permanent popularity of the 'safety,' and subsequent developments of detail converted it into a luxurious vehicle. The years 1896 and 1897 witnessed an extraordinary 'boom' in cycling, and for a time a vast amount of capital was invested in the manufacture of bicycles in the United States, Great Britain, France, and Germany. After 1900, however, the taste for cycling suddenly declined.

Cycles are classified as bicycles, tricycles, and quadricycles, having two, three, and four wheels respectively. Bicycles are single-track machines, in which the rear wheel is usually the driving wheel, and the front one is used for steering. Tricycles are three-track machines, having either one wheel or two wheels in front, the remaining wheel being the driving wheel. Quadricycles are two-track machines, the rear wheels driving and the front wheels steering. For motorcycles, see Motorcycles.

When the enthusiasm for cycling was at its height bicycle tours attained great popularity, being encouraged by such organizations as the League of American Wheelmen in America and the Cyclists' Touring Club of England. Thomas Stevens made a trip around the world in 1884-6, and other adventurous cyclists traversed the continents of Europe, Asia, and America.

Cycle racing was also highly popular for some decades, but the abuses to which the sport was subjected—exploitation of 'makers' amateurs' and the introduction of organized pacing teams by manufacturers—resulted in its decline. It was somewhat rehabilitated by the National Cycling Association, which holds meets for amateurs and professionals during the summer season, but the great interest of earlier years has departed, probably never to return. Six-day races are held once or twice in each year in some of the larger cities, but they are less profitable than formerly.

The value of the cyclist in war is considerable in countries where good roads exist, but for this purpose the motorcycle has practically supplemented the ordinary bicycle.

Cy'cloid, the curve traced out by a point on the circumference of a circle which is rolling in its own plane along a straight line—*e. g.* any point on a rim of a wheel rolling along the ground. The form of the curve is indicated in Fig. 1, which also shows two positions of the rolling circle. Every point in the circumference describes an exactly similar curve. Since the point of the rim in contact with the ground is for an instant at rest, it will begin to move off perpendicular to the ground, whether the wheel is rolling backwards or forwards.

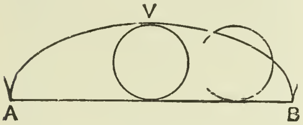


Fig. 1

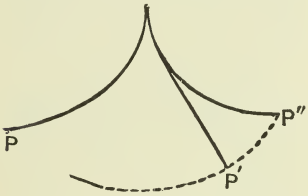


Fig. 2

Hence the succession of cycloids described by any one point meet the straight line in what are called cusps, as shown at A and B. A great many of the geometrical properties of the cycloid may be proved kinematically—*i. e.* by a direct appeal to elementary laws of motion. As mentioned in the article Curve, the involute of the cycloid is a similar cycloid. Hence, by attaching a string to the inside of the cusp where two inverted cycloids meet, as in Fig. 2, and allowing the string to wrap round the two cycloidal cheeks alternately, we find that the point of the string which passes through the vertex of each of the inverted cycloids will describe a similar cycloid. If a ball be attached to this point it will swing to and fro under the action of gravity in exactly the same period, whatever size of cycloidal arc it describes. Such an arrangement is called the cycloidal pendulum, and it is interesting as giving an absolutely tautochronous motion. Closely related with this is another interesting dynamical property of the cycloid. If we take two points not in the same vertical line, and consider the various paths by which a heavy particle can pass from the one to the other, we find that the path of quickest descent, or the brachystochronic path, is the arc of a cycloid with cusp at the higher point. The cycloid just described is one of a family of curves described by points in the circle, but not necessarily on the rim, as the circle rolls on a straight line, or on another circle.

Cyclometer, an instrument used specially by cyclists for recording the distance ridden. It consists essentially of a toothed pinion which is moved one tooth forward at every revolution of the wheel by means of a stud fixed to one spoke. The pinion is connected by clockwork gearing with a recording dial.

Cy'clone, a violent, rotary storm, usually occurring in tropical or sub-tropical regions, and distinguished by winds blowing around a centre of low pressure. Cyclonic areas travel at the rate of twenty or more miles an hour; the direction of motion in equatorial regions is from east to west, but in higher latitudes from west to east. Unsettled, rainy, squally, or showery weather is usually associated with cyclonic areas, which are mainly responsible for an unstable climate such as that of the British Isles. In a cyclone the wind rotates round the centre in the

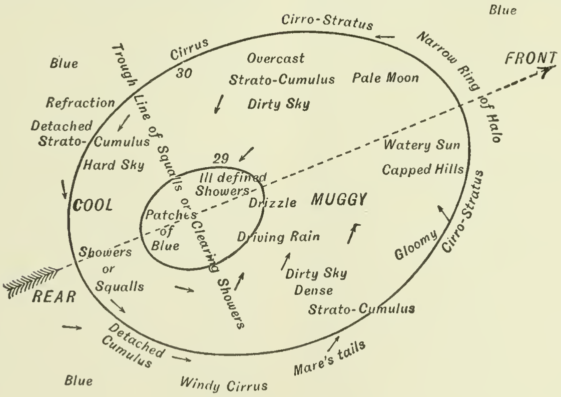


Diagram of a Cyclone

(From *Weather*, by Ralph Abercromby.)

opposite direction to the motion of the hands of a watch, the wind velocity being indicated by the closeness of the lines of equal barometric pressure. The general characteristics of a cyclonic disturbance are shown in the accompanying diagram. The outer line or isobar indicates that pressure everywhere along that line starts at thirty inches, and along the inner line at twenty-nine inches. That portion in front of the centre facing the direction towards which it moves is called its front, while the other side of the center is known as the rear. As a cyclone passes over any given place the weather undergoes a fairly regular sequence. As the front approaches we have halos round the sun or moon, then a paling of these orbs as the cloud veil becomes denser. The hills then become capped with mist; the air becomes muggy; rain begins to fall, at first as a mere drizzle, but becoming heavier as the centre approaches. As the trough or centre of the cyclone passes there is a sharp downpour of rain, commonly called a 'clearing shower,' while the rear of the disturbance is characterized by cool, dry, bracing winds and a bright, hard sky. Cyclones in tropical countries acquire great intensity, devastating the land, and in many cases causing loss of life. See HURRICANE; TYPHOON.

Consult Ward's *Practical Exercises in Elementary Meteorology;* Davis' *Elementary Meteorology;* Ferrel's *Treatise on the Winds.*

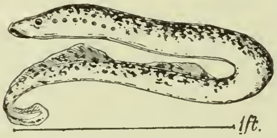
Cyclopædia. See ENCYCLOPÆDIA.

Cy'clopae'an Masonry, a name given to the rude walls of the ancient Greeks and Etruscans, built of huge blocks of unshaped rock, uncemented and depending on their own weight for cohesion and stability. They were so called from the Cyclopes (q. v.), the legendary builders of the walls of Tiryns and Mycenæ.

Cyclopes, sī-klō'pēz ('round eyed'), a race of monsters in Greek mythology, of vast stature and strength, with a single eye, placed in the middle of the forehead. Homer represents them in the Odyssey as a race of wild and lawless shepherds living in the isle Trinacria, which has generally been identified with Sicily; their leader was Polyphemus, whom Odysseus blinded. Hesiod makes them Titans, three in number, sons of Uranus and Ge. Their father, and later, Cronus cast them into Tartarus, but Zeus released them to forge his thunderbolts. They were afterward slain by Apollo. Later writers regard them as the assistants of Hephæstus (Vulcan), and place their residence in Mount Etna and the volcanic Lipari Islands. The great walls of unhewn stone which exist in Mycenæ, Tiryns, and elsewhere in Greece and Italy are sometimes regarded as their work.

Cyclopteris, sī-klop'tėr-is, fossil leaves, usually circular or approximately circular in outline, without a median nerve, but with numerous radiate veins. They are believed to belong to ferns of the group Medulloseæ, and are now regarded as probably of the nature of stipules or 'aphlebiæ.' Their principal development is in the Carboniferous system.

Cyclostomata, sī-klō-stō'ma-ta, or ROUND MOUTHS, a small group of vertebrates, including the hag (*Myxine*), and the lamprey (*Petromyzon*), animals often described as fishes, though in many respects simpler. Cyclostomes have no jaws, no scales, no paired fins. They breathe by gill-pouches, and have not, like true fishes, gills supported on gill-arches. The mouth is round and suctorial, and encloses a rasp-like 'tongue.' The skeleton is entirely cartilaginous, and the skull very simple. The same tale of archaic simplicity is told by the internal anatomy, which in several respects differs markedly from that of fishes. Cyclostomes are widely distributed, but there are few living genera. All the existing forms may be grouped as hags or lampreys (qq. v.).



The Great Lamprey, one of the Cyclostomata

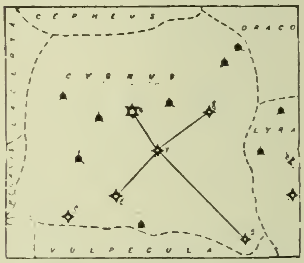
Cydnus, sid'nus, river in Cilicia, Asiatic Turkey, rises in Mount Taurus, and flows southwest, past Tarsus, into the Mediterranean. In classic times it was famed for the coldness of its waters, in which Alexander nearly lost his life while bathing. The modern name is Sihun.

Cygnäus, sig'nā-o͞os, FREDRIK (1807–81), Finnish poet and writer, was born in Tavastehus; was educated at Abo; and was professor of literature there (1854–61). He was a patron of fine art, an eloquent speaker, and the author of six volumes of *Skaldestycken* (1851–70), two patriotic dramas—*The Age of Fleming* and *Duke John's Youthful Dreams*—and books of travel.

Cygnäus, UNO (1810–88), Finnish educator, was born in Tavastehus. He acted as pastor and teacher at Viborg (1837), Sitka in Alaska (1839–1846), and St. Petersburg, successively, and was in 1861 appointed chief inspector of education in Finland. It is to him that Finland owes her excellent educational laws (1866), and the *slöjd* system of manual instruction.

Cygnet. See SWAN.

Cyg'nus, an ancient constellation, possibly of Babylonian origin, situated between Draco and Pegasus. Connected in classic times with the legend of Leda, it figured as *Gallina* in the Alphonsine tables, and the name was still current in the 18th century. Eight of the chief stars in Cygnus form the Northern Cross, extending over twenty degrees of the Milky Way, which is perforated, between γ and ϵ Cygni, with the so-called Northern Coal-sack. The constellation comprises nearly two hundred stars visible to the naked eye, besides a number of remarkable telescopic objects.



The Constellation Cygnus

Cyl'inder, a solid traced out by a straight line moving round a given curve in such a manner that it always keeps parallel to its original direction. The cylinder is called elliptic, hyperbolic, etc., according as the curve is an ellipse, hyperbola, etc. If the curve is a circle and the generating line is perpendicular to the plane of the circle, the cylinder is a *right circular cylinder.* The volume of such a cylinder, when bounded by ends parallel to the plane of the original circle, is equal to the area of the circle multiplied by the length of the cylinder. The area of the curve surface is equal to the length of the cylinder multiplied by the circumference of the circle. Oblique cross-sections of the right cylinder are ellipses. The cylinder may be regarded as a cone, with its vertex at infinity.

Cyllene, sil-lē'nē, a celebrated mountain of Greece in the Peloponnesus, the legendary birthplace of Hermes, the modern Ziria. Its altitude is 7,789 feet.

Cylon, sī'lon, an Athenian noble, who attempted to make himself master of Athens about 632 B.C. He succeeded in seizing the Acropolis, but was besieged there by the archon Megacles and the citizens, until he escaped with his brother. Cylon, his brother,

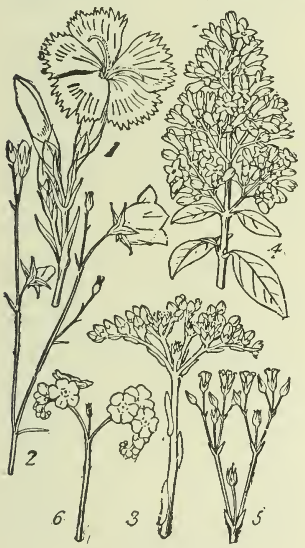
26 1935

and his descendants were condemned to perpetual banishment.

Cymbals, sim'bals, a pair of thin circular plates of metal (copper and tin alloy) with a leather strap attached to each. The performer strikes them against each other with a frictional movement. In orchestras the cymbals usually have the same part as the bass drum, and are played by the same performer. They were used by the ancient Greeks.

Cymbeline, sim'bē-lin, otherwise Cunobelinus, a king of Britain in the first century of the Christian era, is supposed to have been a son of Cassivelaunus, who resided at Camulodunum, near Colchester. His name survives on many coins, whose design shows Roman influence. He was the father of Caractacus (q. v.). In Shakespeare's play, *Cymbeline* (an adaptation from Holinshed), the main interest centers in Imogen, the king's daughter.

Cyme, sīm, an inflorescence, or floral arrangement, in which the terminal flower on the stalk is the first to open. In the simple cyme—of which there are several modifications such as the racemose, the spicate, and the panicled cyme—the lateral flower stalks spring from the same level on the parent stem, like the three prongs of a fork. Common examples are afforded by the pink, campanula, stonecrop, and privet. When two branches are given off by the flower stem below the terminal flower, and each of these stems, again, ends in a flower, below which two other branches are given off, a dichotomous cyme is produced, as in the chickweed. When the older flower stalks are lengthened, a flat-topped cyme is produced. If, instead of two branches, one only is given off, from which one again in turn is given off on the same side, and so on several times, the result is a scorpioid cyme, as in the forget-me-not.



Forms of Cyme

1. Pink. 2. Campanula (*racemose*). 3. Stonecrop (*spicate*). 4. Privet (*panicled*). 5. Chickweed (*dichotomous*). 6. Forget-me-not (*scorpioid*).

Cy'mogene, a distillation product of petroleum (q. v.), used in freezing machines to lower the temperature by rapid evaporation. Its boiling point is 32° F.

Cymry. See Celts ; Wales.

Cynewulf, kin'*e*-wŏŏlf (*c.* 730–*c.* 800), an Anglo-Saxon poet and ecclesiastic, who lived in the north of England. He is one of the only two Anglo-Saxon poets before the Conquest of whom we have any verse remaining to which the author's name can be attached. The other is Cædmon. Cynewulf signed four poems with acrostics, which spell out his name in runic letters. These are *Juliana, Elene, Christ,* and *The Fates of the Apostles.* The author cannot be definitely identified with any Cynewulf of whom we have knowledge from other sources. Whether he composed other poems like *Guthlac, The Phoenix* and *Andreas* we do not know. They have similar characteristics. It is more difficult to show in translation the virtues of Cynewulf and his school than of the *Beowulf* poet (q. v.). Cynewulf was gifted with amazingly keen sense perceptions, and depended largely upon sensory images for his effects. The rhapsodic hymns and emotionalized descriptive scenes of *Christ* have great beauty, and *Elene* is a poem that appeals with its narrative verse in the heroic manner. Some of the *Riddles*, in the *Exeter Book*, are attributed to Cynewulf, and he was probably the author of some of the poems (see Exeter Book). For criticism consult Stopford Brooke, *English Literature to the Norman Conquest ;* Cook's *The Dream of the Rood ;* Brink's *Early English Literature ;* also in Nelson's *English Readings.*

Cyn'ics (Gr. 'doglike'), a school of ancient Greek philosophers founded by Antisthenes (q. v.) about 400 B.C. They professed contempt of riches, neglect of personal appearance and comfort, and usually a disbelief in virtue. Stripping life to its bare essentials, they robbed it of its nobility by scorn of morality, the arts, and literature. Leading cynics were Diogenes, Menippos, Onesicritos, Crates, and Hipparchia. The name survives, with much of the original meaning.

Cynocephalus. See Baboon.

Cynodon, sī'nō-don (*Cynodon dactylon*), the Bermuda or Bahama grass, is a low creeping grass with jointed roots which grow rapidly in all directions. It is used as a lawn grass in certain parts of America, but is not especially suitable for that purpose. It is extensively grown for fodder in India.

Cynoidea, sī-noi'de-a, one of the three classes of the fissiped carnivores—the dog section. See Carnivora.

Cynoscephalæ, sin'os-sef'*a*-lē, ('dogs' heads'), two hills in Thessaly, Greece, 15 miles southeast of Larissa. Here in 197 B.C. Philip v of Macedon was defeated by the Romans under T. Quintius Flaminius, and had to sue for peace.

Cynosure, sī'no-shōōr, (Gr. 'dog's tail'), a name sometimes given in astronomy to the constellation Ursa Minor (q. v.).

Cynthia, sin'thi-*a*, one of the many names of the Grecian goddess Artemis, the Roman Diana.

Cynthiana, sin-thi-an'*a*, city, Kentucky, county seat of Harrison county, on the Louisville and Nashville Railroad, and on the south fork of Licking River ; 27 miles N.E. of Lexington. It is located in a fertile district famous for its horses. There are flour mills in the city, and it is an important tobacco market. It was the scene of a battle in the Civil War, June 11, 1864. Pop. (1930) 4,386 ; (1936) 4,875.

Cyperus, sī-pē'rus, a genus of rush-like plants of the order Cyperaceæ, bearing small spikes of bisexual flowers without calyx or corolla. They are found in both tropical and temperate regions. Among the many species are *C. papyrus* (formerly known as *Papyrus antiquorum*), the Egyptian Paper Plant, which grows to about six feet in height, and has a drooping mass of filiform bracts and umbel-rays, topping the tall stems (see Papyrus) ; *C. esculentus*, the Chufa (or Earth Almond), a tropical variety, producing small edible tubers ; and *C. alternifolius*, the so-called Umbrella Palm, which grows to a height of about two feet, bearing long, drooping, involucral leaves in a circle at the top of the slender stems. For illustration, see page 518.

Cyphel, the Common Houseleek (q. v.).

Cy-près, a Norman-French word adopted in English law relating to charitable trusts. Its meaning is 'near to it.' See Charitable Trusts and Uses.

Cy'press, the name applied to various coniferous, evergreen and deciduous trees of Europe, Asia, and North America, belonging to the genera *Cupressus*, *Chamæcyparis*, and *Taxodium*. The cypresses are tall shapely trees, with light, graceful leaf sprays and yellow-brown wood, usually soft. They are exceedingly popular for ornamental planting and for windbreaks and hedges, and the wood of many of the species is valuable as timber, because of its durability, its ability to withstand dampness, and the ease with which it can be worked.

Cyperus
1. Spikelet. 2. Flower

Of the genus *Cupressus*, one of the best known species is *C. macrocarpa*, the Monterey Cypress, native to California and grown also in Australia and Europe. When sheltered, this tree is a magnificent evergreen of symmetrical growth, but when exposed to the winds it becomes picturesquely misshapen, its contorted branches forming a broad ragged crown. Its wood is strong, heavy, and durable. *C. arizonica* and the Old World *C. sempervirens* are other well-known species. The latter has been planted as a symbol of mourning in the burial places of Europe from time immemorial, and of its wood the cross of Christ is said to have been fashioned. Of the genus *Chamæcyparis*, which is distributed in North America, Japan, and Formosa, the most important species are *C. thyoides*, known as the White Cedar, which grows in swampy places on the Atlantic seaboard (see CEDAR); an Alaskan species, *C. nootkantensis;* and *C. lawsoniana*, a valuable ornamental tree, 200 feet in height, seen on the Pacific coast. To this genus belongs, also, the Japanese Cypress or Retinospora, a beautiful evergreen valuable for its wood. The most important species commercially is the Bald Cypress of the genus *Taxodium* (*T. distichum*), a tall deciduous tree growing abundantly in the Southern United States. It is characterized by the development on its roots of peculiar conical growths, known as 'knees', often far distant from the trunk. The wood is soft, easily worked, handsome, and durable, and is used for interior finishings, blinds, railings, washtubs, fences, posts, pails, buckets, shingles, and for many other purposes.

The chief disease from which the cypress suffers is caused by a fungus known as pecky (or peggy), caused by *Fomes geotropus*. While this affects the beauty and strength of the wood, it does not cause the tree to decay, and large numbers of so-called 'pecky' trees are used for purposes where strength and beauty are not essential.

Cypress Vine (*Ipomœa quamoclit*), a genus of half-hardy climbing annuals belonging to the order Convolvulaceæ. There are three varieties, with scarlet, white, and rose-colored blossoms, all native to the East Indies, but found quite commonly in tropical America. They are easy to cultivate and are extremely decorative.

Cyprian, sip'ri-an, or THASCIUS CÆCILIUS CYPRIANUS (*c.* 200–258), one of the fathers of the church, was born in North Africa, of a wealthy pagan family, and became a teacher of rhetoric at Carthage. Shortly after his conversion to Christianity (*c.* 245), he was made a presbyter, and later, while he was but a novice, bishop (248), thus becoming the head of the African church. At the outbreak of the Decian persecution (250), Cyprian was persuaded to go into concealment; but returned in the following year, to find persecution still raging. Some of his own clergy were bitterly hostile to him, and he fell into conflict with the bishop of Rome over the question of the rebaptism of heretics, but throughout all he acted with courage and single-hearted faithfulness. In 257 persecution again broke out under Valerian, and Cyprian was banished; he was recalled shortly afterward and suffered martyrdom under the severer edict of 258.

Cyprian's rôle was that of a great church leader. To the development of the idea of the church's unity, he gave a strong impetus, finding the unifying bond not in the acceptance of a common standard of truth—viz., the Apostolic Confession, the prevalent theory of the time—but in the fact that the bishops were the successors of the apostles by unbroken historic descent—the hypothesis of apostolic succession. He laid a doctrinal basis for the priesthood of the clergy; the lower ranks received the charism from the higher, and all of them stood apart from the laity. With this view is connected the idea of the eucharist as a sacrifice, the reproduction of the original offering of Christ's body and blood, which none but a consecrated priest could perform. Cyprian also taught that by almsgiving and good works a man could attain, at least by way of preparation for the initial grace, to acceptance and standing with God. He was thus the first to promulgate several ecclesiastical doctrines which became distinctive features in the constitution of the Roman Catholic Church.

Cyprian's chief works are *De Unitate Ecclesiæ*, *De Lapsis*, *De Opere et Eleemosyna*, and eighty-one letters of great historical value. Consult editions of his collected works by J. Fell and Pearson and by Hartel, and an English translation in the *Ante-Nicene Fathers*, vol. v.; also E. W. Benson's *St. Cyprian: His Life, His Times, and His Works.*

Cyprinidæ, si-prin'i-dē, ('carp-like'), a family of fresh-water bony fishes to which belong the carp, the goldfish, the chub, and other less familiar fishes.

Cyprinodontidæ, si-prin'ō-don'ti-dē, ('carp-toothed'), a family of bony fishes, including small forms widely distributed over the world in fresh waters. The males and females differ from one another in size and appearance, the former being among the smallest known fish. Examples are the top-minnows and 'killifish' (*Fundulus*).

Cypripedium, sip-ri-pē'di-um, a genus of beautiful hardy terrestrial orchids of the family Orchidaceæ, popularly known as LADY'S SLIPPER or MOCCASIN FLOWER. They are widely distributed throughout the north temperate zone and are often planted in shady borders and in rock gardens. The popular name comes from the fact that the labellum in all species forms a sort of cup or pouch, resembling a slipper. There are about 30 species, the best known of which are *C. calceolus*, a native of Europe, deep brown and yellow in color; *C. candidum*, the white, purple-streaked variety; *C. pube-*

scens, pale yellow; *C. acaule,* the pink, stemless species; and *C. arietinum,* the purplish or brownish green variety, known as the Ramshead Lady's Slipper. Cypripediums require a peaty soil, plenty of moisture, and good drainage. There are many hybrids of unusual beauty. See also LADY'S SLIPPER.

Cypripedium calceolus
1. Gynœcium

Cy'prus, an island in the Mediterranean Sea, under British administration since 1914. It lies 40 miles south from the coast of Asia Minor and about 60 miles to the west of Syria; between 34° 33′ and 35° 41′ N. lat. and 32° 20′ and 34° 35′ E. long. Its greatest length is 140 miles, its greatest breadth 40 miles, and its area 3,572 square miles. Two parallel mountain ranges traverse the island from east to west, with a wide alluvial plain between. The southern range, which is the higher and more extensive, culminates in Mount Troödos (6,400 feet); the highest point in the northern range, which extends in an unbroken line more than 100 miles along the coast, is Akromandra (3,343 feet). The central plain, known as the Mesaoria (or Messaria), is a broad, treeless tract from 10 to 20 miles across, extending, from the Bay of Famagusta on the east to that of Morphou on the west. In this plain lies a large proportion of the island's cultivated area. The rivers, chief of which are the Pedias and Ialias, are little more than mountain torrents. The climate is dry and healthful except on the coasts in summer. Summers are intensely hot in the plains and winters are cold and bracing.

The *flora* and *fauna* are with few exceptions the same as those of the neighboring coasts of Syria and Asia Minor. Among wild animals, the moufflon or Cyprus sheep is the most interesting, but is becoming scarce.

The forests, at one time extensive and valuable, were badly neglected during the years of Turkish administration, but under British rule much has been done for the preservation of the remaining wooded areas, and for reforestation. Copper is mined on a large scale, and there are deposits, also, of asbestos, gypsum, terra umbra and marble.

Agriculture is the leading industry and about one third of the cultivable land is utilized. The principal products are wheat, barley, oats, olives, cotton, raisins, potatoes, linseed, cheese, carobs (locust beans), citrus and deciduous fruit and cumin. The principal exports include potatoes, carobs, wine, barley, cheese, citrus fruits and mules; imports include flour, machinery, cotton goods, woolens, timber, chemicals, drugs, sugar and tobacco.

There are 870 miles of main roads on the island, some 2,000 miles of village roads, and a narrow-gauge Government railroad from Famagusta Harbour to Kalon Chorion (71 miles).

In 1936 the population of Cyprus was 369,091, of which 64,238 were Moslems. The capital is Nicosia (pop. 23,677). There are 791 elementary schools on the island, as well as Turkish and Christian secondary schools, and several private schools.

Languages spoken on the island are a dialect of Modern Greek, Osmanli Turkish and Arabic by Moslems, English and French by the educated classes. The use of English is rapidly spreading. Most of the newspapers are in Greek; a few in Turkish and English. *Enosis* is the name of a movement agitating union (or Anschluss) of the island to Greece (from Gr. *enos,* union).

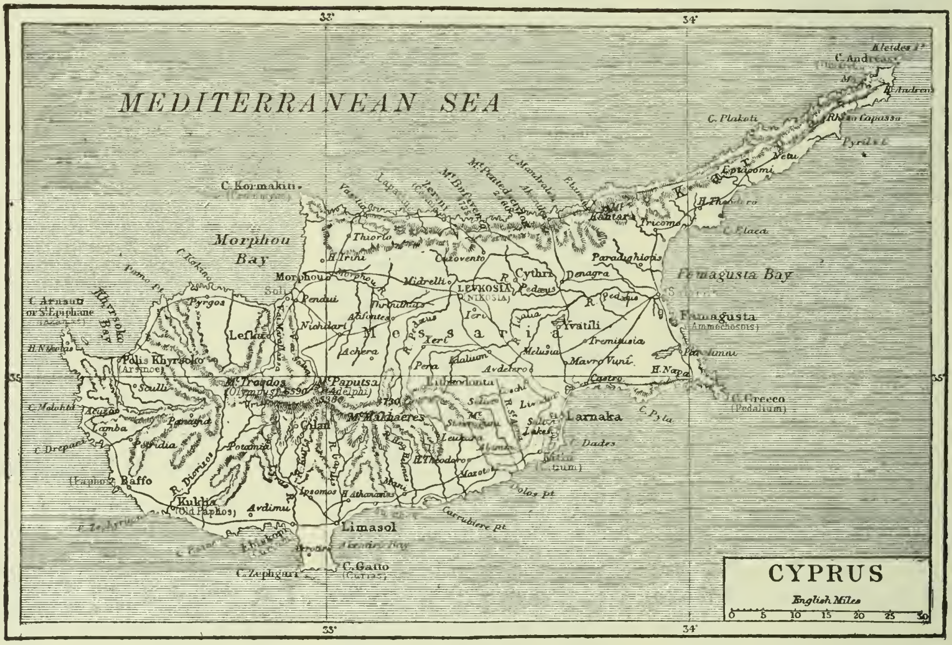
Government.—In 1925 Cyprus was given the status of a British colony. In 1931 the Legislative Council was dissolved and the power to make laws was vested in the Governor. The 14 principal towns have municipal corporations. The appointment of the village headsmen rests in the hands of the Governor.

History.—Cyprus was conquered by Egypt as early as 1450 B.C., fully colonized by Greeks and Phœnicians (1000–500 B.C.), and successively annexed by Assyria (700–670), Egypt (569), and Persia (525). For two centuries it remained in dispute between Persia and the Greeks, but fell to Ptolemaic Egypt in 306, and to Rome in 57 B.C. Christianity was introduced by St. Paul, and St. Barnabas was a Cypriote Jew (Acts iv. 36). The long prosperity of the island was wrecked by Saracen raids (644–975), and later by Byzantine misrule, till in 1191 it was occupied by Richard Cœur de Lion, and sold first to the Knights Templar, and then to Guy de Lusignan, king of Jerusalem, whose dynasty gave place to Venetian rule in 1489.

In 1570–1, the Turkish sultan Selim II expelled the Venetians, and for three centuries Cyprus was under Turkish rule. In 1878, under a treaty which recognized the sovereignty of the Sultan and assured him an annual income, the island passed under British administration. The Convention of 1878 remained in force until November 1914, when, by the entrance of Turkey into the war against the Allies, it was automatically annulled and Cyprus was annexed to the British crown. During the war more than 10,000 Cyprians volunteered as muleteers with the army in Salonika. A camp for Turkish prisoners of war was established at Famagusta, and the island furnished large supplies of cereals, timber, and fuel for the troops in Egypt and Palestine.

Antiquities of all periods are numerous and important—tombs everywhere of prehistoric, Greek, and Roman date, with sanctuaries at Tamassos, Idalion, Paphos, Voni, and elsewhere, and other buildings at Salamis; Byzantine castles at St. Hilarion, Bufavento, and Kantara; splendid Gothic churches at Nicosia, Famagusta, and Bellapais; and perfect Venetian fortresses at Nicosia, Famagusta, and Kyrenia. The antiquities of the island had long been explored in a desultory way, but since the British occupation in 1878, excavations under modern scientific methods have been conducted by the Cyprus Exploration Fund, the British Museum, and other agencies. There is a small museum at Nicosia. Explorations of the caves (1902) have revealed fossil remains of elephants and other animals now extinct.

Consult R. Gunnis, *Historic Cyprus* (1936); S. Casson, *Ancient Cyprus: Its Art and Archaeology* (1937); O. Chapman, *Across Cyprus* (1937).



Cypselus, despot of Corinth from 655 to 627 B.C.

Cyrano de Bergerac. See Bergerac.

Cy′rena′ica, a region of Italian Libya, in northern Africa, now forming the administrative division of Barca. Its boundaries have varied during 3,000 years of history until the Italians wrested it from Turkey by the war of 1911–12. An immense plateau, endowed with an ideal climate and fertile soil, it produces bananas, figs, palms, barley and olives; cattle is raised, ostrich feathers are traded and sponge fishery is carried on.

The name Cyrenaica is applied also to an ancient district in the north of Africa extending from the borders of Carthage on the west to the borders of Egypt on the east. It is a high plateau bordering on the Mediterranean, with a fertile soil and a delightful climate. Wheat, oil, corn, fruits, wine, and dates are produced. The region was once famous for a rare plant called *Silphion,* which produced a resinous gum known as *laser.*

Cyrenaica became subject to Egypt in 321 B.C. and flourished under the Ptolemies, but in 95 B.C. Apion, an illegitimate son of Ptolemy Physcon, bequeathed it to the Romans, who reduced it to a province (75 B.C.). The Libyan barbarians overran it in the fifth and sixth centuries A.D., and it was conquered by the Arabs in 647. The chief cities were Cyrene (q. v.), Teuchira, Hesperides, Barca, and Apollonia.

Cy′rena′ics, a school of ancient Greek philosophy, an offshoot of the practical (ethical) teaching of Socrates, was founded by Aristippus of Cyrene, who was a pupil of Socrates, in the second half of the 4th century B.C. The central tenet of his teaching was that the chief pursuit of man is and ought to be a prudent personal enjoyment; hence all knowledge is relative, and restricted to personal feelings.

Cyrene, sī-rē′nē, Greek colony on the north coast of Africa, between Alexandria and Carthage, was founded in 631 B.C. by colonists from Thera, led by Aristoteles or Battus—*i.e.,* 'king' in the Libyan dialect. The city, which soon became rich and prosperous, lay 8 miles from the coast. Its chief trade was in the now extinct plant silphion, the properties of which seem to have been medicinal. Battus was succeeded by his son Arcesilas, and afterwards the monarchs were called Battus and Arcesilas alternately. Their dynasty lasted for eight generations. After the fall of the Battiad dynasty, about 460 B.C., Cyrene passed into the hands of the Ptolemies, and later became part of the Roman empire.

The ruins of Cyrene, although much defaced, are numerous, and comprise streets, temples, aqueducts, tombs, coins, and fragments of sculpture. Extensive excavations have been carried on, an expedition by the British government in 1861–2 being particularly notable.

Cyr′il (827–69) and **Metho′dius** (830–85), sons of a Thessalonican named Leo, were the great apostles of the Slavs in the 9th century. Cyril, or Constantine, known as the Philosopher, successfully preached the gospel to the Khazars, and Methodius became abbot of a monastery in Constantinople. Subsequently when Boris, Bulgarian prince, requested a missionary to teach his people, the brothers were sent, preaching also in other Slavonic countries. They also set to work to give the Slavs an alphabet, and to translate the Scriptures. It is difficult to dissociate their work, but Methodius lived and labored the longer, especially in Pannonia. He was consecrated archbishop of Syrmia in 870. In 879 he was called to Rome to justify his celebration of the Mass in the native tongue, and there succeeded in gaining the approval of Pope John VIII. To one or both of the brothers is attributed the invention of the Cyrillic and Glagolitic alphabets (see CYRILLIC ALPHABET), modifications of the Greek. Though later Popes stigmatized them as Arians, they were ultimately canonized.

Cyril′lic Alphabet, presumably devised by Cyril (q. v.) and Methodius in the ninth century for the use of the Moravians and Bulgarians, and consisting originally of thirty-eight letters based on the Greek uncials of the eighth and ninth centuries. Although the alphabet has been increased by ten letters because of the greater number of Slavonic sounds as compared with the Greek, twenty-four of the characters still remain identical with the Greek uncials. With slight modifications the Cyrillic is the alphabet now in use in Bulgaria, Russia, and by the Serbs and Ukrainians.

Cyrillus, Lucaris. See Lucaris.

Cyril of Alexandria, St. (*c.* 376–444), one of the Fathers of the Church, succeeded his uncle as patriarch of Alexandria in 412 and forthwith proved his somewhat intolerant zeal by closing the churches of the Novatians and expelling the Jews from the city (415). He was in a measure at least responsible, also, for the murder of Hypatia (q. v.). The latter part of his life was spent in his controversy with Nestorius, against whom the synod held at Alexandria in 430 hurled twelve anathemas, and who was afterwards condemned by the council of Ephesus, 431 (see Nestorians). Among the extant works of Cyril are a defense of Christianity, in ten books, written against the Emperor Julian in 433. The best edition of his works is that of J. Aubert in the *Oxford Library of the Fathers.*

Cyril of Jerusalem, St. (*c.* 315–86), one of the Church Fathers, was born in Jerusalem, and in 351 became bishop of his native city, succeeding Maximus. Controversy with his metropolitan, the Arian Acacius, led to Cyril being accused of selling church treasures for the relief of the starving poor, for which crime he was deposed. A later synod restored him, but he was again deposed and banished by the Emperor Valens (367–78). He afterward returned to Jerusalem, and also participated in the second ecumenical council at Constantinople. His works were collected by Touttée, and translated into English by Gifford in *The Nicene and Post-Nicene Fathers.*

Cyrus the Great, si'rus, or Cyrus the Elder (d. 529 B.C.), founder of the Persian empire. Accounts of his birth and lineage vary. According to Herodotus, he was the son of Cambyses, a noble Persian, and Mandane, daughter of Astyages, king of Media. Being warned in a dream that his daughter's son would become master of Asia, Astyages attempted to destroy the child in infancy, but Cyrus was saved by a herdsman, who brought him up as his own son. In course of time he rose against Astyages, whom he defeated in battle and dethroned. This story is contradicted by a cylinder in which Cyrus describes himself, as 'king of the city of Ansan (or Anshan),' which was certainly in Persia, probably near Pasargadæ, and declares himself the son of Cambyses I, grandson of Cyrus I, and great-grandson of Teispes, conqueror of Elam, who was also the great-grandfather of Hystaspes, the father of Darius.

Whatever his origin, Cyrus certainly attacked and defeated Astyages in a great battle in 549 B.C., seized his capital of Ecbatana, and dethroned him. In 547 he overthrew Crœsus and the Lydian empire, capturing Sardis, while his general, Harpagus, proceeded to subdue the Greek cities in Asia Minor. In 539 he advanced on Babylon and, after giving battle to the army of Akkad, took Sippara (Sepharvaim) and Babylon itself 'without fighting,' thus making himself master of all Asia from the Mediterranean to the Hindu Kush. He at once entered upon a policy of religious conciliation, and in the following year he gave permission to the Jewish captives to return home (2 Chron. xxxvi. 22–23; Ezra i. 1–4). His last war was against the Massagetæ, a Scythian people, by whom he was defeated and slain.

Consult Horner's *Daniel, Darius the Median, Cyrus the Great;* Grote's *History of Greece;* Holm's *History of Greece.*

Cyrus, the Younger, second son of Darius Nothus, king of Persia, and Parysatis, was made satrap of the maritime parts of Asia Minor, and of Lydia, Phrygia, and Cappadocia, by his father in 408 B.C. In 404 his father died, and he formed the idea of dethroning his brother, Artaxerxes Mnemon. For this purpose he collected a force of 13,000 Greek mercenaries, whom he led, with a large Asiatic force, from Sardis in the spring of 401 B.C. His troops, the famous Ten Thousand of Xenophon (q. v.), met the king's army at Cunaxa, near Babylon, and defeated it; but Cyrus was slain.

Cyst (*kystis,* 'a bladder'), a word sometimes applied, in the original sense, to hollow organs with thin walls, as the urinary bladder and gall-bladder; but commonly reserved for the designation of pathological structures or new formations within the body having the bladder form. Cysts may arise by the accumulation of products within cavities normally present, or by the independent formation of a cavity. Of the first, wens, collections of secretion in a sebaceous gland of the skin, are the commonest example (see Wen); instances of the second are cystic tumors of the ovary (see Dermoid Cyst) and the sacs developed in connection with certain parasites (see Cysticercus; Bladder Worm; Tapeworms).

Cysticercus, sis-ti-sûr'kus, a generic name formerly given to the 'cystic worms' (bladder worms), often found within watery cysts in vertebrates, before it was realized that these are merely the first stage of tapeworms (*Cestoda*). See Tapeworms.

Cystid'ea, an extinct group of the Echinodermata which exhibit affinities to sea urchins (echinoids) and crinoids (qq. v.). As their name implies, they have a box-like, calcareous shell, which consists of many small, close-fitting plates. These plates are perforated by apertures, which are arranged to form rhombic figures, the *pore-rhombs;* and at one end there is an orifice which is supposed to be the mouth. As a rule the body, or calyx, is the largest part of the fossil. Cystidea are characteristic of the Palæozoic formations, and are found in the Cambrian, Silurian, Devonian, and Carboniferous.

Cystin, a crystalline amino-acid ($C_3H_5NSO_2$) found in keratin, also occurring sparingly in urine and forming a rare variety of urinary calculus (q. v.) known as cystic calculus. It is the main sulphur-bearing acid contained in the proteins.

Cystitis, sis-tī'tis, in pathology, inflammation of the bladder. See Bladder.

Cys'toscope, a surgical instrument for the visual examination of the interior of the bladder. It consists of a hollow metal cylinder, with an electric lamp and prism at one end and a lens at the other.

Cythera. See Cerigo.

Cytisus, sit'i-sus, a genus of leguminous shrubs and small trees, of which the Common Broom, *C. scoparius,* is the best known species. Of the greenhouse varieties, those most commonly grown are *C. racemosus* and *C. canariensis.* The former is a shrub which grows to four feet or more in height, and bears long, loose spikes of bright yellow flowers. *C. canariensis,* commonly known as the Genista, bears fragrant yellow flowers. *C. laburnum* and *C. purpureus* are other well known varieties. See Broom; Laburnum.

Cytol'ogy, the science of the structure and functions of organic cells. See Cell.

Cyzicus, siz'i-kus, the ancient name of a peninsula of Asia Minor projecting into the Sea of Marmora, immediately to the S.E. of the island of Marmora, about

9 miles in length. In early times Cyzicus was a Milesian colony, and the city of Cyzicus is described by Strabo as one of the first cities in Asia, alike for extent and splendor. It was besieged by Mithridates, king of Pontus, in 74 B.C., and was conquered and laid waste by the Arabs in 675 A.D.

Cytisus purpureus.
1, Flower.

Czar. See TSAR.

Czárdás. See CSARDAS.

Czarniecki, chär-nyets'ki, or CZARNECKI, STEFAN (1599–1665), Polish general, was born at Czarnca, a village near Sandomir. When Poland was invaded in 1654 by the Russians and Swedes, he was forced by Charles X to yield Cracow, after a heroic defense of two months (1655) but later defeated the allies at Sandomir, Kozienice, Warka, and elsewhere. In 1660 he inflicted a heavy defeat on the Russians at Polonka and at Lachowicza. He died in camp at Sokolovko (Volhynia) during a campaign against Russia. He was surnamed in France the Polish DuGuesclin. Consult *Life* by Krajewski in Polish.

Czartoryski, chär-tō-rēs'ki, ADAM GEORG, PRINCE (1770–1861), leader in the Polish insurrection of 1830, was born in Warsaw. He joined the rising of Kosciuszko against the Russians, following the second partition of Poland, and was captured and taken as a hostage to St. Petersburg, where he gained the royal favor. By the Emperor Paul he was appointed ambassador to Sardinia, and by his successor, Alexander, assistant minister of foreign affairs and curator to the University of Vilna (1803–21). He was also senator palatine of the kingdom (1815). When the revolution of 1830 broke out, he warmly espoused the popular side. Appointed president of the provisional government, and placed at the head of the national government, January, 1831, he devoted half his property to the public service. When Poland's hopes were destroyed by the terrible events of August, 1831 (see POLAND), he resigned his post, but continued to serve as a private soldier. Exempted from the amnesty offered by Russia, he fled to Paris. He liberated his serfs in 1848, and declined the amnesty later offered him by Alexander II (1858).

Czaykowski, chī-kôf'ski or chī-kôs'ki, CZAJKOWSKI, or CZAIKOVSKI, MICHAIL, afterward SADYK PASHA (1808–86), Polish author and soldier. He fought in the Polish revolution of 1831 against Russia, and afterward fled to Paris, where he wrote striking novels dealing with the life of the Cossacks and the Slavs along the Danube. In 1840 he was sent on a secret mission to Constantinople, and there went over to Mohammedanism, taking the name of Sadyk. He fought against Russia in the Crimean War (1853–6), but in 1873 returned to Russia, after abjuring Mohammedanism. His novels include: *Wernyhora* (1838), *The Hetman of the Ukraine* (1841, in Polish), *Legends* (1885, Polish), *The Moslem and the Christian*, and *The Black Pilgrim*.

Czecho-Slovakia, chek-ō-slō-vä'ki-*a*, a republic of Central Europe, bounded on the north by Poland and Germany, and on the south by German Austria, Hungary and Rumania. The Czechs and Slovaks (qq. v.), until the World War subjects of the Austro-Hungarian Empire, are of the same race (Slavic) and except for differences in dialect speak the same tongue. They are for the most part Roman Catholics.

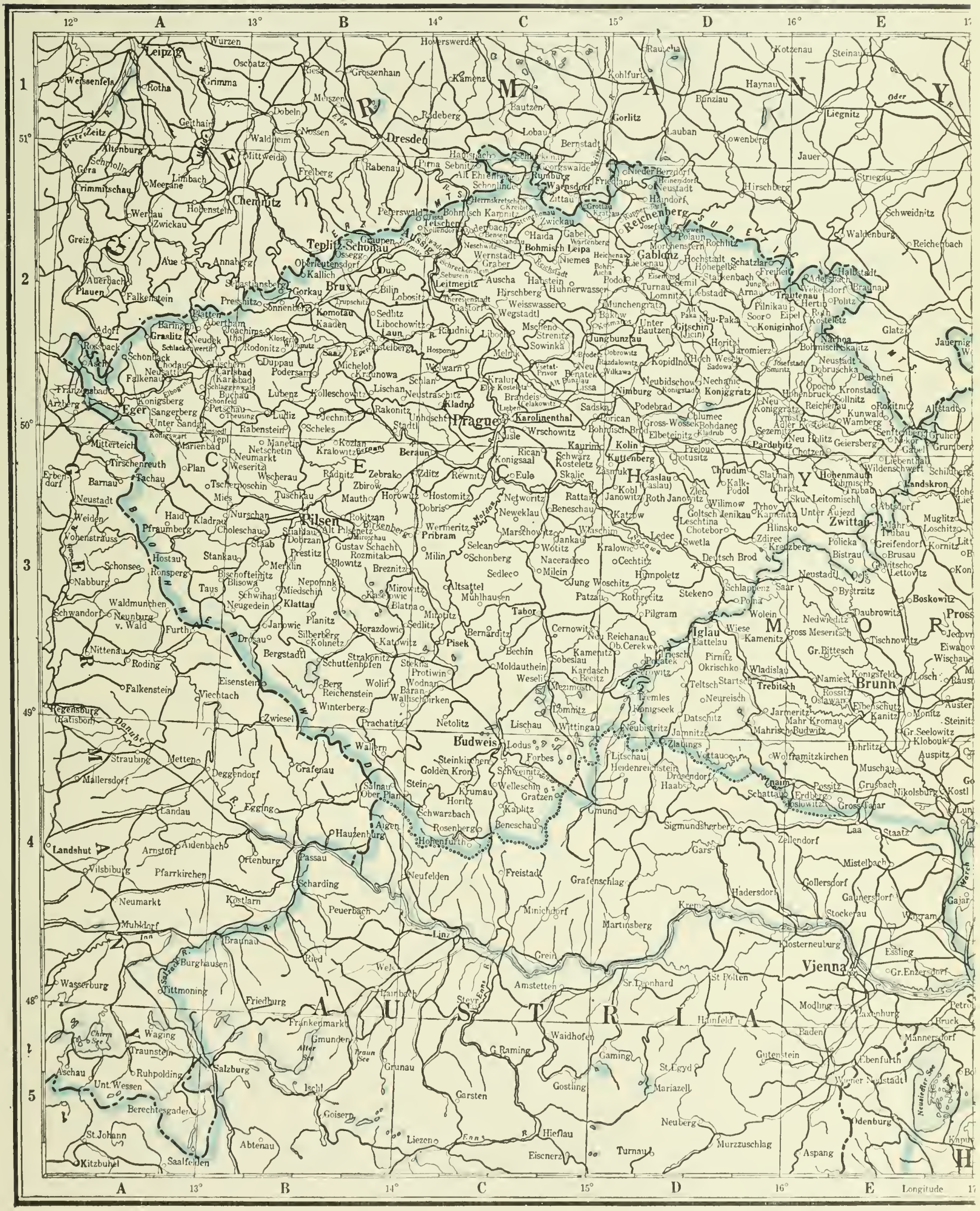
The country is watered by the Elbe and its tributary, the Moldau, and by the March (or Morava), Waag and other affluents of the Danube; it is rich in mineral resources; and agriculture is unusually highly developed. The monetary unit is the *Koruna*, or Crown.

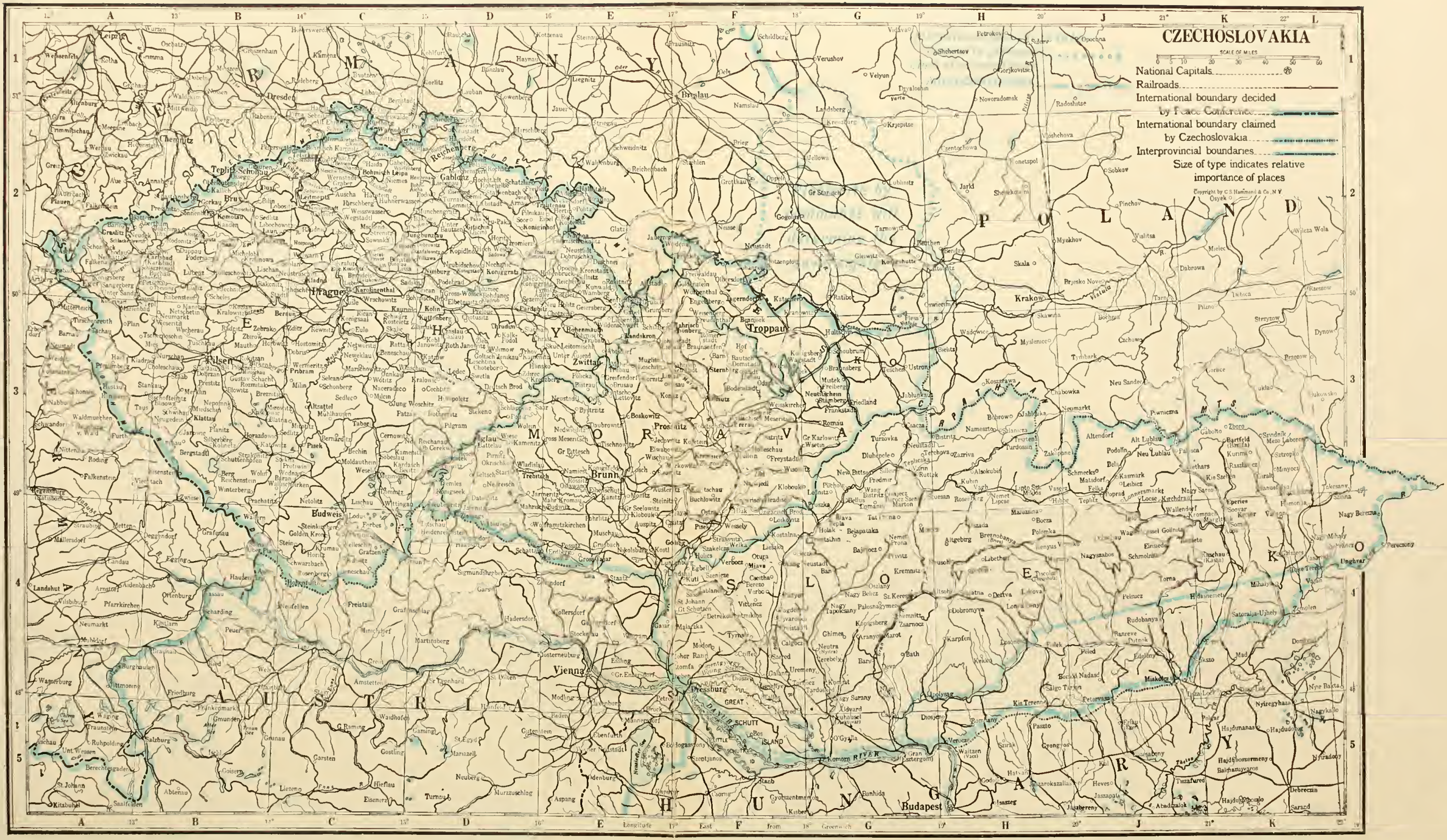
History.—The Czechs established themselves in their present home toward the end of the sixth century, having been driven westward from the Carpathians by the Avars, and at the same time the Slovaks settled in Northern Hungary. The Slovaks soon came under the Magyar yoke and for a thousand years had no independent history, while the Czechs formed the once powerful kingdom of Bohemia (q. v.). In 1526 under threat of Turkish invasion they united in a defensive union with Austria and Hungary, electing Archduke Ferdinand of Hapsburg to the throne. From the beginning the Hapsburg rulers adopted a policy of Austrianization and Germanization, but the national spirit of the people remained strong, and in 1618, tired of foreign interference, they revolted, deposed Ferdinand II, the Hapsburg ruler, and made the Protestant Elector Palatine, Frederick, their king. They were defeated, however, at White Hill in 1620 (see THIRTY YEARS' WAR), the elector was overthrown, and the whole country was ravaged and deprived of its independence. From this time on the Czecho-Slovaks practically disappear from history until 1848, when a new movement for independence in Bohemia was defeated and the reign of absolutism confirmed. In 1867 a further step in oppression was taken when Austria and Hungary reached an agreement whereby Bohemia, Moravia, and Silesia, though nominally independent, became subject to Austria, and Slovakia to Hungary.

During the World War (see EUROPE, GREAT WAR OF) large numbers of Czecho-Slovaks refused to aid Austria-Hungary, and a movement for independence was organized abroad by the Czech leader, Thomas G. Masaryk. The republic proclaimed on Oct. 18, 1918, was confirmed by the peace treaties of Versailles, St. Germain and Trianon. A Constitution adopted on Feb. 29, 1920, provided for a bi-cameral legislature which had power to elect a President for a seven-year term.

Dr. Masaryk, hitherto provisional head of the state, was elected President in 1920, and reëlected in 1927. He resigned on Dec. 14, 1935, and was succeeded by Dr. Eduard Beneš. Czecho-Slovakia joined with Yugoslovia and Rumania as a 'Little Entente,' making a pact of mutual assistance, and like treaties were concluded with France (1924) and Russia (1935). These measures to ensure the territorial integrity of the country collapsed as soon as they were put to the test in 1938.

The government had been slow to concede autonomy to minority racial groups within its frontiers, and in the fall of 1938 Hitler


12°
A
13°
B
14°
C
15°
D
16°
E
1
2
3
4
5
51°
50°
49°
48°
G E R M A N Y
B O H E M I A
M O R
A U S T R I A
E R Z G E B I R G E
B O H M E R W A L D
S U D E T I C
Leipzig
Dresden
Chemnitz
Gorlitz
Liegnitz
Reichenberg
Teplitz-Schonau
Aussig
Karlsbad
Eger
Marienbad
Pilsen
Prague
Kladno
Kolin
Kuttenberg
Pardubitz
Koniggratz
Jungbunzlau
Budweis
Tabor
Pisek
Iglau
Brunn
Znaim
Linz
Vienna
Salzburg
Passau
Regensburg
Landshut
Danube R.
Moldau
Elbe
Inn
Oder
Longitude


CZECHOSLOVAKIA
SCALE OF MILES
0 5 10 20 30 40 50 60
National Capitals
Railroads
International boundary decided by Peace Conference
International boundary claimed by Czechoslovakia
Interprovincial boundaries
Size of type indicates relative importance of places
Copyright by C.S. Hammond & Co., N.Y.
GERMANY
POLAND
AUSTRIA
HUNGARY
BOHEMIA
MORAVIA
SLOVAKIA
SUDETES
CARPATHIAN MTS.
DANUBE
GREAT SCHUTT ISLAND
LITTLE SCHUTT ISLAND
Prague
Vienna
Budapest
Pressburg
Brunn
Pilsen
Budweis
Troppau
Breslau
Dresden
Krakow
Leipzig
Chemnitz
Reichenberg
Olmutz
Kaschau (Kassa)
Ungvar
Miskolcz
Salzburg
Linz
Longitude East from Greenwich
A B C D E F G H J K L
1 2 3 4 5

peremptoriliy demanded that the predominantly German area (Sudetenland) on the western frontier be transferred forthwith to the Reich. Fellow members of the Little Entente, and Russia, refused to implement their treaty obligations at this juncture, and when France, failing to get promise of British support, likewise declined to come to her aid, the government had to yield before the threat of a German invasion.

France and Great Britain signed an accord with Hitler in Munich (Sept. 29, 1938) by the terms of which an international commission was to supervise the method of German annexation of Sudetenland; the outcome was that Czechoslovakia lost one-fifth of its territory and population. Forthwith, Hungary and Poland annexed respectively 4,787 and 405 square miles of territory from defenseless Czechoslovakia, thus completely altering the balance of power in Europe. Hitler's annexation of Austria (March 12, 1938) had greatly increased the peril of Czechoslovakia's position, for German territory now enveloped its most vital military and industrial areas on three sides.

President Beneš resigned Oct. 6, 1938; for 56 days the government was in the hands of Gen-Jan Syrovy; and on Nov. 30 Dr. Emil Hacha, president of the supreme court, was elected president of the republic.

Separatist turmoil continued by Slovaks against Czechs, accompanied by bomb outrages. On March 15, 1939, German troops occupied Prague, the capital. Slovakia seceded on March 14, declared its independence, and on the 16th Dr. Tiso, its president, offered Slovakia to Hitler. The German government incorporated the 'Protectorate of Bohemia and Moravia' as an integral part of the Reich. Great Britain, France, Russia, and the United States declined to recognize that status and threw their support to the Czechoslovak provisional government which Dr. Beneš established in London in July 1940. Between October 1944 and May 1945 liberation of the country was effected, and territory taken by Germans, Poles, and Hungarians was restored. Sovereignty over Subcarpathian Ruthenia was transferred to Russia by the Treaty of Moscow (July 29, 1945). The government returned to Prague May 10, 1945, followed by President Beneš May 25.

Consult T. G. Masaryk, *The Making of a State* (1929); Holland, *Czechoslovakia* (1931); Wiskemann, *Czechs and Germans* (1938); Seton-Watson, *A History of the Czechs and Slovaks* (1943); Thomson, *Czechoslovakia in European History* (1944); Taborsky, *The Czechoslovak Cause* (1944) and *Czechoslovak Democracy at Work* (1946).

Czechs, cheks, or Czekhs, a Slavic people, settled in the extreme n.w. of the old Austro-Hungarian Empire. Their tongue, including its dialects Moravian and Slovak, is one of the west branches of the Slavonic family of languages, of which Russian is the chief. The name Czech (etymology obscure) is first used by the Russian monk Nestor (1056–1116). See Czechoslovakia; Slavs.

Czenstochowa, chen-stō-kō'-vä (Czestochowa), town, Poland, county of Kielce, is situated on the Warta, near the frontier of Silesia, on the railroad from Warsaw to Cracow; 143 miles southwest of Warsaw. It contains a convent with St. Luke's alleged picture of the Virgin—the famous 'Black Virgin'—visited yearly by thousands of pilgrims. Cotton and woolen cloth and paper are manufactured. In 1655 Czenstochowa was the only place in Poland which offered resistance to Charles Gustavus of Sweden. Pop. (1945 est.) 120,000.

Czermak, cher'mäk, Jaroslav (1831–78), Bohemian painter, brother of Johann Czermak (q. v.), studied at Antwerp and Brussels under Gallait, and began his career as an artist by painting subjects from Bohemian history, especially the period of the Hussites. His canvas representing *Rudolph II's Court Poet Begging on the Bridge at Prague* (1854) is among his early works. In 1858 he undertook a journey through Hungary and the Balkan peninsula, and from this time his paintings deal chiefly with the people of those countries.

Czernin, Ottokar, Count (1872–1932), Austro-Hungarian statesman, was Joint Foreign Minister from 1916 to 1918. He was forced out of office upon the publication of the Emperor Karl's (Charles) letter to his brother-in-law, Prince Sixtus of Bourbon-Parma, to approach the governments of Great Britain and France to effect the withdrawal of Austria-Hungary from the First World War by making concessions to Italy of territory from the Dual Monarchy.

Czernovitz, cher'nō-vits, (Rum. Cernautzi), city, Rumania, capital of Bukovina, is situated on the Pruth, near the Rumanian border; 165 miles by rail s.e. of Lemberg. It is the see of an archbishop of the Orthodox Greek Church, and has a university, founded in 1875. Its most prominent public buildings are the archiepiscopal residence (1864–75), which contains the provincial museum; the Greek Cathedral (1864), on the model of St. Isaac's of Leningrad; and the Jewish synagogue (1877), in Moorish style. Czernovitz was the seat of an active trade, and had machine shops, sawmills, breweries, and other industries. Pop. (1937) 110,357.

Czernovitz was the scene of some of the most violent conflicts of the First World War.

Czerny George, or Kara George (1766–1817), Serbian patriot, grandfather of King Peter of Serbia (q. v.), was born of peasant parentage. Of gigantic stature and herculian strength, dauntless courage, and resourcefulness, he was a born leader, and after collecting a band of followers, with secret help from Russia, he not only repeatedly defeated the Turks, but wrested Belgrade from them, and ruled it from 1806 to 1813, striking such terror into his foes that they called him *Karajorj* ('Black George'), a term which was afterward adopted as the designation of the Yugoslav dynasty. But when Russia and France went to war, the former could no longer assist Czerny, and he was compelled to take refuge in Vienna. Milosh Obrenovich succeeded him, and when Czerny returned to his native country, he was assassinated.

Czerny, Karl (1791–1857), Austrian composer and pianoforte teacher, was born in Vienna. He studied under Beethoven after he had become famous as a teacher at fourteen. His compositions number almost a thousand.

Czolgosz, Leon (1873–1901), American anarchist, assassin of President McKinley, Sept. 6, 1901. He was born in Detroit of Polish-German parents, and was executed Oct. 29.

Czuczor, tso͞ot'sor, Gergely (1800–66), Hungarian poet, was born at Andod (Nyitra). He became a Benedictine monk in 1824, and from 1825 to 1835 was teacher in Raab and Komorn. He was also secretary of the Hungarian Academy, under whose auspices he edited four volumes of the great Hungarian lexicon (6 vols. 1861–74). His patriotic *Poems* (1824–33) excited great enthusiasm, and in 1836 a collection of them was published. For the publication of another poem of the same kind, *Riadó* (Call to Arms), in December, 1848, he was sentenced to six years' imprisonment, though he was pardoned in 1851. Besides these, he wrote a *Life of Washington* (1825).

D

D, the fourth letter in the English alphabet, as well as in the Phoenician, Hebrew, Greek, and Latin, from which last it was immediately derived. It originally represented the sound which it generally has in English—*viz.* a voiced *t* or voiced point stop. (See T.) This tends to change into the corresponding spirant, which is *th* in English 'breathe.' In other languages *d* itself takes that value, as in modern Greek and Hebrew (*cf.* B). In modern English the most frequent change in the pronunciation of *d* is that it becomes voiceless—*i.e., t*—when it follows a voiceless consonant ('dropped,' 'backed').

D, the Roman numeral for 500, represented one-half of the original Tuscan numeral_CIↃ. A dash over the D, as D̄, denotes that its value is increased tenfold.

D, in music, is the second note in the natural scale of C. The major key of D has two sharps; the minor key, relative to the major key of F, has one flat.

Dab (*Limanda limanda*), a species of flounder, common on European coasts. It is distinguishable from plaice and flounder by its light-brown, or ashen-gray color, with small irregular dark spots, by the roughness of its small, close-set scales, and by its more arched lateral line. Its length is from 8 to 16 inches. The Rusty Dab (*L. ferruginea*) and Rough Dab (*Hippoglossoides platessoides*) are found in the American North Atlantic, and the Alaska Dab (*L. aspera*) in the North Pacific.

Dab'chick, any of the smaller grebes, especially in the United States *Podilymbus podiceps,* or in England *Podiceps fluviatilis.* They haunt sluggish streams, lakes, and ponds, and are exceedingly quick divers. See Grebe.

Dab'ney, Charles William (1855–1945), American educator, was born in Hampden-Sidney, Virginia. He was educated at Hampden-Sidney College, the University of Virginia, and at Göttingen (ph.d. 1880); was professor of chemistry at the University of North Carolina (1880–81); director of the North Carolina Agricultural Experiment Station and state chemist (1880–87); professor of agricultural chemistry at the Tennessee Experiment Station (1887–90); president of the University of Tennessee (1887–1904); and Assistant U. S. Secretary of Agriculture (1892–7). From 1904–20 he was president of the University of Cincinnati. He was a member of the Southern Education Board from 1901 to 1912. His publications include: Experiment Station *Reports; History of Agricultural Education* (1900); *Man in the Democracy* (1904); *The Meaning of the Solid South* (1909); *Fighting for a New World* (1919).

Da Capo, dä kä'pō (abbrev. *D.C.*), in music, a direction to return to the beginning of the movement, and repeat to the word *Fine* or the sign *:S:*.

Dacca, dak'kȧ, city India, in Bengal, on the Buri-Ganga, connecting the Ganges and the Brahmaputra; 150 miles northeast of Calcutta. It was the capital of the short-lived Province of Eastern Bengal and Assam (1905–12). From about 1610 until 1704 it was the seat of the Mohammedan government of Bengal. The suburbs extended 15 miles northward, where mosques and brick buildings are still found buried in thick jungle. The manufacture of muslins, celebrated in the eighteenth century, is almost extinct, but shell carving, carried on from ancient times, is still an important industry. Pop. (1941) 213,218.

The ***Division of Dacca*** consists of four districts: Dacca, Mymensingh, Faridpur, and Akarganj. Its area is 14,822 square miles and its population, 13,864,104. The ***District of Dacca*** has an area of 2,723 square miles; pop., 3,432,577. Consult B. C. Allen's *Dacca.*

Dace, Dare, or Dart (*Leuciscus vulgaris*), a fresh-water fish in the carp family Cyprinidae, and of the same genus as the roach, chub, minnow, etc., commonly the prey of youthful anglers. The various species include the Horned Dace, Long-nosed Dace, and the Red Dace (*Notropis megalops*), or common Shiner.

D'Ache, Caran. See Poiré, Emmanuel.

Dachshund, däks'ho͝ont ('badger dog'), a breed of dogs long common in Germany and introduced into Great Britain towards the middle of the nineteenth century. In shape and appearance the dachshund is allied to the basset hound, having very short legs, an abnormally long body, and a head resembling that of a miniature bloodhound; in color it is black and tan or brown. It is a good water dog, affectionate, and courageous.

Dachshund.

Dacia, dā'shi-*a*, an ancient region north of the Danube, including the modern Transylvania, Wallachia, Moldavia, Bessarabia, and part of Hungary. Its capital was Sarmizegethusa, later Ulpia Trajana, in southwestern Transylvania. Its inhabitants were akin to the Getae (q. v.), or Goths, and first became important in the reign of Domitian, when their king Decebalus threatened the empire, and was only bought off by an annual payment. Trajan waged a five years' war with the Dacians, from 101 to 106 A.D., and made Dacia a Roman province. It remained part of the empire until 274 A.D., when Aurelian withdrew its garrison and people to the south of the Danube.

Dacier, dȧ-syā', André (1651–1722), French scholar, was born at Castres, Languedoc. He was appointed royal librarian in 1694, and later became a member of the Academy, and in 1713 its permanent secretary. His work was confined to editing minor classical authors, and to making indifferent translations of Horace, Plato, Aristotle, etc. Madame Dacier (1654–1720) who, prior to her marriage was Anne Lefèvre, translated both the *Iliad* and the *Odyssey,* Aristophanes, Plautus, and Terence.

Dacites, dā'sīts, are volcanic rocks which occur principally as lava flows, and are very closely related to the andesites. They consist of plagioclase, feldspar, quartz, and biotite or hornblende, and are therefore essentially quartz andesites; occasionally they contain pyroxene. Dacites are abundant in Hungary (the name is derived from Dacia), the Aegean Islands, and in North America, especially in Nevada.

Dacoits, da-koits', or Dakaits, a name used for brigands herding in gangs in various parts of India, and living by *dakaiti* or robbery with violence, similar to thugs (q. v.).

Da Costa, dä kos'tä, Isaac (1798–1860), Dutch poet, was born in Amsterdam, of Portuguese-Jewish descent, and was a pupil and poetic ally of Bilderdijk. His fame rests upon the politico-historical poems, *Vijfentwintig Jaren* (1840), *Hagar* (1847), and *De Slag bij Nieuwpoort* (1859); but he also wrote a *Life of Bilderdijk* (1859), and an historical work, *Israël en de Volken* (1848–9).

Dacryd'ium, a genus of tall, coniferous trees with a slightly drooping habit. Among the species are *D. taxoides,* a native of

AY 2

New Caledonia; *D. frankilini,* the Huon pine, a Tasmanian species possessing a distinct and pleasant fragrance (its wood is hard and suitable for ships' spars, and for carving); and the New Zealand *D. cupressinum,* a beautiful tree which occasionally reaches a height of a hundred feet.

Dacryocystitis, dak'ri-o-sis-tī'tis, inflammation of the lachrymal sac.

Dactyl, dak'til, in Greek and Latin versification, a measure consisting of one long and two short syllables. It is the basis of the hexameter measure.

Daddy-long-legs, a popular name for the very long-legged, globular-bodied 'harvestmen' of the family Phalangidæ, which are closely related to the spiders. They feed on insects, and on soft fruits and vegetables. The eggs are laid in the ground under stones or in crevices of wood. Numerous species inhabit North and South America and other warm regions. The name is used in England for the crane-flies (q. v.) of the family Tipulidæ.

Da'do, in architecture, the solid cubic block which forms part of the pedestal of a column between the base and cornice. The term is also applied to the space running around the walls of a room to a height of three or four feet from the floor, decorated in paper or distemper different from the remainder of the walls.

Dædalus, ded'*a*-lus, in Greek mythology, an Athenian of the royal house, who was forced to leave Athens because he had murdered his sister's son and his own pupil. He then went to Crete, where he made the famous wooden cow for Pasiphaë; and, after the birth of the Minotaur, constructed the labyrinth in which the monster was confined. This brought him into disfavor with Minos and consequently Dædalus made wings for himself and his son Icarus, with which he flew to Italy, though Icarus flew too near the sun and the wax which held the wings melted causing him to fall into the sea. From Italy Dædalus went to Sicily, where he erected various marvellous works, and then to Sardinia. He is said to have invented the axe, the saw, the auger, the gimlet, and glue; and in sculpture to have been the first to give lifelike action to statues.

Daendels, dän'dels, HERMAN WILLEM (1762–1818), Dutch general, was born in Hattem. He served with Dumouriez (1793) and Pichegru (1795); entered the service of the king of Holland (1806), and was appointed (1807) governor-general of the Dutch East Indies, which he ruled until the capture of Java by the British in 1811. Returning home, he accompanied Napoleon into Russia (1812–13), and in 1815 was entrusted with the organization of the Dutch West African colonies.

Daet, dä-ātī', pueblo, Luzon, Philippine Islands, in Ambos Camarines province, on the Daet River; 140 miles southeast of Manila. Pop. (1918) 14,413.

Daffodil, the popular name for *Narcissus pseudovarcissus,* a member of the order Amaryllidaceæ. See NARCISSUS. died June 2

Dafoe, ALLAN ROY (1883–1943), Canadian physician, son of a doctor, took his degree at the University of Toronto and became a general practitioner in 1907. He sprang into prominence and popularity by attending the birth of the Dionne Quintuplets and afterwards supervising the task of rearing the five sisters. His services were recognized (1935) by the award of a medal (Civil Division) of the Order of the British Empire.

Dagami, dä-gä'mē, pueblo, Leyte, Philippine Islands, on the Binahaan River, 15 miles southwest of Tacloban. Pop. (1918) 17,803.

Dagestan, dä-ges-tän', or DAGHESTAN, an autonomous Soviet republic. It extends along the Caspian, and stretches inland to the crest of the Caucasus range; area, 13,600 square miles. The chief town is Makhach-Kala (formerly Petrovsk). Agriculture is often carried on under great difficulties. Cattle-grazing is the most widespread occupation, and there are also domestic manufactures and some trade; sulphur and salt are worked. The people are mixed, but chiefly Lesghians in the mountains and Tatars along the coast. Since 1921 it has constituted a part of the Russian Socialist Federal Soviet Republic but is governed by its own Central Executive Committee and Council of People's Commissaries. Pop. 787,000.

Dag'ger, a short, acutely pointed weapon usually having a flat triangular blade and cylindrical grip. The earliest forms were of flint (abundant in Scandinavia), bone or horn. Copper, iron, and bronze daggers, often richly decorated with gold and silver, and some few specimens of solid gold and silver have been known since early Persian and Egyptian times.

Dagnan-Bouveret, dȧ-nyäṅ'-bo͞o-v'rā', PASCAL ADOLPHE JEAN (1852–1929), French painter, was born in Paris. He studied under Gérôme, and in 1876 was awarded the second Prix de Rome. His first Salon pictures (1875–7) were classical subjects and portraits; but his reputation was established by his reproductions of Breton life and character, of which *A Wedding-party at the Photographer's,* the amusing *Vaccination,* and *Le pain benit* (Luxembourg, 1885) are typical examples. His *Breton Pardon* (1887) was the event of the Salon, and his other striking picture of that year, a Virgin in sunlight and shadow, gave the first indication of the mystic and religious tendencies later further developed in his *Last Supper* (1896), and *The Supper at Emmaus* (1898). Several examples of his paintings are in the United States, one of his figures of a Breton peasant being in a private collection in Chicago, while *A Pardon in Brittany* is in New York, and his finest peasant picture, *The Village Musician* (1880), is in the Walters Collection, in Baltimore. He was made an officer of the Legion of Honor in 1884. His work is thoughtful and sincere, his modelling admirable, and he exhibits both keen observation and humor.

Dago, a sailor's term for any one of Spanish, Portuguese, or Italian descent; said to be a corruption of the common Spanish name Diego (Jack or James). The term is colloquially employed in the United States to designate Italian laborers.

Dagö, däg-û', DAGDEN, or GIOMA, island belonging to Esthonia, in the Baltic Sea, near the entrance of the Gulf of Finland, area, 367 square miles. Its shores are rocky and rugged, and the soil is sandy and marshy, and well forested. The population, about 16,400, three-fourths of whom are Esthonians, are chiefly engaged in fishing and cattle-rearing.

Dagoba. SEE TOPE.

Dagobert I., dag'ō-bȧ, Merovingian king of the Franks, who ruled from 628 to 638. His reign is the most brilliant period of the fifth and sixth centuries. He surrounded himself with high ecclesiastics and greatly enriched the churches, founded the Abbey of St. Denis and brought the Basques, for a time at least, under subjection.

Dagon, dā'gon, a deity worshipped by the Philistines. He had temples at Gaza (Judges xvi. 23 *f.*) and Ashdod (1 Sam. v. 1 *f.*), and seems to have been represented as a fish (Heb. *dag*), though with human face and hands (1 Sam. v. 4), and even feet, according to the Septuagint version of the latter passage. Many recent investigators maintain that Dagon was not a fish-god, but rather the god of agriculture (see 1 Sam. vi. 4), derived from the Babylonian Bel; and this seems to be borne out by the fact that the name Baal-Dagon, in conjunction with an ear of corn, is found on a Phœnician seal.

Daguerre, da-gâr′ Louis Jacques Mandé (1789–1851), the inventor of the diorama and the pioneer of the process of photography named after him (daguerreotypy), was born in Cormeilles, Normandy. For many years he experimented unsuccessfully to fix the pictures in the camera obscura, and finally coöperating with J. N. Niepce (1827), who for fifteen years had been laboring to attain the same object, and had made some important discoveries, the two worked together at their 'sun-pictures' up to the time of Niepce's death (1833). Daguerre's experiments at length proved successful and in 1839 the discovery was announced to the world. His published works include *Historique et description des procédés du Daguerréotype et du diorama* (1839; Eng. trans. 1839), and *Nouveau moyen de préparer la couche sensible des plaques destinées à recevoir les images photographiques* (1844).

Daguerreotype. See Photography.

Dagupan, dä-gōō-pän′, town, Luzon, Philippine Islands, in the province of Pangasinan, on the south shore of Lingayen Gulf, at the mouth of the Agno River; 120 miles north of Manila. It is the northern terminus of the railroad from Manila, has road communications with all the surrounding provinces, and is an important trade center. Pop. (1918) 22,441.

Dahabiyeh, dä-hä-bē′yeh, or Dahabeah, a decked passenger boat used on the Nile. It has a sharp prow, a broad stern, and one or two masts with lateen sails, and is similar in arrangement to the houseboats used in England and the United States.

Dahl, däl, Johann Kristen Clausen (1788–1857), Norwegian painter, was born in Bergen. After studying in Copenhagen he settled in Dresden (1818), becoming professor in the academy there. His paintings, chiefly landscapes, though realistic, are lacking in technique. He also published (1837) a work on the decorative wood architecture of Norway.

Dahl, Vladimir Ivanovitch (1801–72), Russian author and lexicographer, served as a doctor in the Turkish campaign (1829–33) and for years occupied government positions. In 1858 he settled in Moscow where he wrote, under the pseudonym of Kasak Lugansky, a number of tales of Russian life. He is chiefly remembered for his excellent Russian Dictionary (4 vols., 1861–8), and his work on Russian songs and folklore.

Dahlak, dä-läk′, archipelago in the Red Sea, off the Bay of Massowah, forming part of the Italian colony of Eritrea. Since the time of the Romans it has been famous for its pearl fisheries.

Dahlgren, däl′gren, John Adolf (1809–70), American naval officer, was born in Philadelphia, the son of a Swedish father and an American mother. He entered the U. S. navy as a midshipman in 1826, soon showed exceptional ability as a mathematician, and in 1834–8 was engaged on the U. S. Coast Survey, then under the direction of Ferdinand R. Hassler. Failing eyesight forced his retirement for four years (1838–42), and in 1847 he was assigned to the ordnance department, soon becoming an authority on all matters concerning naval armaments. He invented a light howitzer which was adopted by the Navy Department in 1850, and in the same year invented the powerful shell gun which bears his name and the introduction of which was an event of great importance in the history of the development of large ordnance. This gun, a cast-iron smooth-bore, was so cast that the thickness at all points would vary in direct proportion to the varying force between breach and muzzle of the powder discharged at the breach. Dahlgren was also instrumental in securing the adoption of powerful eleven-inch guns for the navy. Immediately after the outbreak of the Civil War he was made commandant of the Washington Navy Yard; in July, 1862, he was placed at the head of the U. S. Bureau of Ordnance; and in February, 1863, was promoted to the rank of rear-admiral. He succeeded Admiral Dupont as commander of the South Atlantic Blockading Squadron in July, 1863, vainly tried, in coöperation with Gen. Q. A. Gillmore, to effect the capture of Charleston, S. C. (July-September, 1863), efficiently conducted the blockade of the Southern coast, assisted the land forces under Gen. W. T. Sherman in the capture of Savannah (Dec. 23, 1864), and finally in February, 1865, gained possession of Charleston harbor. After the war he commanded the South Pacific Squadron (1865–7), and was again chief of the ordnance bureau (1868–70). Among his publications are *Boat Armament of the United States Navy* (1852), *Ordnance Memoranda* (1853), *Shells and Shell Guns* (1853), and *Notes on Maritime Law* (1877).

Dahlgren, Karl Frederik (1791–1844), Swedish humorous author, was born near Norrköping. He was educated at Uppsala and became a clergyman. His first great work *Molbergs Epistler* (1819–20) showed an odd blending of the idyllic and burlesque. He also wrote *Aurora* (1815), and a humorous romance, *Nahum F. Bergströms Kronika* (1831).

Dahlgren, Madeleine Vinton (1835–98), American author, wife of Admiral John A. Dahlgren (q. v.) was born in Gallipolis, O., the daughter of Samuel F. Vinton, a Whig leader in that State. She married, first, Daniel C. Goddard, of Zanesville, O., and second, in 1865, Admiral Dahlgren, after whose death she resided in Washington, where she assisted in founding the Literary Society of that city acting as its vice-president for several years. Besides contributions to periodicals over the pen names of 'Corinne' and 'Cornelia,' she published, among other books *South Sea Sketches* (1881), *Etiquette of Social Life in Washington* (1881), and *Lights and Shadows of a Life* (1886). She also made translations from the French and Spanish.

Dahlia, däl′ya, a genus of herbaceous composite plants which derives its name from the Swedish botanist Dahl (1791). They are cultivated extensively for their profuse and richly colored bloom, which makes them extremely decorative. There are as many as 2,500 varieties, practically all of which have come from one greatly variable species known as *D. variabilis* or *D. rosea*. The cactus variety however, has been developed from *D. juarezii*. Dahlias are known as show, fancy, pompon, single and cactus. They vary from the single type, not unlike a daisy with broad rays, to the tiny, tightly-quilled, formal 'pompon,' and to the 'cactus-flowered,' resembling a chrysanthemum; and their colors are equally varied. Yellow, lilac, white and the deepest maroon, are found in innumerable combinations, in fact the only colors lacking are the shades of blue. The show and fancy dahlias are very similar but the show dahlia is generally of one color, while the fancy is always of two or more colors.

Dahlias are propagated by cuttings, by division of roots, by grafting to produce rare varieties, and by seeds to produce new kinds. The first method is the one used commercially and the second the most successful for the amateur. Any rich soil, enriched by manure or some commercial fertilizer, will grow dahlias. Planting should be done early in the spring, placing the roots 18 to 36 inches apart, in rows 4 feet apart and 6 to 8 inches deep. In the fall the roots should be lifted and after being dried in the air should be stored in a cool dry place for the winter.

Dahlmann, däl'män, FRIEDRICH CHRISTOPH (1785–1860), German historian and statesman; was born in Wismar. He was professor at the universities of Kiel, Göttingen, and Bonn from 1813 until 1842, and published *Quellenkunde der deutschen Geschichte* (1830; 6th ed. 1894). His chief works are *Geschichte von Dänemark* (1840–3), and a History of the English Revolution (Eng. trans. 1844). He was one of the leaders of the constitutional Liberals of Germany after the failure of the Hanoverian movement of 1848. Consult *Life* by Springer.

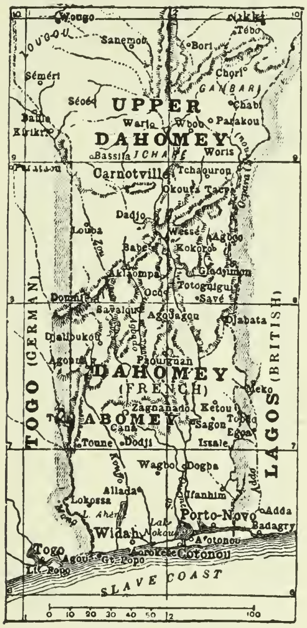
Dahlonega, dä-lŏn'ē-gä, city, Georgia, county seat of Lumpkin county, 25 miles north of the Southern and the Georgia Railroads; 60 miles northeast of Atlanta. The town has plants for the extraction of gold, which is mined in the surrounding country. It is the seat of the North Georgia College. Pop. (1930) 905.

Dahlstierna, däl-sher'nȧ, GUNNO EURELIUS (1661–1709), Swedish cartographer and poet, was born in Ohr. He was graduated from the University of Uppsala and conducted surveys in the Baltic region, Livonia, Rügen, and Pomerania. He was a man of intense patriotism, which found expression in a considerable number of songs in honor of his native land. Of these the best are his *Elegy on the Death of Charles XI* and *The Goth's Battle Song,* a spirited ballad.

Dahn, dän, JULIUS SOPHUS FELIX (1834–1912), German jurist and author, was born at Hamburg, and held professorships of law at Würzburg (1865), at Königsberg (1872), and at Breslau (1888). He achieved popularity by his novel *Ein Kampf um Rom* (1876; Eng. trans. 1878), which was followed by the less important and weaker *Kleine Romane aus der Völkerwanderung* (1882–1901); *Die Kreuzfahrer* (1884); *Was ist Liebe?* (1887); and *Julian der Abtrünnige* (1894). Of his historical writings *Die Könige der Germanen* (9 vols., 1861–1902) is the most important. Several collections of poems have been issued. With his wife he published the popular *Walhall, Germanische Götter- und Helden-Sagen.* A collected edition of his *Werke poetischen Inhalts,* in 21 volumes, appeared in 1898–9.

Dahomey, dä-hō'mi, a colony of French West Africa, reaching from the Gulf of Guinea northward to the indefinite limits of the ancient kingdom of Dahomey, with Nigeria on the east and Togoland on the west. The coast line measures about 70 miles; the total area of the colony is about 41,302 square miles.

The climate is moist and hot, particularly along the low sandy coast, where the average temperature is 80° F. There are four well-marked seasons, a long dry one from the first of December to the middle of March; a long wet one from the middle of March to the middle of July; a short dry one from the middle of July to the middle of September; and a short wet one from the middle of September to the first of December. Inland the surface is somewhat higher and the heat is less intense.



Dahomey.

The soil is a rich red clay and very fertile. Groves of oil-palms encircle each town, and palm-oil is made in large quantities. Maize, beans, and peas, as well as cassava, manioc, yams, sweet potatoes, limes, oranges, pineapples, and other tropical fruits grow luxuriantly; cotton, sugar, and coffee are also grown. Cotton cloth is made, and weapons and tools are forged from native iron. The principal imports are cotton goods and metal goods; chief exports palm kernels, palm oil and cotton. The chief port is Kotonu, from which a railroad runs into the interior to Chaoru (227 miles), with a branch to Whydah and Segborué on Lake Aheme. Another line links Kotonu with Porto Novo, the capital. There are several other railroads.

The population was (1935) 1,351,511, chiefly Negroes who belong to the Fon branch of the Ewe family. The chief business center and seat of government is Porto Novo (pop. 25,724).

The colony represents the former native kingdom of Dahomey, which for nearly two hundred years was a chief seat of the grossest fetish idolatry, involving yearly a great number of human sacrifices. These abominations were put an end to after the country was subdued by the French in 1892.

Daimiel, dī-myāl', city, province of Ciudad Real, Spain, 17 miles N.E. of the city of Ciudad Real. It is famous for its grapes and vegetables. Pop. 16,188.

Daimio, dī'mi-ō, or DAIMYO, the title of the feudal lords of Japan who rendered homage to their chief, the Mikado. They governed their domains as provinces of the empire and had many retainers and large holdings of land. With the abolition of feudalism in 1871, they surrendered their lands and privileges to the Mikado, who granted them pensions and relieved them of the support of their military retainers, the Samurai (q.v.).

Daimler, dīm'lėr, GOTTLIEB (1834–99), inventor of an exceedingly light and effective oil-engine, was born in Würtemberg. After receiving a technical education at Stuttgart, he spent two years as an engineer in the Karlsruhe machine works. In 1872 he joined Dr. Otto, near Cologne, and aided him in the production of the Otto gas engine. He became director of the gas-motor factory, but retired in 1882 to devote himself to the construction of light, high-speed gas and oil engines, and later, in 1887, to the invention and development of the motor-propelled carriage which bears his name. See OIL AND GASOLINE ENGINES; also MOTOR CARS; MOTORCYCLES.

Daingerfield, ELLIOTT (1859–1932), American artist, was born in Harper's Ferry, Virginia. In 1880 he went to New York, where he entered the studio of Walter Satterlee; later he became closely associated with George Inness. His work is characterized by great imagination, a true insight into the glory of nature, and a depth and brilliance of coloring. It is generally idealistic in conception and symbolic in treatment.

Among his best known works are *The Waters of Oblivion; Madonna and Child; Child of Mary; The Story of the Madonna; Slumbering Fog; The Genius of the Canyon;* and *The Epiphany* and *The Magnificat,* mural paintings for the Lady Chapel of the Church of St. Mary the Virgin, New York City. He wrote monographs on *George Inness* (1911) and *R. A. Blakelock* (1914).

Dairying is that branch of agriculture which has to do with the production of milk, butter, cheese, and other milk products. Dairying in the United States began with the early English colonists, and although the date when the first cattle became established is still in doubt, it is definitely known that cattle were landed at Jamestown, Va., in 1611 and at Plymouth, Mass., in 1624. Other importations followed during the next 150 years, and these cattle together with the natural increase in numbers gave rise to the present dairy industry.

The cattle of the colonial period were of the various kinds and breeds prevalent in the countries from which they were imported, the same animals supplying the work stock and meat for the colonists, as well as milk, butter, and cheese. The production of milk and other dairy products was incidental to the regular farm and home activities and the products were mostly consumed at home or sold nearby. Many families in towns and villages kept a cow to supply their own needs, and town women as well as farm women made butter at home for the family. There were no factories for making butter or cheese; cows calved in the spring, were milked during the pasture season, and allowed to go dry for the winter. They subsisted mainly on pasture throughout the summer and had but roughage and other coarse feeds in winter.

Dairy Cattle.—Little if any effort was made to develop herds strictly for dairy purposes until after the close of the colonial period. By 1790 a few cities had become large enough to furnish a market for considerable quantities of butter and milk, and trade and commerce were creating a demand for dairy products for export. Farmers then began to turn to types of cattle more suitable for dairy purposes. The first Holstein-Friesians were imported in 1795, the first Ayrshires in 1822, the first Guernseys in 1830, the first Jerseys in 1850 and the first Brown Swiss in 1869.

Breeds of dairy cattle, like races of people, have certain outstanding differences and characteristics that have been developed through many years of selecting and breeding in the countries of their origin. Aside from noticeable differences in form and color, the breeds differ mainly in the average quantity of milk they produce and in the richness of their milk. In richness of milk, or butterfat content, the Jersey ranks first, followed in order by the Guernsey, Brown Swiss, Aryshire, and Holstein breeds. In quantity of milk, the Holstein ranks first, followed by the Brown Swiss, Ayrshire, Guernsey, and Jersey breeds.

These are the principal dairy breeds in the United States today. In addition, however, large numbers of dual-purpose cattle, beef cattle, and cattle of mixed breeding are used for dairy purposes. Jerseys and Holsteins are about equal in number and, being the most numerous of the dairy breeds, make up about 55 per cent of all the cows milked. The dual-purpose breeds (Shorthorn and Red Polled) make up about 17 per cent of the total, Guernseys about 12 per cent, cattle of mixed breeding about 11 per cent, beef breeds 3 per cent, and Ayrshires and Brown Swiss 2 per cent.

The number of cows kept for milking purposes has increased steadily. In 1870 there were about 9½ million, in 1938 about 25 million. Since 1920, milk cows have been most numerous in the West North Central States, next numerous in the East North Central States, next in the South Central States, next in the North Atlantic States, next in the Western States, and least in the South Atlantic States.

Cows are kept more generally in those sections where hay is grown extensively, where grains are relatively cheap, or where climatic conditions favor the growth of pasturage. The Northeastern States have abundant rainfall, and pasturage and hay crops are grown steadily. As a result large numbers of cows are kept in that region. In the central West, where grain is grown extensively and prices are relatively low, dairying is also important. Other factors, such as nearness to large groups of consumers also encourage dairying.

Kinds of Dairying.—Cows are kept for milking purposes on about 80 per cent of all the farms in the United States, in numbers varying from 1 to 50 or more. Some farms have several hundred head. The kind of cattle and the size of the herd depend on a number of factors, such as the use to be made of the milk or the type of market, the system of farming the region, and the owner's preference.

In general Jerseys are more common in the South, where many farm families keep but 1 or 2 cows to supply milk and cream for home use, and in regions where cream is sold for butter-making. Holsteins are most numerous in the larger herds, and in regions where whole milk is marketed, for making cheese or evaporated milk, or for use as fluid milk. Dual-purpose cattle are more numerous in the general farming regions, and particularly on farms where milk production is a sideline enterprise and where farmers shift from livestock farming to dairying, or vice versa, as economic conditions change. One of the five dairy breeds is almost always found on the farms that make dairying the principal source of the income, however.

Small herds are usually found in regions where feed and pasture conditions are unfavorable for intensive dairying, or on farms where other enterprises are more profitable. The cows are fed mostly on roughages, such as silage and pasture; and many are milked only through the winter, when other farm work is slack. Usually the milk is separated on the farm, the cream is hauled to the creamery or nearby shipping station and sold for butter-making, while the skim milk is held on the farm for feeding pigs and poultry. Herds of less than 10 cows provide nearly half the cream used in the manufacture of creamery butter.

The largest herds, on the other hand, are found mostly in the market-milk areas, or within a few hundred miles of the big cities. In these areas, pastures are limited but more grain is fed and the cows yield greater quantities of milk. Whole milk is produced under rigid sanitary rules, and goes to the city for use as fluid milk or cream. Another type of dairying is the commercial herd maintained near a large city, chiefly as a milk-producing plant. Fresh cows are purchased to replace those that go dry, they are milked only as long as they maintain a good flow of milk, and then sold to the butcher as a rule. No young stock is raised, and practically all the feed is purchased.

All farmers who make a special business of dairying must continually replace the older cows with young ones. The breeding and raising of young stock is therefore an important part of the dairy industry on many farms. The more progressive dairymen belong to coöperative associations and employ testers to keep records of the milk and butterfat produced by every cow in the herd, also a record of the feed and income. With these individual records as a basis, the dairyman is able to feed each cow more efficiently and also to select those that are most suitable for building up the average producing ability of the herd. By this means farmers in these herd-improvement associations have improved their herds until the average production per cow is almost twice that of the average cow milked throughout the United States.

Cows kept for dairy purposes differ greatly in the amount of milk and butterfat they produce, the average production by all cows milked in the United States being about 4,500 pounds of milk per cow per year, or 170 pounds of butterfat. This average, of course, includes beef cattle and scrub cattle, as well as purebred dairy cattle. Cows kept by the more progressive dairymen produce considerably more than this; the average production of the 500,000 or more cows enrolled in the testing associations is about 8,000 pounds of milk, or 320 pounds of butterfat. Leading purebred cows of the various dairy breeds produce many times these amounts, which indicates the possibility of breeding higher-producing cattle.

Importance of Dairying.—Dairying is the largest single branch of the agricultural industry, as measured by the farm income it produces. Although this income includes the returns from the sale of meat and breeding animals and veal calves, the sale of dairy products alone accounts for nearly one-fourth of all the income farmers receive from the sale of all farm products. Dairying is also important because of its favorable relation to the production of crops that maintain soil fertility, because it provides the dairyman a steady income, and because of its stabilizing influence on agriculture in general, and most of all because of its relation to the proper nourishment of the people.

The steady growth and development of the dairy industry has been due in a large measure to the discoveries of scientists in many fields and to the application of scientific information in the sanitary production and distribution of milk and other dairy products. But one of the most important factors, perhaps, has been the endorsement and approval of milk as an essential part of diet by eminent nutritionists, physicians, educators, and health authorities. Although milk and its products were recognized as valuable foods for thousands of years, it remained for scientists to answer the question 'Why?' It is now known that milk contains sugar, fat, protein, minerals, vitamins, enzymes, and pigments. Even these major classes have been broken down by laboratory analyses into literally hundreds of different substances. The sugar and fat furnish energy and fuel for the body, the proteins furnish muscle-building material, the mineral group furnishes iron for the blood, and calcium and phosphorus for building strong bones and good teeth. The sugar of milk also plays an important role in maintaining the proper conditions in the intestinal tract for the absorption of the calcium into the body system. Of the various vitamins discovered, all are present in milk to some extent. Vitamins as a group promote growth and make for health and vigor, by protecting the body from so-called deficiency diseases.

Utilization of Milk.—The quantity of milk used for different purposes fluctuates from year to year and season to season, but in general about 42 percent is used as fluid milk or cream; 30 percent in the cities and villages, and 12 percent on farms where it is produced. The next largest quantity is that used for making butter, about 41 percent of all the milk being used in this way; 31 percent for creamery butter, and 10 percent for farm butter. The manufacture of cheese accounts for about 6 percent, condensed and evaporated milk 4 percent, and ice cream 3. The rest is used for various products such as milk powder and malted milk, and includes milk fed to calves or lost in handling.

The production of market milk, or milk sold for consumption in its fluid state, is the most exacting branch of the dairy business. Milk must be produced with the greatest care to avoid contamination with organisms that cause it to spoil or that make it dangerous to health. Many cities and towns have strict regulations for the control of the sanitary quality of the milk sold in them. Farmers are required to keep their herds free from disease, to milk only clean healthy cows, and to use approved sanitary measures in every step involved in producing, handling, and transporting the milk. All this involves considerable extra expense on the part of the producer and distributor of market milk, as well as skill and education in using scientific information, but the returns are also proportionately greater as a rule than for milk sold for other uses.

Many herds today are housed and fed in one barn, but milked in a special barn, or so-called milking parlor, where the most sanitary conditions can be maintained. Cows may be milked by hand, or by machine; but many leading dairies use the combine milking machine, which draws the milk from the cow by vacuum and sends it through a sanitary pipe line to vacuum tanks in the milk room. There it may be cooled and prepared for shipment, or pasteurized and bottled ready for the consumer, with no opportunity to come in contact with human hands or other sources of contamination.

Throughout the milk-sheds, or areas that furnish a city's milk supply, the large milk-distributing companies have country receiving or shipping stations along the railroads to which milk from the surrounding farms is brought daily. There the milk is tested for its butterfat content, weighed, and cooled for shipment to the city. It may be hauled by truck or shipped by railroad in cans, or in tanks made of stainless steel or glass-lined steel and built like a thermos bottle. Milk in such tanks can be transported over great distances without loss from changes in temperature.

Many cities require the milk dealer or distributor to pasteurize all milk, regardless of the sanitary measures used in its production. This heat treatment, or pasteurization, kills harmful bacteria but does not affect the flavor or food value of the milk; it is merely an added safeguard against the spread of disease.

Butter-making.—Until the introduction of the factory system in the middle of the 19th century, butter-making was entirely a farm industry. Most of the butter was still made on farms as late as 1900, for it was not until then that the factory system really began to operate successfully in the United States. By 1938, less than 25 percent of the nation's butter was being made on farms, the rest being produced in more than 5,000 creameries scattered throughout the country. More than 70 percent of the creamery butter is made in the East North Central and West North Central States. Minnesota is the leading butter State, with Iowa next.

Creameries are of various sizes, the capacity depending on the volume of milk produced in the surrounding territory or within a profitable shipping distance. Local creameries often buy only the cream produced in the immediate farming area, while large centralizer creameries in big cities may draw on the supply produced within a zone of several hundred miles. The tendency in recent years has been toward the use of whole milk, delivered fresh daily, instead of cream delivered once or twice a week. When a creamery buys whole milk, the skim milk must be utilized in the manufacture of byproducts, or concentrated for use as human and animal feed. Some creameries process their own skim milk, others ship it to larger plants for processing.

Until about 1908, butter was made entirely from soured cream, for it was considered that high acidity in the cream was necessary to give the butter a desirable flavor and to protect it from deterioration. About that time, however, scientists demonstrated that butter would keep its quality better for a long time in storage if it were made from low-acid, or pasteurized sweet cream, and today most creamery butter is made from such cream.

Cheese-making. — Factory production of cheese in the United States was developed somewhat earlier than that of butter, and was fairly well established by 1850. Farm production has declined steadily since that time and less than 2 per cent of all the cheese is now made on farms, the rest being made in more than 3,500 factories.

In the early days, cool nights and an abundance of cool, clear water were essential in cheese production. These conditions in the North were largely responsible for the start and growth of the industry there. Although factories are now found in nearly every State, most of the cheese is still made in the North. Wisconsin and New York are the leading States and make more than 80 per cent of the total output.

Research workers have developed scientific methods for making good cheese, but in most factories cheese-making is still an art rather than a science, and the quality or grade of the cheese varies with the skill of the cheese-maker. Where scientific methods are in use, and farmers produce the kind of milk demanded, factories are able to make good cheese consistently and of a quality equal to the best imported grades. Most cheese is made from fresh milk and for this reason the factories are local establishments that depend on nearby farms for their milk supply.

By far, most of the cheese made in the United States is of the English Cheddar variety, or so-called American cheese. This type is made in various sizes and shapes, or styles, which have such descriptive names as flats, long-horns, twins, and daisies. Recently this type of cheese has been cured in cans, for direct sale to the consumer, instead of being cured and sold in the usual bulk forms. Canned cheese has numerous advantages over the bulk form, from the manufacturer's point of view as well as the consumer's. Some factories specialize in making foreign types of cheese; particularly Swiss in Wisconsin and Ohio, Munster in Wisconsin and New York, Brick in Wisconsin, Illinois, Idaho, and Minnesota, and Limburger in Wisconsin, New York, Minnesota, and Illinois. Soft cheeses, such as cream cheese and cottage cheese, are also made extensively.

Concentrated Milks.—Milk contains about 87 percent water, all or part of which may be removed by heating to make condensed milk, evaporated milk, or dried milk. Condensed milk is preserved by adding sugar after about two-thirds of the water has been removed. Evaporated milk is condensed milk with nothing added, but which is sterilized in the cans under pressure by live steam to kill organisms and destroy the enzymes. Dried milk is the product resulting from removal of practically all the water, and is in powdered form. All these concentrated forms may be made from either whole or skim milk, and are made principally in States where there are large creameries.

Condensed milk was the first of these products made in the United States and dates back to 1856, when the first patent for the process was issued to Gail Borden. By 1861 condensed milk was found to be a valuable food for Civil War soldiers and this fact had much to do with making it popular. Evaporated milk was developed in the 1880's. The World War period created a demand for this product for shipment abroad, not only for the armies but for starving children and refugees. Evaporated milk production now amounts to nine times the production of the sweetened condensed product. Both these products make up the bulk of exports of dairy products from the United States. Dried, or powdered milk, is a comparatively recent product in the dairy industry, but has made enormous growth since 1925. Some powdered whole milk is made, but far the greater quantity is dried skim milk. Most of it is used by bakers, confectioners, and ice-cream manufacturers. Some buttermilk is also dried for use in poultry and hog feeds.

Ice Cream.—Ice cream is strictly an American dish, once regarded as a luxury but now consumed the year round for both its food value and its delectability. Commercial factory production, which began in Baltimore, Md., in 1851, has now practically displaced the home-freezer except in rural areas and villages. More than 20,000 plants now make it, in every State; the largest production, however, is in States with large cities, being particularly outstanding in Pennsylvania, New York, California, Illinois, and Michigan.

Milk Byproducts.—The increasing volume of skim milk, buttermilk, and whey in dairy plants has made it necessary to find some profitable way to utilize these byproducts. Casein is produced from both the skim milk and buttermilk in creameries, and also from the skim milk left when the cream is separated for city trade. Casein is useful in making plastic products, such as buttons, umbrella handles, billiard balls, combs, and many other articles. But most of it is used in coating paper for fine printing. In Italy and several other foreign countries it is used in making a wool-like fiber for weaving into cloth.

From whey, lactic acid is made in one commercial plant in the United States for use in the tanning and textile industries. Other chemicals in turn are made from the lactic acid, which are useful in making lacquers, resins, and plastic glass.

Milk sugar is one of the chief constituents in skim milk and whey. Large quantities of this sugar are recovered for use in baby foods and medicinal preparations. See CHEESE; MILK.

Bibliography.—C. H. Eckles, *Dairy Cattle and Milk Production* (1931); W. J. Fraser, *Dairy Farming; Most Milk and Profit per Acre* (1930); T. R. Pirtle, *History of the Dairy Industry* (1926); H. F. Judkins, *The Principles of Dairying, Testing, and Manufactures* (1931); Ernest Kelly and C. E. Clement, *Market Milk* (1931); L. A. Maynard, *Animal Nutrition* (1937); F. B. Morrison, *Feeds and Feeding* (1936); U. S. Department of Agriculture, *Yearbook.*

L. S. RICHARDSON,
Assistant to the Chief,
Dairy Information,
U. S. Department of Agriculture.

Dais, dā'is, a lofty seat for one or more persons, covered by a canopy, whence it derives its name. Usage has extended its meaning to include the whole raised platform usually found at the upper end of ancient or collegiate halls.

Daisy. A name applied to various composite flowers. The European daisy of literature is a little plant (*Bellis perennis*) with small, fleshy leaves, which commences to bloom in very early spring. It has little, white-rayed flowers, tipped with pink, and is commonly cultivated, in a double form, for borders and the like. The American 'daisy' is *Chrysanthemum leucanthemum,* known occasionally as 'white weed,' a rank weed, rampant in meadows and bearing large, white flowers an inch or more broad. The ox-eye daisy, or 'black-eyed Susan' (*Rudbeckia hirta*), is golden yellow, with a cone-shaped, brown center.

American Field Daisy.

Dajo, Mt., an extinct volcano, on Sulu Island, Philippines. A battle took place here, March 6–7, 1906, between U. S. troops and the hostile Moros, who took up their position in the crater.

Dakahlieh, dä-kä-lē'yeh, province of Lower Egypt, borders north and northeast on Menzaleh Lake. Area 1,006 square miles. The capital is Mansura. Pop. (1937) 1,215,440.

Dakar, dä-kär', fortified seaport town, of French West Africa, is situated in the colony of Senegal, near the extremity of Cape Verde; 163 miles by rail s.w. of St. Louis. It has a fine harbor, the natural advantages of which are supplemented by ample docking facilities including a large dry-dock, and by an admirable lighting system. Pop. (1936) 92,634.

Dakin's Solution, or Carrel-Dakin Solution, an antiseptic bactericide used for infected wounds, developed during the World War by Henry D. Dakin and Alexis Carrel. It is an approximately neutral solution of sodium hypochlorite, which also dissolves dead tissues.

Dako'ta. See North Dakota, South Dakota.

Dakota Formation, the lowest member of the Upper Cretaceous series in the western part of North America, especially in the Great Plains region. It is largely a sandstone and is regarded as mostly of non-marine origin. The porous nature of this formation and its occurrence in the semi-arid plains region makes it an important source of water from artesian and deep wells. Its average thickness is 200 to 300 feet.

Dakota Indians. See Sioux.

Dakota River, more correctly, the James River, rises in the center of North Dakota, flows south through South Dakota, and after a course of nearly 600 miles falls into the Missouri, 10 miles below Yankton. Its valley is exceedingly fertile, and is rich in phosphate of lime; irrigation from artesian wells is largely resorted to.

Dakota Wesleyan University, a Methodist institution of higher learning for both sexes at Mitchell, South Dakota, established in 1885. It is a fully accredited college of liberal arts with especially strong teacher training and music departments.

Dal, däl, river of Sweden, rises on the Norwegian border, flows southeast through Lake Siljan, and falls into the Gulf of Bothnia after a course of 280 miles.

Dalaguete, dä'lä-gā'tā, pueblo, Cebu, Philippines, 44 miles southwest of Cebu, on the east coast. Pop. 23,000.

Dalai-Kui, dä-lī'ko͞o'i, islet in the middle of Lake Kosso (Kossogol or Kos-gol) in Mongolia, about 130 miles southwest of Lake Baikal. It is held in especial reverence by Mongolian Buddhists as the 'navel of the earth.'

Dalai Lama. See Lamaism.

Dalai-nor, dä-li'nor ('Holy Sea'), the name of two lakes in Eastern Mongolia. One, called also Kulun-nor, is situated in the northeast extremity of Mongolia, about lat. 49° n. and long. 117° 30'e. It is entered by the Kerulen at the southwest end, and the Argun leaves it at the northeast. The other lake lies in the southeast extremity of Mongolia, nearly 200 miles north of Peking. The name Dalai-nor is also applied by the Mongols to Lake Baikal (q. v.).

Dalarne, dä'lär-ne ('The Dales'), also called Dalecarlia, an ancient division of Sweden, coinciding roughly with the present county Kopparberg. This district is inhabited by a fine race of peasantry who have always been distinguished for their patriotism and love of liberty. They have several times played a decisive part in Swedish history. In 1434, under Engelbrecht Engelbrechtsson, they rose in revolt against the Danish conqueror; in 1520–3, roused to fury by the 'blood bath of Stockholm,' they helped Gustavus Vasa to drive the hated Danes out of the country. Their customs and racial characteristics are well described in Frederika Bremer's *I Dalarne* (English translation by Mary Howitt) and in Selma Lagerlöf's *Jerusalem.*

D'Albert, Eugen Francis Charles. See Albert.

Dale, David (1739–1806), Scottish philanthropist, was born in Ayrshire. He founded the village of New Lanark, engaged in cotton manufacture there, and established the first Turkey-red dye works in Scotland (1785). Having seceded from the Established Church of Scotland, he founded the 'Old Independents,' of which he was chief pastor. Robert Owen (q. v.) married Dale's daughter, and succeeded him in the Lanark mills.

Dale, Richard (1756–1826), American naval officer, was born near Norfolk, Va. Having gone to sea at an early age, he had become the captain of a merchant vessel in 1775. On the outbreak of the Revolutionary War he entered the Virginia service, was captured by the British, and served for a short time in the British navy, but subsequently (1776) became a midshipman on an American vessel and, after another period of captivity, was first lieutenant under John Paul Jones in the battle between the *Bon Homme Richard* and the *Serapis.* In 1781 he was once more taken prisoner, but was soon released. He was one of the six captains appointed in 1794 on the establishment of the new U. S. Navy, captain then being the highest regular rank. With the courtesy rank of commodore, he commanded a U. S. squadron in the Mediterranean in 1801–2 during the war with Tripoli.

Dale, Robert William (1829–95), English Congregational divine, was born in London. Accepting (1853) the position of deputy minister at Carr's Lane Chapel, Birmingham, he became sole pastor there in 1859. In 1877 he visited the United States and delivered at Yale College the Lyman Beecher lectures on preaching, being the first Englishman appointed to this lectureship. He was for seven years editor of *The Congregationalist,* and published *Weekday Sermons* (1867), *The*

Ten Commandments (1872), *The Atonement* (1875), *Impressions of America* (1878), *Fellowship with Christ* (1891), *Christian Doctrine* (1894), *Christ and the Future Life* (1895). He compiled *The English Hymn Book* (1874). Consult *Life* by his son (1898).

Dale, Sir Thomas (?–1620), colonial governor of Virginia, had already distinguished himself as a soldier, when sent by the London Company with supplies for the Virginia colonists in 1611. He arrived at Jamestown not long after the departure of Lord de la Warr (q. v.), and took charge of the government, administering it under martial law to the discontent of the colonists. He was relieved by Sir Thomas Gates later in the same year, but remained in the colony until 1616, again acting as governor from 1614 to 1616. Through his efforts the colonial land laws were altered so as to make possible the possession of land by those who cultivated it. He returned to England with Pocahontas and John Rolfe, and died in command of England's East Indian fleet. His regulations for the Virginia colonists, known as 'Dale's laws,' were famous for their severity; they may be found in Force's *Tracts,* vol. iii (1836–46).

Dalecarlia. See Dalarne.

D'Alembert, dȧ-läṅ'bâr', Jean le Rond (1717–83), French philosopher and mathematician, was born in Paris, an illegitimate son of the poet Destouches and Madame de Tencin. He was abandoned on the steps of the church of St. Jean le Rond, and, having been rescued by an overseer of that quarter, was brought up in the family of a poor glazier. He was educated at the College Mazarin and upon finishing his course took up his residence in the family of his old nurse, devoting himself to the study of mathematics. At the age of twenty-four he was elected a member of the Academy of Sciences, Paris; in 1746 a member of the Berlin Academy, and in 1754 of the French Academy, whose secretary he became (1772).

As a mathematician D'Alembert distinguished himself by several original observations, which may be found in his *Traité de Dynamique* (1743), in which he enunciates his 'principle' of the equilibrium of dynamical forces; *Traité de l'Equilibre et du Mouvement des Fluides* (1744); *Recherches sur différents Points Importants du Système du Monde* (1754–6); and *Opuscules Mathématiques* (2 vols., 1761–80). He greatly furthered the study of the integral calculus, the problems of the resistance of fluids, the precession of the equinoxes, the nutation of the earth's axis, and the perturbations of the planets. From about 1754 he devoted much attention to philosophical and similar subjects, becoming associated with Diderot in the issue of the *Encyclopédie ou Dictionnaire Raisonné,* to which he contributed the introduction on the classification of the sciences, and several articles. He also wrote *Elements de Philosophie* (1759) and *Essai sur la Société des Gens de Lettres,* and was bitterly attacked on account of the religious views embodied in these and other works. His works of this character were collected as *Œuvres Philosophiques, etc.* (Didot, 5 vols., 1821). Consult Bertrand's *D'Alembert.*

Dalen, dä'len, Nils Gustaf (1869–1937), Swedish scientist, was born in Stenstorp, and was educated at the Chalmers Engineering Institute, Gothenburg, and in Zurich. He became a consulting engineer and devoted much time to the improvement of hot-air turbine machinery and air compressors. In 1905 he worked on new inventions for the Swedish Carbide and Acetone Company, and in 1906 became chief engineer for the Swedish Gas-Accumulator Company, for which he invented a method of using acetylene gas dissolved in acetone for automatic marine lights, railway signals, railway lighting, etc. The sun valve on unmanned lighthouses is one of his most important inventions. In 1912 he was awarded the Nobel Prize in physics.

Dalgarno, dal-gär'nō, George (c. 1626–87), Scottish writer for the deaf and dumb, was born in Aberdeen. He is known especially for his *Ars Signorum* (1661), in which he sought to prove that ideas could be expressed by specific universal characters, *i.e.,* without reference to the words of any particular language, and for his *Didascalocophus* (1680), in which he aimed at showing how a deaf man could be taught to read and write. He was the first to exhibit a finger alphabet for the deaf and dumb.

Dalhart, city, Texas, county seat of Dallam county, is situated on the boundary line between that county and Hartley county, on the Fort Worth and Denver and the Chicago, Rock Island, and Gulf Railroads; 412 miles east of El Paso. The machine shops of the Rock Island Railroad are situated here. Pop. (1920) 2,676; (1930) 4,691.

Dalhousie, James Andrew Broun Ramsay, Marquess of (1812–60), governor-general of India, was born in Dalhousie Castle, Midlothian, Scotland, the third son of the ninth earl of Dalhousie. He was graduated from Christ Church, Oxford. In 1832, by the death of his only remaining brother, he succeeded to the title of Lord Ramsay. On the death of his father in 1838 he entered the House of Lords. In 1843 Sir Robert Peel appointed him vice-president of the Board of Trade, and in 1845 he succeeded Gladstone as president of the Board. In 1847 he was appointed governor-general of India, as successor to Lord Hardinge, and arrived in Calcutta, January 12, 1848—the youngest governor-general ever sent to that country. He successfully carried out the second Sikh war, which led to the annexation of the Punjab in 1849, and the British Empire was consolidated by the annexation of territory from this time on through his administration. Dalhousie threw open the civil service to English and Hindus alike; constructed great lines of railway, as well as many miles of road and of electric telegraph; and organized numerous other important improvements. Some political opponents endeavored to make him a scapegoat for the troubles of the Mutiny (1857), but the charges were acknowledged to be baseless. Consult Dalhousie's *Minute* (1856); also Sir W. Lee-Warner's *Life of the Marquis of Dalhousie* and the Duke of Argyll's *India under Dalhousie and Canning.*

Dalhousie University, a nonsectarian university, situated in Halifax, N. S., founded in 1818 by the ninth Earl of Dalhousie for the education of youth in the higher branches of science and literature. The original endowment was received from custom duties collected at the port of Castine, Maine, during its occupation by the British in the War of 1812. After a period of inactivity, the university was reorganized in 1863. In 1887 and again in 1911 it was forced, by its growth, to find a new site. It confers degrees in Arts, Music, Science, Commerce, Law, Medicine, Dentistry, and Pharmacy.

Dalin, Olof von (1708–63), the principal representative of Swedish literature in the first half of the 18th century. He founded the weekly *Den Svenska Argus,* on the model of Addison's *Spectator,* in which he gave the language its modern form. In 1739 he composed his satire, *Saga om Hästen;* and in 1740, *Aprilvärk om vår Härliga Tid,* in imitation of Swift's *Tale of a Tub.* In 1755 the Riksdag entrusted him with the compilation of a history of Sweden (*Svea Rikes Historia*, 1747–62). Appointed (1751) tutor to the Crown Prince Gustavus, afterward Gustavus III, his complicity in the revolutionary projects of Queen Louisa Ulrica lost him his post (1756), and entailed banishment from the court till 1761. He was also the author of the epic *Svenska Friheten* (1742); a tragedy, *Brynhilda* (1738); a comedy, *Den Afundsjuke* (1738). Consult Warburg's *Olof von Dalin.*

Dalkeith, dal-kēth′, town, Midlothian, Scotland, 6 miles southeast of Edinburgh. The chief glory of the place is Dalkeith Palace, seat of the Dukes of Buccleuch, erected in 1700. There are brush factories, foundries, tanneries, and corn mills. Pop. (1931) 7,502.

Dall, Caroline Wells Healey (1822–1912), American author and reformer, was born in Boston, Mass. She adopted teaching as her vocation and became an ardent advocate of women's rights, founding, with Paulina Wright Davis, *The Una*, one of the pioneer journals for feminist propaganda. She was married in 1844 to the Rev. Charles H. A. Dall of Baltimore, for thirty years a missionary in India. She was one of the founders of the American Social Science Association. Her published works include: *Woman's Right to Labor* (1860); *Woman's Rights under the Law* (1861); *The College, the Market, and the Court* (1867); *Sordello* (1886); *Margaret and Her Friends* (1895); *Alongside* (1900).

Dall, William Healey (1845–1927), American naturalist, son of Caroline Dall (q. v.), was born in Boston, Mass. He studied natural sciences under Louis Agassiz, and took special courses in anatomy and medicine with Jeffries Wyman and Daniel Brainard. He was chief of scientific corps of the International Telegraph Expedition to Alaska in 1865–8, and assistant, U. S. Coast Survey (Alaska), in 1871–84. He was palæontologist to the U. S. Geological Survey; a curator of the U. S. National Museum from 1880; and gold medallist and professor of invertebrate palæontology in the Wagner Institute of Science, Philadelphia, from 1893. He was a member of the National Academy of Sciences. Besides numerous monographs, his publications include: *Tribes of the Extreme Northwest* (1877); *Scientific Results of the Exploration of Alaska* (1865–74); *Alaska and Its Resources* (1870); *Coast Pilot of Alaska* (1879–83); *Reports on the Mollusca of the Blake Expedition* (1880–90); *Marine Mollusca of the Atlantic Coast of the United States* (1889); *Tertiary Fauna of Florida* (1890–1903); *Contributions to the Tertiary Palæontology of the Pacific Coast* (1909); *Spencer Fullerton Baird; a Biography* (1915).

D'Allainval, Léonor Jean Christine Soulas (?1700–53), French dramatist, was born at Chartres early in the eighteenth century. In the course of a life of great poverty he wrote several plays which were performed in Paris, the best of these being *L'Embarras de Richesses* (1725) and *L'Ecole des Bourgeois* (1728). He also published *Ana ou Biguarrures Calotines* (1732–3), *Anecdotes du Règne de Pierre I.* (1745), and an edition of Cardinal Mazarin's letters (1745).

Dal'las, town, Oregon, county seat of Polk county, on the Rickreal or LaCreole River, and the Southern Pacific Railroad; 15 miles west of Salem. It has lumber and flour mills, machine shops, a tannery, prune packing plant, and manufactures of woollens, sashes, and doors. Pop. (1930) 2,975.

Dal'las, city, Texas, county seat of Dallas county, second city in the State in population, is situated on the Trinity River, which is navigable to Galveston, and on the Atchison, Topeka and Santa Fé, the Missouri, Kansas, and Texas, the Texas and Pacific, the Southern Pacific, and other railroads; 185 miles northeast of Austin. Interurban electric lines and buses connect Dallas with Fort Worth on the west and Denison on the north.

Important structures are the Protestant and Roman Catholic cathedrals, city hospital, St. Paul's Sanitarium, Carnegie Public Library, a Confederate monument, and a fine Union Station opened in 1916. The Dallas Museum of Fine Arts contains a noteworthy collection of paintings. There is a concrete viaduct (5,840 feet), said to be the longest in the world, and a coliseum with a seating capacity of 7,500. The public parks occupy 4,119 acres, including the beautiful State Fair Park. At Oak Cliff, a suburb south of the city is the Female University, and in the city proper are the Southern Methodist University, the University of Dallas and St. Mary's College. There are 100 churches and 130 hotels, also 4 airports near by.

Dallas is an important railway centre in a rich cotton, corn, wheat, alfalfa, and fruit district, and is the chief wholesale jobbing and manufacturing centre in the State, and the largest inland cotton market in the world, handling some 2,000,000 bales annually. It has grain elevators, foundries, machine shops, meat-packing houses, and manufactures of cotton-ginning machinery, lumber, textiles, saddlery, cotton, cotton-seed oil, and farm implements. It is a great distributing centre for automobiles, and is the headquarters of the eleventh district of the Federal Reserve Banking system.

The commission form of government was adopted in 1907. With approval by the Texas Supreme Court a comprehensive zoning ordinance was enacted in 1934. Pop. (1900) 42,638; (1910) 92,104; (1920) 158,976; (1930) 260,475.

Dallas, Alexander James (1759–1817), American financier and executive, was born in Jamaica, W. I. He was educated in Edinburgh and London, and about 1783 emigrated to Philadelphia, where he entered politics. He was secretary of the commonwealth of Pennsylvania (1791–1801); U. S. district attorney for the eastern district of Pennsylvania (1801–14), and a leader of the conservative wing of the Democratic-Republican party in the State. In 1814 he became Secretary of the Treasury under President Madison, at a time when the finances of the nation were in a critical condition, from which he built up a $20,000,000 surplus. He was instrumental in the establishment of the second U. S. Bank (1816), and the passage of the protective tariff act of 1816. He held a high rank among American financiers. During 1815 he also served as Secretary of War *ad interim.* He retired in 1817. He edited *Laws of Pennsylvania* (1801); *Reports of Cases Adjudged by the Courts of the United States and of Pennsylvania* (4 vols., 1790–1807); and wrote *Exposition of the Causes and Character of the War of 1812* (1815). Consult *Life*, by his son.

Dallas, George Mifflin (1792–1864), Vice-President of the United States during Polk's presidency, was born in Philadelphia, Pa., the son of A. J. Dallas (q. v.). He was graduated from Princeton in 1810, and was admitted to the Pennsylvania bar. In 1813–14 he was secretary to Albert Gallatin (q. v.), whom he accompanied on a mission to St. Petersburg. After practising law for 14 years, he was mayor of Philadelphia (1828); U. S. district attorney (1829–31); member of the U. S. Senate (1831–3); attorney-general of Pennsylvania (1833–5), and U. S. minister to Russia (1837–9). In 1845–9 he was Vice-President of the United States; and from 1856 to 1861

U. S. minister to Great Britain. As president of the Senate he cast the deciding vote for the passage of the tariff act of 1846. He wrote *Letters from London* (1869–70), and edited a *Life* of his father.

Dallas, Robert Charles (1754–1824), English writer, was born in Kingston, Jamaica. After holding a lucrative post in his native island, he spent the rest of his life in the United States and Europe. During his travels in Europe he made the acquaintance of Lord Byron, who was encouraged by him to publish the first part of *Childe Harold* (1812). An intimate friendship resulted, and Byron gave to Dallas the proceeds from the first part of *Childe Harold* and the *Corsair*. Dallas published his *Recollections of Lord Byron* (1824), and a number of tales and tragedies.

Dalles, dalz, or The Dalles, city, Oregon, county seat of Wasco county, on the Columbia River, and on the line of the Oregon Railroad and Navigation Co.; 85 miles east of Portland. It has flour and planing mills, machine shops, box factories, and canneries, and there is a considerable trade in wool, grain, fruit, and salmon. The scenery on the river, in the vicinity is picturesque. The Dalles, or rapids, obstruct navigation above but a canal between Dalles and Celilo provides a passageway around this barrier (see Dalles-Celilo Canal). Pop. (1930) 5,883.

Dalles-Celilo Canal, a canal between the towns of Dalles and Celilo, Oregon, on the Columbia River, opened to traffic in 1915. Navigation of the Columbia is obstructed between the two towns by rapids, which long constituted a barrier to direct water communication between the rich 'Inland Empire' (Northwestern Idaho, Southeastern Washington, and Northeastern Oregon) and the Pacific. The Dalles-Celilo Canal, paralleling the river on the southern or Oregon side, passes around the rapids and makes possible uninterrupted transportation from Lewiston, Idaho, on the Snake River, to the mouth of the Columbia, a distance of 479 miles. The length of the canal is about 8½ miles; half of which is cut through solid rock; there are five locks, which overcome a rise of 90 feet in the level of the river; the minimum depth is 8 feet; the total cost $6,000,000.

Dalles of the Wisconsin, a narrow gorge, 7 miles in length, in the course of the Wisconsin River. It is from 60 to 200 feet in width, with sides 200 feet high, and the river flows through it in a succession of cascades.

Dal'lin, Cyrus Edwin (1861–), American sculptor, was born in Springville, Utah. He studied in Boston, and at the École des Beaux Arts and Julien Academy, Paris. He devoted special attention to the portrayal of Indian life, though without limiting himself to that field. His more important works include *Signal of Peace*, awarded a gold medal at the Chicago Exposition (1894), now in Lincoln Park, Chicago; *Sir Isaac Newton*, U. S. Library of Congress; *Pioneer Monument*, Salt Lake City; *Don Quixote; Medicine Man*, awarded a gold medal at the St. Louis Exposition (1904), now in Fairmount Park, Philadelphia; *Appeal to the Great Spirit*, Boston Museum of Fine Arts; *Indian Hunter*, Arlington, Mass.; *The Redskin's Prayer; The Scout*, awarded a gold medal at the Panama-Pacific Exposition, placed permanently in Kansas City, Mo.; equestrian statue, *The Cavalryman*, Hanover, Pa.; Soldiers' Monument, Syracuse; Statue of Anne Hutchinson, State House, Boston.

died – Nov 14 1944

Dalling, Baron. See Bulwer.

Dallinger, William Henry, (1841–1909), English biologist. He was distinguished for his researches into the origin of minute forms of life. He was a fellow of the Royal Society. He published *The Creator, and what we may know of the Method of Creation* (1887), and edited Dr. Carpenter's *Microscope and its Revelations* (new ed. 1901).

Dallmeyer, John Henry (1830–83), German optician. He was early apprenticed to an optician in Osnabrück, and later went to London. He became interested in photography, and introduced numerous improvements in photographic lenses and object glasses, inventing and patenting a single wide-angle lens. He served for many years on the councils of the British Royal Astronomical and Royal Photographic societies, and wrote *On the Choice and Use of Photographic Lenses*.

Dalmatia, dal-mā'shi-*a*, the Primorska (Maritime) *Banovina* of Jugoslavia, is a narrow strip of country bordering on the eastern shore of the Adriatic Sea, formerly a crown land of Austria-Hungary, whose possession was the subject of controversy between the Jugoslavs (q. v.) and Italy after the World War (1914–19). It is bounded on the north by Croatia, on the south by Montenegro, and on the east by Bosnia and Herzegovina. Its total area is about 4,923 square miles; its length exceeds 200 miles; its breadth is everywhere less than 50 miles.

The surface is generally mountainous, including the western chains of the Dinaric Alps and the Karst Plateaus, reaching heights of 6,000 feet. The coast is rugged and bordered by islands, including Pago, Lunga, Brazza, Lesina, Lissa, Curzola, and Meleda. The climate is subtropical, and is greatly influenced by the chilling, gusty *bora* of winter and the violent southwest wind at other seasons. Much of the land is in pasture and wood. About one-ninth is arable and produces wheat, barley, oats, maize, rye, and potatoes. The mineral products are iron, lignite, asphalt, and salt. Fishing, fruit-growing (including the vine and olives), seafaring, shipbuilding, and transit trade are the chief occupations. Among important exports are wines, maraschino liqueur, and olive oil. There is a famous lace school in Spalato, some silk manufacture, and a cement industry of considerable importance.

The people of Dalmatia are mostly of Serbo-Croatic origin, but Italians predominate in Zara; and Austrians, Hungarians, and Poles are found. The peasant dress is mediæval, but the younger generation adopt modern costume. The inhabitants belong mostly (83½ per cent) to the Roman Catholic Church. The total population in 1936 was estimated at about 883,000. The capital, Spalato, is now called Split; the old capital, Zara, was ceded, with an enclave, to Italy by the Treaty of Rapallo (q. v.) in 1920. Other towns are Mostar, Sibenik and Livno. Ragusa, Dubrovnik and Cattaro have been included in the *Banovina* of Zetska, made up of Bosnia and Herzegovina.

The antiquities of Dalmatia are of special interest—particularly the Roman monuments, of which the most noteworthy are the Palace of Diocletian at Spalato covering 9½ acres and dating back to between 290 and 310; and extensive remains at Salona, including ruins of a theatre, amphitheatre, city walls and gates, and fragments of houses, arches, baths, and basilicas.

Architecturally interesting are remains of the Byzantine period at Salona and elsewhere and a large number of beautiful Romanesque structures, of which the belfry of Santa Maria at Zara, the splendid twelfth century campanile at Arbe, and the cathedral at Trau, are especially noteworthy.

Dalmatia anciently formed a part of Illyria (q. v.). It was conquered by the Romans in the time of Augustus; was later occupied by the Slavs; and in the Middle Ages was, with the exception of Ragusa, divided between Hungary and Venice. The Turks occupied the greater part of Venetian or modern Dalmatia in the sixteenth century but the territory reverted to Venice in 1699. In 1797 it was ceded to Austria, in 1805 to France, and in 1815 to Austria-Hungary, of which it became a crown land. By the Pact of London (1915), signed by Great Britain, France, Russia, Japan, and Italy during the World War (1914–19), all the Dalmatian islands and the northern part of Dalmatia, including Zara and Sebenico, and down to a frontier a little north of Spalato, were assigned to Italy. The claims of the newly created Jugoslav Kingdom, however, based upon the large Slav population of Dalmatia, conflicted with the Italian plan and the status of the territory was settled by the Rapallo Treaty. See also FIUME.

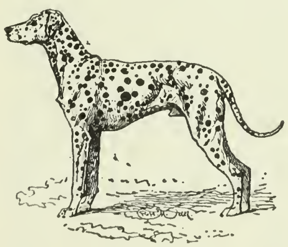
Copyright by Underwood & Underwood.

View on the Dalmatian Coast.

Naval base at Ragusa, one of the chief naval bases in Dalmatia. From the Lovchen Mountains, which are seen in the photograph, French and Montenegrins endeavored to bombard the town during the World War.

Consult Jackson's *Shores of the Adriatic* (1908); Holbach's *Dalmatia* (1908); Band's *Dalmatien* (1910); Frothingham's *Roman Cities in Italy and Dalmatia* (1910); L. Vojnović, *Dalmatia and the Jugoslav Movement* (1920).

Dalmatian Dog, or SPOTTED COACH DOG, a variety of dog half hound and half pointer by breed, which first came into fashion about 1820. In shape and size it closely resembles the modern pointer. The color should be white, with black or liver-colored spots, not more than an inch in diameter, regularly distributed over the body, including the ears and tail. The spots do not develop until the dog is three weeks old. The Dalmatian is valuable as a watch dog, and is sometimes trained to be a shooting dog. Its proper weight is 50 to 55 pounds. Other points are: Head longish; skull flat, moderate amount of stop; muzzle long and powerful; eyes medium size, and dark or light, according to markings; ears small, and carried close to the head; nose black or brown, according to markings; neck fairly long and arched; no throatiness; chest very deep and not wide; body well ribbed; back powerful; loins muscular; legs straight, elbows well under; feet compact and well padded; tail rush-grown, and slightly curved upwards; coat short, hard, and dense; ears and tail well spotted.



Dalmat'ic (from Dalmatia, where it was first worn as a royal robe), an ecclesiastical vestment, the official dress of the deacons of the Roman Catholic Church from early in the fourth century. It was long one of the insignia of rank, and is worn by bishops when celebrating mass. It is a long robe with sleeves, open on each side, formerly white with purple stripes, but now colored.

Dalme'ny, village, Linlithgowshire, Scotland; one mile southeast of South Queensferry. Near it are the Forth Bridge, Dalmeny Park, the seat of the earl of Rosebery, and Barnbougle Castle (restored 1880), the ancient seat of the Mowbray family. Pop. (1931) 3,237.

Dalmorès, dal-mō′rès, CHARLES (1871–), French dramatic tenor. He was educated at the Paris Conservatoire and started his musical career as a player of the horn. He later studied the violoncello and finally turned his attention to the cultivation of his voice, making his *début* at Rouen in 1899. He sang in Brussels, and in Covent Garden, London; was one of the leading tenors for four seasons with the Manhattan Opera Company, New York City; and in 1910 joined the Philadelphia-Chicago Opera Company. In 1908 he sang Lohengrin at Bayreuth. Siegfried, Nicias in *Thaïs,* Samson, and Herod are among his best known rôles.

Dalny, däl′ni, or, properly, DAIREN, a seaport on Talienwan Bay, in the southern corner of the Liaotung Peninsula, Manchukuo. It is the southern terminus of the South Manchuria Railway. When Russia leased the place from China in 1898, it was a small fishing village, which it was intended to transform into a commercial port. Some progress had been made when the Russo-Japanese War came in 1904, after which the Japanese took over the lease of Dalny. Since then a great modern city has been built up, with wide, macadamized streets, electric lighting and cars, water and sewage systems, parks, clubs, theatres, a stadium for 50,000, swimming pools, etc., all the equipment of Western civilization. The harbor has been developed by Japanese engineers, with docks, warehouses, cranes, breakwaters, lighthouses, waiting pavilion, and a great Railway Hospital. Electric and bus lines connect Dalny with Port Arthur and adjacent beaches and pleasure resorts.

The population is nearly 430,000, over two-thirds of which is Chinese. Without its suburbs, the city covers 11,270 acres. Dalny was opened as a free port in 1901; after its transference to Japan by the Treaty of Portsmouth, N. H., it was again opened as a free port in 1906, as Dairen or Tairen. In 1907 a Chinese custom house was established for goods crossing the border of Kwantung.

Dalou, då-lōō′, JULES (1838–1902), French sculptor, was born in Paris. He studied under Carpeaux (q. v.). At the time of the Commune he fled to London, where he was for some years master of the modelling classes of the National Art Training School, and there took a leading part in the renascence of English sculpture. His work is picturesque, and vividly conceived; his execution is masterly. *The Triumph of Silenus* (1897), in the gardens of the Luxembourg at Paris, is a fine example. One of his most striking works is the bas-relief, *The States-General,* in the Chamber of Deputies at Paris; and another is the colossal group representing the *Triumph of the Republic* (1900) in the Place de la Nation, Paris. His bronze statue, *Eugène Delacroix* (Petit Luxembourg), and his busts of Rochefort, Vacquerie, and Theuriet are celebrated. Consult Dreyfous' *Dalou* (1903).

Dalriada, dal-ri-ä′da ('the home of the descendants of Riada'), the ancient name of a territory in Ireland, comprehending what is now called 'the Route,' or the northern half of County Antrim. Its inhabitants were Scots of Gaelic race, living in the midst of a Pictish population, and a number of them crossed over to Argyll in 498 and founded there another kingdom of Dalriada. More than twenty kings of this state are enumerated before Kenneth MacAlpin, who, about 843, united under one sceptre the Dalriads or Scots and the Picts, and thus became the first king of Alban, which about two centuries afterwards began to be known as Scotia or Scotland.

Dalrymple, ALEXANDER (1737–1808), first hydrographer to the British Admiralty (1795), was born at New Hailes, near Edinburgh. He spent most of his life in the service of the East India Company; he devoted himself to geographical and hydrographical studies, and published, in addition to many pamphlets, an *Account of Discoveries in the South Pacific Ocean before 1764* (1767).

Dalrymple, dal′rim-p'l *or* dal-rim′p'l, SIR DAVID, LORD HAILES (1726–92), Scottish judge, was born in Edinburgh. He is remembered for his controversies with Hume and Gibbon which are embodied in his 'An Inquiry into the Secondary Causes which Mr. Gibbon has assigned for the Rapid Growth of Christianity,' which is one of the best of the many replies made to the famous 15th and 16th chapters of the 'Decline and Fall of the Roman Empire.' He is known also for his friendship with the leading men of letters, especially Johnson, who greatly valued his opinion; and for his books, relating chiefly to the antiquities of Scotland. The best known is his *Annals of Scotland* (2 v. 1776–79), from Malcolm Canmore to the accession of the Stuart dynasty, which, because of its accuracy and its dependence on original sources, has been the foundation for subsequent histories. Consult Boswell's *Life of Johnson.*

Dalrymple. See STAIR.

Dalton, dôl′t*u*n, town, Berkshire county, Massachusetts, picturesquely situated in the Berkshire Valley, on the Boston and Albany Railroad; 5 miles northwest of Pittsfield. It has manufactures of machinery, textiles, and paper. Pop. 4,220.

Dalton, city, Georgia, county seat of Whitfield county, on the Nashville, Chattanooga and St. Louis and the Southern Railroads; 100 miles northwest of Atlanta, and 40 miles southeast of Chattanooga, Tenn. The region is rich in iron, manganese, and sedimentary deposits. Lumber, flour, textiles, iron, and machinery are the chief manufactured products. There is also a large publishing trade. Ohio River is located here, and cotton and grain are raised. Pop. (1930) 8,160.

During the Civil War the Confederate General Braxton Bragg retired to Dalton after his defeat at Chattanooga (q. v.), Nov. 23–25, 1863, and here his successor, Gen. Joseph E. Johnston, organized the defence against Sherman's invasion. The town was Sherman's first objective in the Atlanta campaign and three armies—the Army of the Cumberland under General Thomas; the Army of the Tennessee under General McPherson, and the Army of the Ohio under General Schofield—were despatched against it (May 7, 1864). The approaches to the town were exceedingly difficult, and the Federal troops suffered serious losses in the skirmishes that continued to May 12. On the evening of that day Johnston withdrew to meet Sherman in battle at Resaca, 18 miles to the south, and on May 13 the town was occupied.

Dalton, JOHN (1766–1844), English chemist, was born in Eaglesfield, Cumberland. From 1791 to 1793 he assisted in the management of a boarding school in Kendal, and in 1793 he became a teacher of mathematics and natural philosophy in the Manchester New College—a position he occupied for about six years. Here he continued the meteorological investigations which he had begun at Kendal, following them up with an inquiry into the phenomena of color-blindness, from which he suffered, and which is sometimes called *Daltonism.* In 1801 he began to publish his important papers on the properties of gases, which probably led him, about 1802, to revive the atomic theory as an explanation of the facts of chemical combination—an account of which he published in his *New System of Chemical Philosophy* (1808). In 1803–10 he delivered courses of lectures at the Royal Institution in London, and in 1807 in Edinburgh and Glasgow. He was elected a fellow of the Royal Society in 1822, receiving the first Royal Medal in 1826. He also published *Meteorological Observations and Essays* (1793), *The Constitution of Mixed Gases*, and *The Expansion of Gases by Heat* (1801). See Sir Henry E. Roscoe's *John Dalton and the Rise of Modern Chemistry* (1895), also Roscoe and Harden's *A New View of the Origin of Dalton's Atomic Theory* (1896).

Dalton-in-Furness, urban district, between Ulverston and Barrow, Lancashire, England. Coal and iron are abundant. Pop. (1931) 10,338.

Daltonism. See DALTON, JOHN.

Daly, (JOHN) AUGUSTIN (1838–99), American dramatist and manager, born at Plymouth, N. C. The list of Daly's plays and adaptations is said to number seventy-five. He undertook the management of the old Fifth Avenue Theatre in Twenty-fourth Street, New York, in 1869, and he there gathered about him the earlier members of the stock company that made him famous. Included in this, from first to last, were Fanny Davenport, Mrs. Scott Siddons, Agnes Ethel, Clara Jennings, Clara Morris, Sara Jewett, Ada Rehan, Catherine Lewis, Estelle Clayton, Mrs. Gilbert, Edwin L. Davenport, George Clarke, James Lewis, Owen Fawcett, George Holland, William Davidge, Charles Leclercq, Digby Bell, and John Drew. The Twenty-fourth Street theatre was burned in 1873, and Mr. Daly was in temporary quarters until the following year, when he opened at Daly's Fifth Avenue Theatre in Twenty-eighth Street, which he managed until 1877. In 1879 he resumed management at the new Daly's Theatre on Broadway, and remained in control until his death. Here he gave a notable series of presentations of Shakespeare's comedies, with Miss Rehan in the leading parts. He took his company to Europe in 1884, and met with such success in London and Continental cities in that and following seasons that in 1893 he built a London theatre for his performances, afterward known as Daly's Theatre. He was of scholarly tastes, but with a keen sense of the practical, and diplomatically firm in controlling the most sensitive class of people in the world. He published in book form, *Woffington: A Tribute to the Actress and the Woman* (1888).

Daly, JOSEPH FRANCIS (1840–1916), American judge, born at Plymouth, N. C. After studying law in New York he was admitted to the bar in 1862. From 1870 to 1896 he was judge of the Court of Common Pleas of New York, chief justice of the same court from 1890 to 1896, and justice of the Supreme Court of New York state from 1896 to 1898. He was active in Catholic charities.

Daly, MARCUS (1842–1900), Irish-American mining expert and financier, born in Ireland. He went to Montana in 1876 and became general manager of the Alice silver mine, then of the Anaconda mine. He was a member of the constitutional convention in 1884 and a candidate for the United States Senate in 1899.

Dalyell, or DALZELL, THOMAS (?1599–1685), British general, fought for Charles II. at Worcester (1651), and though taken prisoner, escaped from the Tower and took part in the Highland rebellion of 1653–4. Proceeding to Russia, he served against the Poles and Turks. Recalled in 1665, and made commander-in-chief in Scotland against the Covenanters, his severities after the victory of Rullion Green (Nov., 1666) made him both dreaded and hated. See *Memoirs* of Captain Creighton in Swift's works.

Dalzell, JOHN (1845–1927), American lawyer and statesman, born in New York, graduated from Yale College in 1865, was a well-known railroad and corporation lawyer. After 1887 he was a Republican member of Congress and served on the Committee on Rules and the Committee on Ways and Means from the 54th to the 58th Congresses.

Dalziel, par., N. Lanarkshire, Scotland, on riv. Clyde, 12½ m. S.E. of Glasgow, has important coal mines. Iron ore and sandstone are largely worked. Steel and iron are manufactured at Motherwell, most of which is included in this parish. Fruit-growing is carried on. Pop. of par. (1931) 45,114.

Dam. See RESERVOIRS.

Damages. The pecuniary compensation awarded by a court of law for the violation of a legal right. An action for damages is the usual remedy for the more common legal wrongs, such as breach of contract and tort, but it is not always the sole remedy even in such cases and in many other classes of cases it does not exist at all. Thus the remedy for an unlawful eviction is not an action for damages but a suit for the recovery of the land, and the remedy for a nuisance may be the forcible abatement of the nuisance or an injunction to restrain its continuance, with or without an award of damages for the injury already sustained. In the strict sense of the term an action for a debt or penalty or other definite, ascertained amount, like a suit for the recovery of a definite parcel of land, is not an action for damages, that term being technically appropriate only of an award made by a judge or jury when the damages sustained are a matter of estimate; but in practice any pecuniary award, whether 'liquidated' or 'unliquidated,' is described by the term damages. Originally damages were awarded only in suits at common law instituted for that purpose, but it is not unusual at the present time for courts of equity to make an award of damages as an incident of a suit for a purely equitable remedy, such as injunction or the specific performance of a contract. There are general rules governing the measure of damages. Perhaps the only one applicable to all kinds of cases is the rule that excludes the remote and improbable consequences of the wrongful act on which the action is founded. These are called 'consequential' damages and cannot generally be recovered. On the other hand, any result, however remote in point of time, which is the natural and probable consequence of the defendant's act, such as the loss of the probable profits of a voyage, may be included in the award of damages. Where the violation of a legal right is merely technical, or where it is not accompanied with substantial injury, merely 'nominal' damages will be awarded. On the other hand, in certain classes of actions based upon or involving personal wrongs of an injurious character, such as libel, slander, seduction, false imprisonment, malicious prosecution and breach of promise of marriage, 'exemplary' or 'vindictive' damages may be awarded. The question of the amount of damages to be awarded, especially where these are unliquidated, is usually for the jury to determine, though this discretion is exercised by the jury under the supervision and subject to the control of the court, which may set aside a verdict of excessive or wholly inadequate damages. See Sedgwick on *Damages.*

Damage to Property. One person may damage another's property unintentionally or maliciously, and in either case he must make good the loss, but if the loss or injury be caused by inevitable accident or, as it is called, by the act of God, while in a bailee's possession, there can be no recovery for the damage done. See DAMAGES and MALICIOUS INJURY TO PROPERTY CARRIERS.

Damanhur, or DEMANHOOR, tn. and ry. junction, 38 m. E.S.E. of Alexandria, Egypt. It occupies the site of the ancient Hermupolis Parva, and has cotton factories. Pop. (1927) 52,000.

Damao, or DAMAN, tn. and dist. in Gujarat, India, about 100 m. N. of Bombay. Was ceded, partly in 1558, partly in 1780, by the Marathas to the Portuguese, in whose possession it has since remained. It produces salt and textiles. Area, 169 sq. m. Pop. 57,000.

Damaraland, central prov., protectorate of S. W. Africa, extends from the Atlantic inland to the Kalahari Desert. Certain islands off the coast, such as Seal and Shark, are famous for guano. Inhabitants are mostly engaged in cattle-rearing. The only good harbor is Walvis Bay. The territory became German in 1884; was captured by South Africans in 1915. See GERMAN SOUTH-WEST AFRICA.

Damascening. This peculiarly Oriental art consists in decorating weapons and armor by first cutting into the metal fine furrows of the intended design, and then hammering into them threads of gold or silver, after which the blades, etc., are filed and polished. The art, which appears to have originated in N. India, was established at Damascus in the reign of the Emperor Domitian (1st century A.D.). Tamerlane, however, in 1401, carried off the cleverest smiths to Samarkand. In a secondary sense, damascening is the art of ornamenting the surface of steel blades, the barrels of shotguns, rifles, etc., with a watered pattern, which is producible by a complicated process of welding and soldering and corrosion. In this art the Persians excel. 'Damascenes,' as a term, is employed in a somewhat vague manner to describe wavy, meandering patterns seen in certain fabrics.

Damascus, city, capital of Syria, also known as Esh-Sham (Arab. *Dimishk*). The city is beautifully situated on the Barada, in a plain of great fertility, and is encircled on three sides by Anti-Lebanon. Numerous branches of the river (two of them identical with the ancient Abana and Pharpar) irrigate the meadows, cornfields, and orchards which surround the city. It still contains some very fine old Mohammedan houses. The great feature of Damascus is the world-renowned Ommiade mosque. It was built originally as a heathen temple, restored by the Roman emperor Arcadius early in the 5th century, turned into a Christian church, then taken by the Moslems and converted by the caliph Walid about 710 into a mosque. This gorgeous building was destroyed by fire in 1069. Tamerlane, when he conquered (1401) Damascus, set it on fire; and in 1893 it was again terribly injured by fire, but since then has been restored. Among other places of interest are the 'street called Straight' (Acts 9:11); the citadel, built early in the 13th century; the Jews' quarter, in the south of the city; 'the Gate of God' (suburb of Meidan), through which passes the pilgrim caravan (*hajj*) to Mecca; and the English cemetery (outside the wall to the south-east), containing the graves of Arnold Broomfield and Buckle the historian. The chief exports of Damascus are inlaid wood and furniture, silken and cotton articles, sweetmeats, gum, woven cotton curtains, etc.; but trade is declining. The city is famous for its confectionery, metal-chasing, silk and cotton fabrics, gold and silver work, saddlery, attar of roses, perfumes, and carpets. There is railway communication with Haifa and with Beirut (since 1895), with a junction for Baalbek and Hamath. The construction of a line to connect Damascus with Mecca is well advanced. Damsons, or 'damascene plums,' derive their name from this city.

De Cou, from Ewing Galloway, N. Y.

Damascus: A Street in the Suburb of Meidan

Pop. variously estimated at 155,000 to 225,000.

History.—Damascus is one of the oldest cities in the world, being mentioned in the Scriptures in connection with Abraham (Gen. xv. 2), and in the books of Kings as being taken by David. The Assyrians conquered it in 806 and 732 B.C., after which it passed successively under the domination of the Persians, of Alexander the Great's successors (Seleucids), and of the Romans. It was taken by Pompey in 64 B.C., but did not become part of the Roman empire until its conquest by Trajan in 105 A.D. St. Paul visited the town, after which Christianity spread rapidly in and around it. The Arabs conquered it in 635, and it was the capital of the caliphate from 660 to 753, preceding Bagdad. In 1148 it was besieged, without success, by the Crusaders under Louis VII of France and Conrad III, emperor of Germany; and in 1401 it was sacked by Tamerlane. It was taken in 1516 by Selim I, sultan of the Osmanli Turks, and except for a short interval (1832–40), when it was in the hands of Mehemet Ali of Egypt, remained a Turkish possession until 1918. In 1840 there was here a massacre of the Jews, and in 1860 (July 9–16) a fearful massacre of Christians by the Moslem population. On Oct. 1, 1918, it was captured by British forces under General Allenby.

Damask, an elaborately woven silk, originally made at Damascus. True damasks are composed wholly of silk of a single color, with flat figures in various patterns, the figures being formed by contrast between warp and filling surfaces. Damasks are not now made wholly of silk, but for curtains, draperies, table use, and upholstery are manufactured of a mixture of silk with linen, cotton, or wool. The true or double damask is woven, both ground and pattern, in eight-leaf satin weave, that is, each yarn or filling skips seven yarns and binds the eighth. Single damask is made in five-leaf satin weave. The art of weaving damask was carried by the Crusaders to Byzantium, where it greatly flourished; thence it passed to Lucca in Italy in the 13th century; from there it made its way into France and Flanders. It was introduced into England by the Flemish weavers.

Damaskeening. See DAMASCENING.

Damasus I., dam'*a*-sus (366–384), a native of Portugal, became Pope in 366, after a sanguinary struggle in the streets and churches of Rome against his rival Ursinus. It was largely due to his influence that Jerome was led to undertake the revision of the Scriptures, which resulted in the production of the Vulgate. Damasus was canonized after his death, his festival occurring on Dec. 11.

Damasus II., a native of Bavaria, was chosen Pope in 1048 but died twenty-three days after his election.

Dame Schools, private elementary schools taught by women in England and the United States. They were common in the eighteenth century and continued popular until the general establishment of public primary schools in the first half of the nineteenth century.

Dame's Violet, or DAMASK VIOLET (*Hesperis matronalis*), a plant belonging to the natural order Cruciferæ. It is a hardy perennial with ovate lanceolate leaves and large lilac-colored flowers particularly fragrant at night. The double variety, known as the 'double rocket,' is a favorite for cultivation. The single varieties are readily grown from seed, the double ones from cuttings or root division.

Damghan, däm-gän', town, Persia, in the province of Semna va Damghan, on the southern slopes of the Elburz Mountains; 50 miles southwest of Astarabad. Though a place of some size, it is in a state of decay. The deserted ruins of a huge citadel are fast crumbling to pieces, and there are two ruined minarets still standing. Damghan is believed to mark the site of the ancient Hekatompylos, but this is more or less speculative. Pop. (1930) 15,000.

Damiani, dä-myä'nē, PIETRO (1007–72), Roman Catholic ecclesiastic and reformer of the Italian Church, was born in Ravenna. After a somewhat desolate childhood, he joined the hermits of Fonte Avellano, a severely ascetic order (1035), became prior, carried out reform within the monastery, and wrote his famous letters to Popes Gregory VI and Clement II, attacking particularly simony in the church and marriage among the clergy. In 1057 he reluctantly accepted the appointment of cardinal and bishop of Ostia. He stood in close relationship, as adviser and censor, to the reigning Popes, particularly Gregory VII, and also endeavored to effect reforms through his influence over the German Emperors. In 1828 Pope Leo XII admitted him to the list of *doctores ecclesiæ*.

Damien, da-myän', JOSEPH, better known as Father Damien (1841–89), Belgian priest, missionary to the lepers. He was sent to the South Seas as a missionary, and in 1873 settled on the island of Molokai, Hawaii, devoting his life to the lepers in the government hospital there. In 1885 he contracted leprosy but continued his heroic labors until his death. His remains were brought home to Belgium in May, 1936. R. L. Stevenson defended Damien's memory in his *Open Letter to the Rev. Dr. Hyde*. Consult *Life* by Clifford and *Autobiography of Brother Joseph* (Ira B. Dutton, 1931).

Damiens, ROBERT FRANÇOIS (1715–57), French fanatic who attempted, in 1757, to assassinate Louis XV. He was executed at Paris with great barbarity.

Damietta, dam-i-et'*a* (Ar. *Damyât*; anc. *Tamiathis*), river port and episcopal see (Coptic Church), Lower Egypt, on the right bank of the Damietta branch of the Nile, to which it gives its name; 8 miles from the Mediterranean. The European quarters, which lie upstream, contain the Government Hospital, Coastguards Barracks, the university and the mosques of Gâmi-el-Bahr and El-Matbuliyeh. There are manufactures of cotton and silk, and fish and eels are exported. In the 11th century Damietta became the chief port in the delta. It was attacked several times by the Crusaders, and was captured by Louis IX in 1249, but in the following year was restored to the Saracens who demolished it, and in 1260 built the present town. In 1798 it was taken by the French; in 1799 Kléber here defeated the Turks; but the French were driven out by the British under Sir Sidney Smith. Pop. (1930) 34,907.

Damiri, otherwise KAMAL UD-DIN MOHAMMED IBN-MUSA UD-DAMIRI (1344–1405), Egyptian Arab writer on natural history and canon law. He wrote *Life of Animals* and was professor of tradition at the great Mosque of el-Azhar in Cairo. His works have been translated into English.

Dammar, dam'*a*r, or DAMMAR PINE (*Agathis, Dammara*), a genus of Coniferæ, of which there are four species, all oriental or Australasian. The most familiar is *A.* (*Dammara*) *orientalis* or *alba* of the Malay Archipelago and the Philippines, a lofty tree with stout, leathery, lanceolate leaves. The tree is chiefly valuable for its extraordinary abundance of resin, which is not only obtained in quantity from incisions made in the large knot-like prominences of the lower part of the stem and the root, but which naturally exudes so freely as to form large lumps underground, and foot-long 'icicles' hanging from the branches. At first semifluid and of pleasant balsamic odor, it soon hardens into an inodorous transparent mass, of no great hardness, but of glossy appearance and conchoidal fracture. It is of value in the preparation of transparent and rapidly drying varnishes. *A. australis* is the Kauri Pine (q. v.) of New Zealand.

The name dammar is also applied, in commerce, to the resin of other and unrelated trees. Thus the dammar of shipyards is derived from a species of Canarium, while black dammar is a kind of pitch derived from the allied Marignia.

Damocles, dam′ō-klēz, a Syracusan Greek, a friend of Dionysius I., a despot of Syracuse during the earlier part of the 4th century B.C., who illustrated to him the happiness of princes by setting him at a magnificent feast with a sword suspended over his head by a single hair.

Damodar, river of Bengal, India, rises in Chutia Nagpur, and flowing southeast, falls into the Hugli. Its valley is rich in coal and iron. Length, 350 miles.

Da′mon and Phin′tias (incorrectly Pythias), two Pythagorean philosophers of Syracuse who stand as types of faithful friendship. When Phintias was condemned to death for plotting against Dionysius, he asked leave to depart to arrange his affairs and Damon offered himself to be put to death should Phintias fail to return. The latter arrived just in time to prevent his friend's fulfilment of the pledge, and was pardoned.

Dampier Archipelago, dam′-pēr, a group of small rocky islands off the coast of Western Australia.

Dampier Strait, a strait separating New Guinea from Waygiou Island, off the northwest coast. It is 35 miles wide and 70 miles long. A strait of the same name separates New Pomerania from Rook Island, just off eastern New Guinea.

Dampier, William (*c.* 1652–1715), English seaman and buccaneer, was born in East Coker, Somersetshire. He took part under Sir Edward Spragge against the Dutch in 1673, and then became overseer of a plantation in Jamaica. In 1679 he joined a party of buccaneers and crossed the Isthmus of Darien. They captured several vessels in the Pacific Ocean, and conducted a piratical war against the Spaniards on the western coast of America. In 1686 Dampier set out for a voyage around the world. Put ashore on the Nicobar Islands (1688), after a dispute with his comrades, he made his way in a canoe to Atcheen, and after two years' trading in the neighboring seas, arrived in England (1691), where he published his vigorous and interesting *Voyage round the World* (1697). He was afterwards deputed by the government to conduct a voyage of discovery to the South Seas, in which he explored the western and northwestern coasts of Australia, also the coasts of New Guinea and New Britain, giving his name to Dampier Archipelago and Strait. On the return voyage his vessel was wrecked off Ascension. He was master and pilot in the privateering expedition of Woodes Rogers (1708–11), which rescued Alexander Selkirk. He wrote *Two Voyages to Campeachy* (1699) and *A Voyage to New Holland* (1709).

Damping Off, a plant disease due to a fungus, *Pythium debaryanum*, affecting especially young plants and seedlings. Excessive moisture in the air and soil, with high and close temperatures, weakens the plants and allows them easily to fall victim to its attack. They lose their fresh color, begin to droop, and are soon covered with a white thread-like growth. The drooping is due to the spreading on the base of the stem of numerous hyphæ of the fungus, the sap of the young plant being sucked by the parasite. The spores may lie dormant in the ground through the winter, and propagate the disease in spring. Diseased plants should be burned, the healthy ones removed to fresh soil, and the infected soil thoroughly sterilized.

Damrosch, dȧm′rosh, Frank Heino (1859-1937), American musician, son of Leopold Damrosch (q. v.), was born in Breslau, Silesia. He studied under his father and with Pruckner, Jean Vogt, and von Inten. He was conductor of the Denver Chorus Club from 1882 to 1884, and supervisor of music in the public schools of that city in 1884–5, when he returned to New York, acting as chorus master at the Metropolitan Opera House until 1891. The following year he organized the New York People's Singing Classes and directed other choral societies both in New York and Philadelphia. In 1897 he was appointed supervisor of music in the New York City public schools, and the following year was elected conductor of the New York Oratorio Society, founded by his father. When he severed his connections with the public schools in 1905, he became organizer and director of the Institute of Musical Art. He published *A Popular Method of Sight-Singing* (1894). Died Oct 22, 1937

Damrosch, Leopold (1832–85), German-American musician and composer, was born in Posen, Prussia, and began the study of the violin at the age of nine. To please his parents, he studied medicine and received his degree (1854) at Berlin, but decided to devote himself altogether to music, and studied the violin under Ries, continuing his musical studies under Dehn and Böhmer. He became successful as a violinist, and obtained through Liszt in 1855 the position of solo violinist in the Grand Ducal orchestra at Weimar, and there made the acquaintance of Wagner, one of whose chief interpreters he was to be. He was conductor (1859–60) of the Breslau Philharmonic concerts, and founded (1862) the Breslau Orchestral Society, at some of whose meetings Liszt and Wagner conducted their own compositions.

Damrosch was called to New York in 1871 as conductor of the Arion Society. Two years afterward he organized the Oratorio Society, which performed important works, by Händel and other great composers, never before heard in America, and in 1877 he founded the Symphony Society, directing both, and combining them in the first musical festival held in New York (1881). He gave several concerts with his orchestra in different cities of the Union in 1883. The following year he gave a season of German opera at the Metropolitan Opera House in New York, introducing a movement that proved important and lasting. He died early in 1885 from a cold contracted while conducting one of these performances. His own compositions included seven cantatas, numerous songs, and several important pieces for the violin.

Damrosch, Walter Johannes (1862–), American musician, son of Leopold Damrosch (q. v.), was born in Breslau, Germany, and studied under his father, and with Rischbieter, Urspruch and Hans von Bulow. He went to the United States with his father in 1871, and ten years later was elected conductor of the Newark (N. J.) Harmonic Society. At the time of his father's fatal illness in 1885, he replaced him as conductor of German opera at the New York Metropolitan Opera House, carried through the performances, and was subsequently assistant conductor. He also succeeded his father as conductor of the New York Oratorio and Symphony Societies. In 1894 he organized the Damrosch Opera Company, giving performances in German, French, and Italian, and in 1903 he became permanent conductor of the New York Symphony Orchestra. In 1918, at the request of General Pershing, he founded a school at Chaumont, France, for the bandmasters of the A.E.F. Damrosch's opera *The Scarlet Letter*, with libretto by G. P. Lathrop, was produced in Boston in 1896;

he composed *Manila Te Deum* (1899) in honor of Dewey's victory at Manila; and in 1913 his opera *Cyrano* was produced in New York. He is also the composer of incidental music to Euripides' *Medea* and *Iphigenia in Tauris,* produced in the Greek Theatre, Berkeley, California, in 1915. He is a member of the National Institute of Arts and Letters.

Dams may be defined as artificial barriers placed on the earth's surface, usually across a natural water course, to create a basin or reservoir to: (1) Impound water; (2) divert all or a part of the flow of a stream into a canal or pipe line; (3) raise the water-level of the portion of the stream above the dam; (4) exclude water from an area. The term is also used in connection with other fluids than water and for other purposes than those enumerated, but these more general meanings of the term are relatively unimportant.

Functions.—Since the rainfall in any locality varies throughout the year and from year to year, the quantity of water flowing in streams varies accordingly. During periods of high flow, the amount of water available may greatly exceed immediate needs and, during floods, cause loss of life and large property damage. During periods of low flow, there may be insufficient water to supply the minimum demand and great inconvenience and loss may result. To remedy this situation, dams are constructed which create reservoirs for impounding or storing water. Such dams are called *storage dams.* They may be constructed to hold back a part or all of the water in a stream, during periods of excessive flow, and release it at a rate which will not exceed the capacity of the channel below. Such dams are called *flood control dams.* The five dams in the valley of the Miami River in Ohio constructed in 1920 after the flood at Dayton, Ohio, are flood-control dams. They are kept empty at all times except when water accumulates in them during periods of excessive flow. On a stream which is used for navigation purposes, dams may be required at points to maintain the minimum depth of water required by the vessels which use the stream. A pound is created behind each dam which, when necessary, extends up to the next higher dam. Water flows over the dams, and locks are provided at each dam to permit vessels to pass the dam and overcome the difference in water level above and below the dam.

The Tennessee River was made navigable as far up as Guntersville, Ala., by Pickwick Landing Dam, Wilson Dam and Wheeler Dam. The purpose of the Fort Peck Dam on the Missouri River is to store the flood waters of this river and release them gradually so that the minimum flow of the river will permit navigation as far up as Sioux City, Iowa. Dams are frequently built to raise the water level of a part of the stream immediately above the dam so that water may be taken from this pool, passed through turbines connected to electric generators, and discharged at a lower level below the dam. In some cases, a considerable amount of water may be stored above a power dam during periods of high water to provide water during periods of low water as in the 'Lake of the Ozarks' in Missouri created by Bagnell Dam, while in a 'run of the river' plant such as that at Keokuk, Iowa, the storage above the dam is insignificant and the amount of power which can be generated varies with the flow of the stream. Dams are built to raise the water level immediately above the dam and divert the water into irrigation canals, as in the case of the Black Canyon Dam which raises the water of the Payette River in Idaho 90 feet to feed a canal which irrigates about 80 thousand acres of land; or into power canals or pipe lines where it is desirable to keep the water at the highest possible elevation, in the first case, so that as much land as possible can be reached without pumping and, in the second case, so that the maximum amount of power can be generated.

The Parker Dam on the Colorado River, about 150 miles below Boulder Dam, diverts water from the river into the intake of the Colorado River Aqueduct, which carries it 300 miles to supply Los Angeles and the surrounding area with water. Dams which divert the flow of a stream in this manner are called *diversion dams.* Boulder Dam on the Colorado River combines many of the functions for which dams are constructed. Meade Reservoir, which it forms, can store the total normal two-year flow of the river. This dam protects the Imperial Valley in California from floods, which used to be a great menace; it regulates the flow so as to make a dependable water supply for Los Angeles and provides water for the irrigation of vast areas in California, New Mexico, and Arizona; and, due to the great difference in the level of the water above the dam and the stream below and the quantity of water available, large amounts of power are generated. Dams, called *cofferdams,* are built to exclude water temporarily from a site in a stream or other body of water where construction operations are to be carried on; dams called *dikes* may exclude ocean water from areas used for agricultural purposes and cities, as in Holland; and dams, called *levees,* may be along rivers to exclude flood waters from cities and agricultural lands, as along the Lower Mississippi River.

Types.—Dams of many types have been developed to suit various topographic and geologic conditions, local materials, safety and appearance requirements, available funds; and preferences of the designer or owner. The principal types are the solid gravity dam, the arched-gravity dam, the single-arch dam, all constructed of stone or concrete masonry; the deck dam and the multiple arch dam constructed of reinforced concrete; the earth-fill dam and the rock-fill dam. Dams are also constructed of steel and timber but not extensively. There are many types of movable dams which are so constructed that they may be partially removed from the river channel during periods of high flow. The following discussions refer only to the dams themselves. The foundation requirements and the treatment of foundations are discussed in the paragraph on foundations.

The *solid-gravity* or *gravity-section* dam, whose profile or outline of cross-section is given in Fig. 1, is a sold impervious stone or concrete masonry structure which resists the water pressure by virtue of its weight. The water load and other lateral loads are transmitted to the foundations by so-called *cantilever action,* each portion of the dam included between two adjacent vertical cross-sections, usually considered as one foot apart for convenience, being a vertical cantilever beam held in position by its own weight. The profiles of such dams are approximately triangular with a vertical or slightly battered upstream face, with the apex of the triangle at or near the high-water level. This triangle is surmounted with a top or crest to give additional strength to this part of the dam, to provide a roadway or walkway and to raise the top of the dam several feet above the high-water level in order to prevent waves from splashing over the dam. The base width of modern dams of this type is never less than seven-tenths of the height and rarely exceeds the height.

The *arch-gravity* or *gravity-arch* dam, illustrated in Fig. 2,

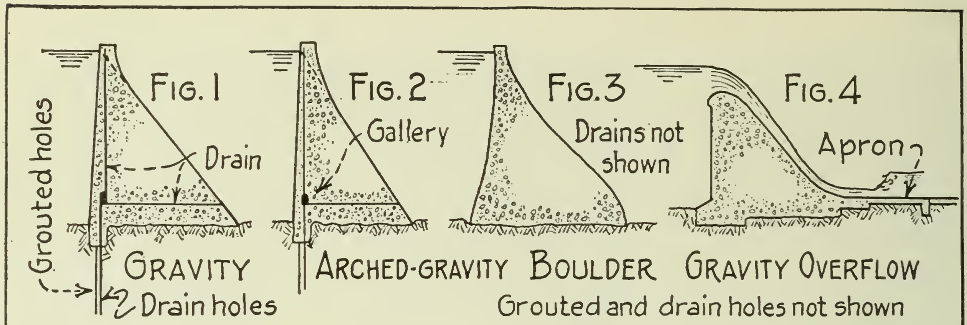


FIG. 1 GRAVITY

FIG. 2 ARCHED-GRAVITY

FIG. 3 BOULDER

FIG. 4 GRAVITY OVERFLOW

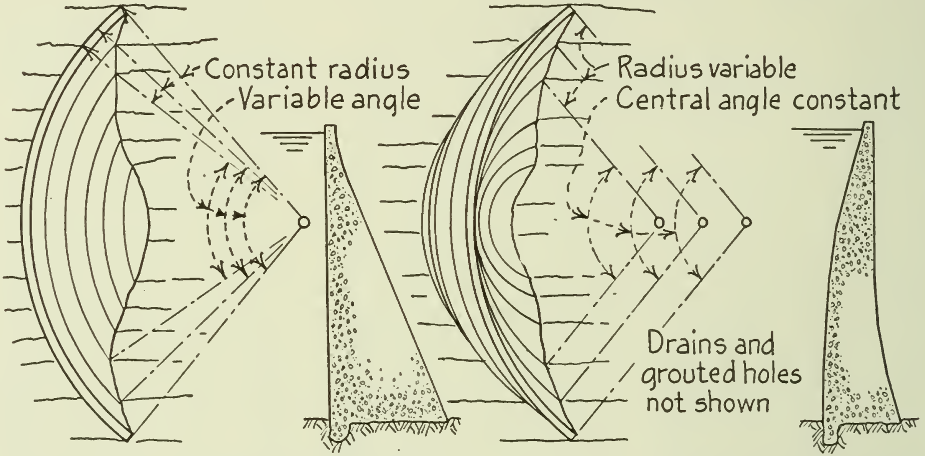


FIG. 5a. CONSTANT-RADIUS ARCH

FIG. 5b. CONSTANT-ANGLE ARCH

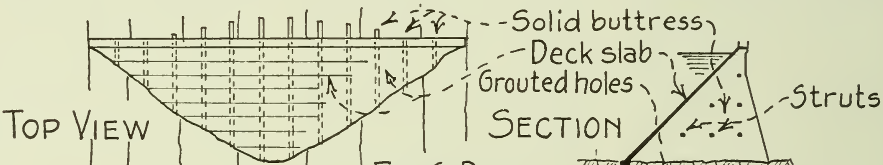


FIG. 6. DECK

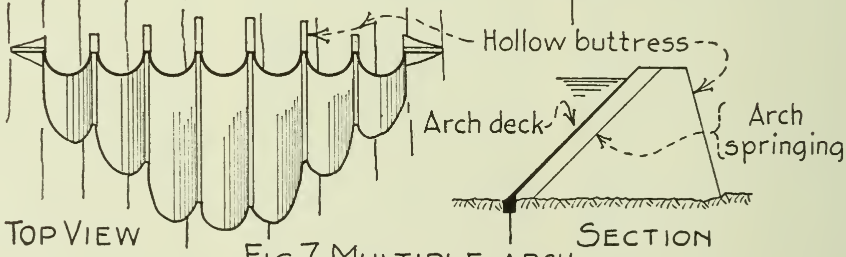


FIG. 7. MULTIPLE-ARCH

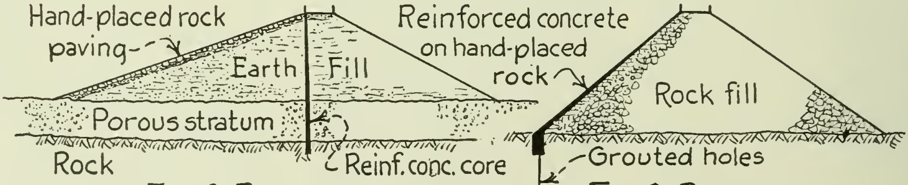


FIG. 8. EARTH-FILL

FIG. 9. ROCK-FILL

TYPES OF DAMS.

is curved or arched upstream so that a part of the water load and other lateral forces is transmitted to the canyon walls by horizontal *arch action* and the remainder is transmitted to the foundation by *cantilever action* as in a solid-gravity dam. In order to develop arch action, the vertical radial contraction joints now provided every 25 or 50 feet in dams of this type, as well as in solid-gravity dams, must be tightly closed under all conditions of loading and temperature. The usual method for accomplishing this is to force into the contraction joints a fluid mixture of cement, pulverized sand and water, called *grout,* under very high pressure. If these joints are not filled, arch action cannot develop and the structure is a curved-gravity dam, rather than an arch-gravity dam. The materials used in the construction of dams of this type are the same as for solid-gravity dams and the profiles are similar in shape but more slender. The profile of Boulder Dam, which is a very high arch-gravity dam, has reverse curves on the upsteam and downstream faces, as shown in Fig. 3, because of certain stress relations which become important in a dam of this height. The contraction joints in this dam are vertical radial joints about 50 feet apart and vertical joints parallel to faces so that the dam is really an assemblage of vertical prisms about 50 feet square *keyed* together and with their tops shaped to conform to the outlines of the dam.

The *single-arch* or *arch dam* is curved or arched upstream to such an extent that practically all of the water load and other lateral forces are transmitted horizontally to the canyon walls by *arch action,* the assistance rendered by *cantilever action* being so small that it is commonly, but not always, neglected. In order to be a satisfactory site for an arch dam a canyon must be narrow with steep side slopes of solid rock. The materials for arch dams are the same as for solid-gravity dams and the joints are pressure grouted as described elsewhere. A single-arch dam may have the same radius of curvature at all elevations, as in the *constant-radius arch dam,* shown in Fig. 5a, the central angle between the extreme radii drawn at any elevation from the points where the dam joins the canyon walls, decreasing because of the narrowing of the dam as the bottom of the canyon is approached; the radius of curvature may be decreased as the bottom of the canyon is approached in order to give more efficient arch action throughout the dam as in the *variable radius arch dam;* or the radius of curvature may be decreased in such a way as to keep the central angle constant for all elevations as in the *constant-angle arch dam,* shown in Fig. 5b, the least material being required when the central angles are approximately 130 degrees. Since the radius of constant-angle dams varies, such dams are often classed as variable-radius dams. The upstream face of a constant-radius dam may be vertical or have a constant batter, and the downstream face may have a constant batter but both faces of variable-radius, and constant-angle dams are warped surfaces.

The *deck dam,* illustrated in Fig. 6, consists of a series of triangular buttresses of reinforced concrete, placed at intervals across the valley, supporting on their upstream faces, which have a slope of 45 degrees or somewhat less, a deck which retains the water and transmits the water load, and the weight of the deck itself, to the buttresses which, in turn, transmit to the foundation these loads and those due to their own weight. The downstream faces of the buttresses are vertical or nearly so. The spacing of the buttresses varies from 10 to 50 feet and is determined by the height of the dam, the type of deck, foundation conditions and other factors. The buttresses are high, thin, triangular-shaped walls which require lateral support to prevent buckling. This is provided along the upstream face by the deck and at intermediate points and near the downstream face by lines of horizontal reinforced concrete struts, running from buttress to buttress, or by heavy pilasters on the sides of the buttresses. When the foundations are solid rock it is not necessary to provide footings for the buttresses, but the bottoms of the buttresses are securely keyed into trenches cut into the rock. If the foundation material is poor, wide footings may be provided or a continuous reinforced concrete mat may be run from buttress to buttress under the entire dam and thereby reduce the foundation pressures by distributing the load over a large area. Vertical holes are provided in the mat so that any water which finds its way under the mat can escape readily without building up large hydrostatic pressures under the mat. Decks of various types have been devised, but they usually consist of reinforced concrete slabs resting on ledges provided along the upstream edges of the buttresses, so that the upstream faces of the slabs and buttresses are flush with each other, the ends of the slabs being keyed into the sides of the buttresses, or of reinforced concrete slabs which are made monolithic or continuous with the upstream faces of the buttresses. Some types of deck dams are called *Ambursen dams* because they were patented by a company of that name.

The *multiple-arch dam,* illustrated in Fig. 7, consists of a series of triangular buttresses of reinforced concrete, placed at intervals across the valley, supporting on their upstream faces, which have a slope of 45 degrees or somewhat more, a deck consisting of a series of cylindrical reinforced concrete arches spanning the openings between the buttresses. The downstream faces of the buttresses are vertical or nearly so. The buttress spacing for any dam is made constant to balance the arch thrusts, but it varies from 20 to 60 feet for different dams according to the height of the dam, the foundation conditions and other factors. In the earlier dams, lateral buckling of the buttresses was prevented by lines of horizontal reinforced concrete buttresses running from buttress to buttress. Later developments consist of heavy pilasters on the sides of the buttresses or preferably the hollow buttress, shown in Fig. 6, which, with the same amount of material as a solid buttress, may be made wider and therefore more resistant to lateral buckling. The foundations of the buttresses are as described under deck dams. The arches or *barrels* are approximately segments of cylinders with central angles of from 120 to 150 degrees and are securely anchored to the buttresses so as to be considered monolithic with them. They increase in thickness with the depth below the water surface to carry the increased water pressure. No contraction joints are provided in the arched deck. Changes in length of the arches due to temperature changes, shrinkage, or other causes, produce stresses in the arches which are provided for in design. As in deck dams, extreme care must be exercised to provide a water-tight joint between the arched deck and the foundation.

The *multiple-dome dam* is similar to the multiple-arch dam but the deck consists of reinforced concrete domes similar in shape to somewhat less than half the shell of an egg cut by a plane parallel to the longitudinal axis, but a short distance from it, the more pointed end being at the bottom and the thickness of the dome increasing with the depth below the water surface.

The *earth dam*, as shown in Fig. 8, consists of an earth embankment which is flat on top and has sloping upstream and downstream faces. The dam is made impervious preferably by the use of proper material throughout, in the upstream two-thirds, or even in the upstream one-third portion and thoroughly compacting it. When such material is not available in sufficient quantities, as is usually the case, the dam is made impervious by a core in the center of the section. This core may be made of selected earth materials carefully compacted; a masonry core wall of stone, plain concrete, or reinforced concrete; a steel membrane of riveted or welded plates or sheet piles; or wood sheathing in small unimportant or temporary dams. The materials of which earth dams are constructed consist of natural or artificial mixtures of gravel, sand, clay and silt. The coarser materials are pervious but they give the dam stability and the clay, which is unstable if used alone, makes the dam impervious. The desirable material for the entire dam, if possible, but at least for earth cores, is that which will have a maximum density, the materials being so graded from coarse to fine that the pore spaces of each will be progressively filled. When a core is used it is desirable to place a coarse, free-draining material in the downstream portion of the dam and the more impervious materials in the upstream portion. The top width of earth dams varies from 10 to 30 feet, or more, depending upon the height of the dam. It projects above the high-water line to provide a freeboard of from 5 to 10 feet to prevent overtopping by waves. The slope of the upstream face is not steeper than 2½ horizontal to 1 vertical and the downstream face more than 2 to 1. The upstream face is protected from erosion due to wave action by a heavy layer or riprap dumped in place, a paving of hand-placed stone on a foundation of gravel or broken stone, or a facing of reinforced concrete slabs supported on all four sides by reinforced concrete sills embedded in the face of the dam. The top and the downstream face do not need to be protected so effectively but riprap and hand-placed paving are often used. A heavy layer of gravel may be satisfactory or these surfaces may be covered with good soil and sodded with hardy grass whose roots will bind the surface soil together. One or more horizontal shelves or *berms* are often provided along the downstream face of high earth dams to direct rain water horizontally at intervals and thereby reduce erosion. Earth dams are divided into two classes according to the method used in placing the earth.

In a *rolled-fill dam* the earth is hauled onto the dam in wheel scrapers, wagons, dump cars, trucks or even brought by man-carried baskets in Oriental countries, spread in layers a few inches thick by graders, bulldozers, or otherwise; it is then sprinkled with a carefully determined amount of water to give it maximum density, and compacted by the tread of the horses' (or human) feet or by heavy rollers which are preferably corrugated or provided with projections as in sheepsfoot rollers, to avoid any possibility of forming planes between the layers along which water might seep. In a *hydraulic-fill dam*, the earth is transported to its place in the dam in water flowing by gravity in flumes or pipe lines or by water under pressure in pipe lines. The earth may be excavated in the usual ways: by monitors provided with nozzles which force a stream of water against a bank of earth; or the saturated soil of river beds may be excavated by hydraulic dredges which are provided with pumps to force the earth-laden water to the dam. Great care must be used in controlling the deposition of the soil on the dam so that the finer, more impervious material will be carried to the puddle of water which accumulates in the center of the dam and be deposited to form the *puddle core*. The coarser material should be deposited on the downstream side and that deposited on the upstream side should be reasonably impervious. Consolidation of the fill takes place gradually as the water drains out.

The *rock-fill dam*, shown in Fig. 9, usually consists of a broken rock embankment which provides the necessary stability and an impervious upstream facing which makes the dam water-tight. The slopes of the faces can be made somewhat steeper than those of earth-filled dams. The upstream facing usually consists of reinforced concrete slabs supported on sills embedded in the face of the dam, or on a hand-placed rock paving over the rock fill.

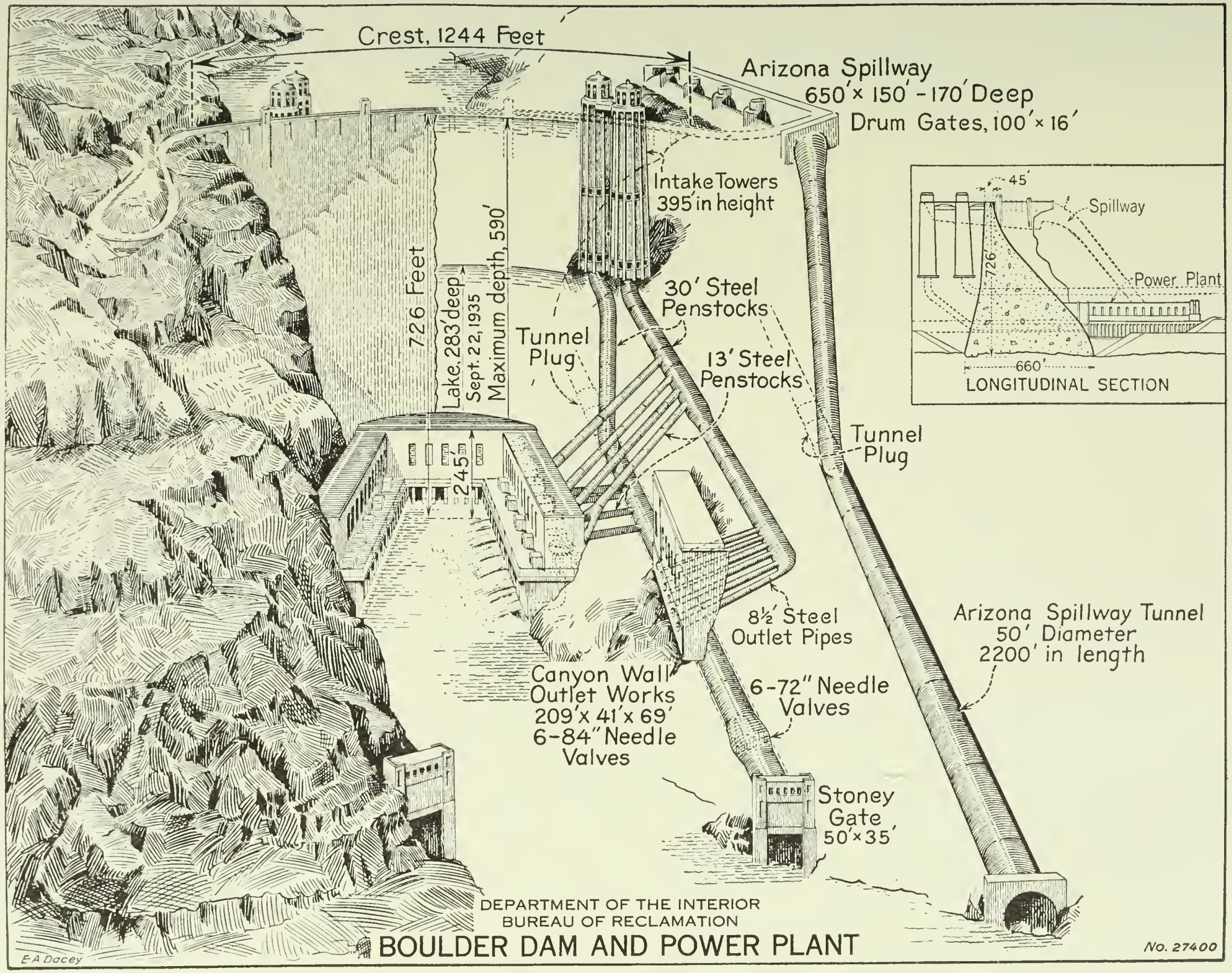
Many other types and modifications or combinations of the types described have been used in the past or are used to a limited extent today. One of the most important of these is the steel dam which consists of triangular steel frames placed at intervals across the valley and supporting an inclined deck made of steel plates. Small dams are constructed of logs or squared timbers and planks usually arranged in cribs or in other ways, so that the structure can be given stability by filling with rock the cells or spaces between the timbers.

An *overflow dam, spillway dam* or *weir* is one which is designed for excess water to pass over its top or crest, as shown in Fig. 4.

A *movable dam* is one which is so arranged that most of its parts which obstruct the flow of a stream can be moved so as to clear the channel during floods. Many types of movable dam have been devised. The *roller dam* consists of a large hollow still cylinder which crosses a stream and forms a dam but which can be rolled upward on inclined guides at its ends and thereby clear the stream. Dams may be provided with *Stoney gates* which are rectangular gates closing large openings in movable dams. To clear the channel these gates are lifted vertically. The ends of the gates operate in vertical grooves in piers, the friction being reduced by trains of rollers. *Shutter dams* have rectangular gates with horizontal axes and various types of devices which enable them to be rotated from a vertical or nearly vertical position and lowered into a recess in the floor of the channel.

Drum dams are hollow segments of cylinders pivoted horizontally at their center of curvature and arranged to move up and down from a chamber in the floor of the channel. There are many other types including needle dams, curtain dams, and bear-trap dams.

Forces on Masonry Dams. —The principal forces which a stone or concrete masonry dam must be designed to resist are the pressure of the water against the upstream face; the pressure of water which might force its way between the dam and its foundation or into the body of the dam itself; the weight of the dam; and, in some cases, earthquake shocks and the thrust of ice which freezes on the surface of the water. Dams are subjected to impact forces caused by moving water, waves and blocks of ice, logs and other floating objects, but the effects of these can only be of consequence near the crests of high dams or in low dams. Wind pressure is usually of no consequence.



BOULDER DAM.

$165,000,000 Government Project. Began Power Plant Operation, Sept. 11, 1936.

VOL. III.—At page 536

Foundations.—One of the chief factors which has caused various types of dams to be developed is the character of the foundation at the sites where dams are to be built. By selecting a suitable type and properly designing it, a satisfactory dam can be built on any kind of material from silt to rock, but one of the most common causes of failure of dams is faulty foundations. Masonry dams, except for very low structures, must be founded on sound, durable rock which has been properly prepared to receive them. In order to avoid any possibility of water being forced between a dam and its foundation and through the foundation rock itself, a cut-off wall is placed in a trench excavated along the heel of a dam and under this cut-off wall is a *grouted curtain* formed by drilling a row of holes two or three inches in diameter and about five feet apart, extending entirely across the portion of the canyon occupied by the dam, having depths which commonly exceed one hundred feet, and filling these holes with cement grout under pressure so that all of the fissures, channels, caverns and other open spaces intersected by the holes are filled solidly after the grout has set. If the foundations are bad, the whole area under the dam may be grouted. Rock-fill dams are usually, and earth-fill dams are sometimes, placed on rock or hardpan foundations. The lower portion of the water-tight facing or core of such dams is extended into the foundation by means of a cut-off wall which may, in turn, be connected with a grouted curtain. Earth dams are usually constructed on earth foundations which have been properly prepared for receiving them. Such foundations must have adequate bearing capacity to carry the weight of the dam and must be sufficiently impervious and of such composition and structure that water will not seep under the dam with a velocity which will carry the fine material with it and eventually cause failure by *piping*. The passage of water through pervious soil is prevented by carrying the core down into an impervious stratum or driving sheet piles through the pervious stratum into the impervious stratum, the upper ends of the piles extending into the core. If there is not an impervious stratum within a reasonable distance below the bottom of the dam, sheet piling is driven down a sufficient distance to make the path that water has to travel, in getting under the piles, so long that its velocity of flow is so low, because of friction losses, as to be unobjectionable.

Drainage.—Dams are built to obstruct the flow of water for some effective use, but water which penetrates into the body of a masonry dam or into its rock foundation is objectionable. In order to dispose of the water in a masonry dam or its foundation, drainage systems are provided as shown in Fig. 1. The dam itself is drained by a row of vertical drain holes up to five inches in diameter and about five feet apart placed near the upstream face and discharging at their lower ends into a longitudinal drainage or inspection gallery near the bottom of the dam, but at such an elevation that the water it collects can be disposed of through drains which pass from the floor of the gallery to the downstream face. The foundations are drained in a similar manner by a row of drain holes drilled into the foundation just a few feet, in the downstream direction, from the grouted curtain. The foundation drains discharge upward into the drainage gallery.

Historical.—The oldest dam of which there is any definite record is the masonry dam constructed across the Nile over 6000 years ago, about ten miles south of Memphis. It was maintained in good condition for about 45 centuries but is now in ruins. According to Wegmann, the oldest masonry dam now in existence is the Almanza Dam in Spain. The date of its construction is unknown but the dam was in use before 1586 and is still functioning. Many solid-gravity, stone-masonry dams had been constructed in Spain, France and elsewhere before the middle of the eighteenth century but, until then, scientific principles had not been applied to the design of such structures. Judgment and experience determined the dimensions. In 1853, De-Sazilly, a French engineer, published the first attempt at a rational procedure for the design of gravity-section dams. His work was followed by that of Delocre, Bovier, Rankine, Levy, Unwin, Wegmann, Cain, Kelen and others, and by many experiments on model dams, culminating in the analytical and model studies of the United States Reclamation Bureau, until the design of gravity-section dams is on a fairly satisfactory rational basis although much still remains to be learned.

The first dam to depend upon arch action for resisting the water pressure was probably the Zola Dam completed in France in 1843. Until recent years, the design of arch dams was based on the *Cylinder Theory* which considered an arch dam as a portion of a thin cylinder in a vertical position and surrounded with water whose radial deformations were unrestrained. Such deformations of an arch dam are restrained by the supporting canyon walls and the foundation. Although this theory disregarded several very important factors no arch dam has ever failed because of structual weaknesses in the dam itself and few have failed from any cause. During recent years, the design of arch dams and of the arch-gravity dams has been developed to a very marked degree through the efforts of Cain. Noetzli, Jorgensen and engineers of the United States Reclamation Bureau, assisted by experimental studies on model dams, the most generally accepted procedure being the *Trial Load Method* developed by the engineers of that Bureau.

Until the close of the last century, masonry dams were constructed of *rubble masonry* consisting of roughly-shaped stones set by hand in mortar with the aid of derricks and with or without a cut-stone facing. As mechanical equipment improved the size of the stones increased until *cyclopean rubble,* containing from 60 to 70 per cent of large stones, became the accepted material, the cementing material changing gradually from lime to natural cement and finally to Portland cement. With the modern development of concrete construction and its mechanical mixing and placing, it became cheaper to embed large stones, weighing up to many tons, in thick masses of freshly deposited concrete, instead of carefully setting them by hand in mortar, and *cyclopean masonry* containing about 25 per cent of large stones replaced cyclopean rubble. This form of construction required that the faces of a dam be built up of rubble or cut-stone masonry or quite commonly of large concrete blocks set in mortar to contain the fresh concrete in the body of the dam. At the present time the common practice is to use forms to contain the fresh concrete, making the masonry facing unnecessary, to limit the stones to a size which will pass a screen with about 8-inch openings, and to require that all of the material pass through the mixers, no separate stones being added.

One of the first deck dams, if not the first, was the Schuylerville Dam constructed in New York in 1904; it was a reinforced concrete structure with the modest height of 28 feet. The first multiple-arch dam, of which there is any record, is the Meer Alum Dam in Southern India, constructed of masonry in about 1800 and still in use. In 1892, a United States patent was issued to J. D. Dickson, an English engineer, on a multiple-arch dam; in 1897 Henry Goldmark prepared plans for such a dam to be located in Utah but never built; in 1900 Edward Wegmann prepared a design for a structure 160 feet high which did not materialize, but in 1908 John S. Eastwood completed the reinforced-concrete Lake Hume Dam in California.

Earth dams were doubtless constructed before the beginning of recorded history. In India and Ceylon there are many thousands of ancient reservoirs, called tanks, formed by earth embankments sometimes 70 or 80 feet high and many miles in length. An ancient tank at Padivil in Ceylon has embankments which are 70 feet high and are faced throughout with squared stones. The hydraulic-fill method for constructing earth dams originated in western United States during the early mining days of the last half of the 19th century. The rock-fill dam also had its origin in this region and at the same time. Until recently, the design of earth dams depended largely on judgment and experience with little understanding of the scientific principles involved. The situation was much the same as that of solid-gravity dams nearly a century ago. At the present time, there is intense interest in the investigation of the physical properties of soils, the mechanics of their consolidation and settlement, and the stability of earth structures. This field of knowledge is called *soil mechanics*.

Failures.—Some of the more outstanding failures of dams, their locations, dates of failure, the type of dams, and the approximate number of lives lost are:

Dam	*Location*	*Date*	*Type*	*Lives*
Puentes	Italy	1791	Gravity	600
Dale Dyke	England	1864	Earth	200
Johnstown	Penn.	1889	Earth	2200
Austin	Texas	1900	Gravity	——
Austin	Penn.	1911	Gravity	400
Gleno	Italy	1923	M-arch	500
St. Francis	Calif.	1928	Gravity	500

Notable Dams.—The most striking feature of a dam, and the feature which is probably the most important in design, is the height, although the volume is a better measure of its size and the magnitude of the construction operation. The best measure of the importance of a dam is the effect it has upon human welfare, but this is difficult to evaluate. In the United States alone there were nearly 70 dams of 200 feet or over in height and 19 dams 300 feet or over, completed or under construction in 1936. Those under construction are indicated by an asterisk.

Gravity and Arched-Gravity.—Boulder, Ariz.-Nev. (1935) 727 ft.; Grand Coulee, Wash.* 550; Chambon, France (1935) 450; Kennett, Calif.* 420; Owyhee, Ore. (1932) 405; Schreah, Switz., 366; Camarasa, Spain, 333; Tarlan, Spain, 328; Grimsel, Switz., 315; Kensico, N. Y. (1916) 307; New Croton, N. Y. (1907) 297; Chavanon, France, 279; Bhandara, India, 270; Norris, Tenn. (1936) 266; Barren Jack, Australia, 245; Howden, England, 242; Schwarzenbach, Germ., 230; Dnieper, Russ., 200.

Single-Arch. — Sautet, France, 414; Diablo, Wash. (1931) 405; Pacoima, Calif. (1929) 358; Shoshone, Wyo. (1910) 328; Montejacque, Spain, 236.

Deck.—La Prele, Wyo. (1909) 150; Stony Gorge, Calif. (1928) 143.

Multiple-Arch.—Bartlett, Ariz.* 270; Lake Pleasant, Ariz. (1927) 256; Tirso, Italy, 239; Sukkur, India, 180.

Earth and Rock-fill.—San Gabriel, No. 1, Calif.* 381; Salt Springs, Calif. (1931) 332; San Gabriel, No. 2, Calif. (1935) 285; Dix River, Tenn. (1925) 270; Cobble Mt., Mass. (1932) 263; Fort Peck, Mont.* 242.

Fort Peck Dam was the largest in the world in 1936, with a volume of 100,000,000 cubic yards of earth, followed by Gatun Dam in the Panama Canal Zone. Boulder Dam contains 3,250,000 cubic yards of concrete, a greater volume than that of any other masonry dam. Meade Reservoir, created by Boulder Dam, is the largest in the world, with a capacity of 30 million acre-feet—greater than the combined capacity of all the reservoirs in the United States as completed in 1935.

Consult E. Wegmann, *The Design and Construction of Dams;* F. W. Hanna and R. C. Kennedy, *The Design of Dams; Engineering News-Record; Reclamation Era* (U. S. Govt.); *Americana Annual.*

W. C. Huntington,
Professor of Civil Engineering,
University of Illinois.

Dan, a tribe of Israel, the ancestor of which was the elder of the two sons of Jacob and Bilhah (Gen. xxx. 6.). It was the last of the tribes to receive its inheritance, which, though small, had great natural advantages. On the north and east it was surrounded by Ephraim and Benjamin, and on the southeast and east it joined Judah. Later a portion of the tribe migrated to the north of Palestine (Judges xviii), where they destroyed Laish, and rebuilt it as Dan. Samson was of this tribe.

Dan, a city on the extreme northern border of Palestine, originally known as Laish, but conquered and renamed by the tribe of Dan. The image which the Danites had stolen from Micah they set up in their new home for worship. It is probable that Dan was the present Tell-el-Kâdi. The expression 'from Dan to Beersheba' refers to the entire length of Israel.

Da'na, Charles Anderson (1819–97), American journalist, was born in Hinsdale, N. H., and passed his boyhood in Buffalo, N. Y. While working in a store, he prepared himself for Harvard, entered in 1839, but was obliged to leave after two years on account of trouble with his eyes. In 1841 he joined the Brook Farm Association, at Roxbury, Mass., and led the simple life of that group of philosophers until the venture came to an end. He edited the *Harbinger* at Boston, and did other newspaper work in that city until he joined the staff of the New York *Tribune* in 1847. He travelled in Europe as a correspondent for the *Tribune* and other papers for several months in 1848, and on his return became a stockholder in, and managing editor of, the *Tribune,* a position he held until 1862, when he severed relations with the paper on account of differing opinions between Mr. Greeley and himself as to the conduct of the war. He then engaged in confidential duties for Secretary Stanton and was for a time (1863–4) assistant secretary of war. He was editor of the Chicago *Republican* in 1865–6, and in 1868 became a proprietor and the editor of the New York *Sun,* which paper he completely reorganized. He continued as editor-in-chief of the *Sun* for the rest of his life, making it a model of terse record, comment, and criticism. His scholarship and knowledge of art and literature, made *The Sun* always readable. He was one of the last of the American journalists whose editorial policies reflected definite personality. He projected and edited, with George Ripley, *The New American Cyclopaedia* (1857–63), and its successor, *The American Cyclopaedia* (1873–76). He compiled *The Household Book of Poetry* (1857); edited, with Rossiter Johnson, *Fifty Perfect Poems* (1883); and wrote: *The Art of Newspaper Making* (1895); *Lincoln and His Cabinet* (1896); *Life of General Grant* (with Gen. J. G. Wilson). His *Recollections of the Civil War* (1898) and *Eastern Journeys* (1898) were published posthumously. Consult J. H. Wilson's *Life* (1907).

Da'na, Charles Loomis (1852–1935), American neurologist, was born in Woodstock, Vt. He was educated at Dartmouth College and the New York College of Physicians and Surgeons, and was professor of physiology in the Women's Medical College, New York (1880–86), and professor of nervous diseases at the New York Post-Graduate School (1884–96), Dartmouth College (1890–93), and Cornell University Medical College and Bellevue Medical College (after 1909). He served as president of the New York Academy of Medicine and of the American Neurological Association. In 1900 he organized the Charaka Club, a society devoted to the study of medical history. His *Text Book of Nervous Diseases and Psychiatry* (9th ed. 1921) is standard and he made many contributions to neurology.

Dana, Francis (1743–1811), American jurist and patriot, was born in Charlestown, Mass. He was graduated from Harvard (1762), and was admitted to the bar in 1767. He was a delegate to the first provincial congress of Massachusetts (1774); a member of the Massachusetts Executive Council (1776–80); and a delegate to the Continental Congress (1776–78), where he served as chairman of the committee to reorganize the army, and of the Congressional committee which acted on Lord North's proposals. In 1879 he was secretary of legation in Paris under John Adams, and in 1781–83 U. S. Minister to Russia. In 1785 he was appointed a justice of the Supreme Court of Massachusetts, and in 1791 chief justice. He retired in 1806.

Dana, James Dwight (1813–95), American geologist and mineralogist, was born in Utica, N. Y., and was educated at Yale. He was an instructor in the U. S. Navy (1833–36); assistant to Prof. Benjamin Silliman at Yale (1836–38); and mineralogist and geologist with the Wilkes Exploration Expedition to the Southern and Pacific Oceans (1838–42). He prepared three extensive reports of his scientific observations during the Expedition, which were published by the U. S. Government: *On the Zoophytes* (1846), *On the Geology of the Pacific* (1849), *On Crustacea* (1852–54). In the work on Zoophytes, no less than 230 species were described for the first time; in that on Crustacea, 658 species. In 1850 Dana was appointed Silliman professor of natural history and geology at Yale, a position which he held for forty years, being then made professor emeritus. He ranked as one of the foremost scientists of the nineteenth century, and his achievements received wide recognition both at home and abroad. He was president of the American Association for the Advancement of Science (1854), and of the Geological Society of America (1890); he was elected to membership in the Royal Society of London, the Institute of France, and the Royal Academies of Berlin and Vienna; and had conferred on him the Wollaston medal and the Copley medal. His text books on mineralogy and geology are standard authorities, and include: *A System of Mineralogy; Manual of Mineralogy; Manual of Geology; Corals and Coral Islands; Text Book of Geology; The Geological Story Briefly Told.* From 1846 until his death he was editor of *The American Journal of Science.* Consult *Life,* by his son.

Dana, Napoleon Jackson Tecumseh (1822–1905), American soldier, was born in Eastport, Me. He was graduated from West Point (1842), and served in the Mexican War under General Taylor through the siege of Fort Brown, and under General Scott at the Battle of Cerro Gordo, where he was severely wounded, and brevetted captain. From 1855 to 1861 he was engaged in the banking business in St. Paul, and at the outbreak of the Civil War entered the Union Army as colonel of the First Minnesota Volunteers. He served through the Peninsula and Maryland campaigns, and was seriously wounded at Antietam. In November, 1862, he became major general of volunteers, and commanded successively the District of Vicksburg, the Sixteenth Army Corps, the District of West Virginia, of Vicksburg again, and the Department of the Mississippi. After the close of the war he engaged in mining and railway management.

Dana, Paul (1852–1930), American journalist, son of Charles A. Dana (q. v.), was born in New York City, and was educated at Harvard and Columbia Universities. In 1880 he joined the staff of the New York *Sun,* and in 1897 succeeded his father as editor, retiring in 1903. In 1891 he was park commissioner of New York City. He was a member of the Committee for Relief in Belgium, being stationed in Namur (1915).

Dana, Richard (1699–1772), American jurist, was born in Cambridge, Mass., and was graduated from Harvard (1718). He studied law and practiced in Boston, attaining a foremost position at the Massachusetts bar. He took a prominent part in the movement of the colonists to resist the imposition of unjust taxes by the British government; often presided over the Boston town meetings from 1763 until his death; and in 1769 administered at one of these meetings the oath binding Andrew Oliver, secretary of the province, not to carry out the provisions of the Stamp Act. He was also a member of the committee which investigated the Boston Massacre (q. v.).

Dana, Richard Henry (1787–1879), American poet and novelist, son of Francis Dana (q. v.), was born in Cambridge, Mass., and was educated at Harvard. He was admitted to the Boston bar in 1811, and served in the state legislature. Turning to literature, he became a contributor to *The North American Review,* and was its associate editor in 1818–20. In 1821 he edited the short-lived literary periodical, *The Idle Man.* His first volume, *Poems,* containing his best-known poem, 'The Buccaneer,' was published in 1827; *Thoughts on the Soul* in 1829; and his collected *Poems and Prose Writings* in 1833. His best work was done in the field of criticism, and he did much to educate and elevate the literary taste of New England.

Dana, Richard Henry (1815–82), American author, son of Richard H. Dana (q. v.), the poet, was born in Cambridge, Mass., and was graduated from Harvard (1837). To cure himself of eye trouble he shipped as a common sailor on a voyage to the Pacific Coast, and later he published an account of his sailor life in *Two Years Before the Mast* (1840, enlarged ed. 1869), which attained enduring popularity. He was admitted to the Massachusetts bar in 1840, and became an authority on maritime law. He published *The Seaman's*

Friend (1841), a manual bearing on the relations of masters and sailors, as well as an edition of Wheaton's *International Law* (1866). He was one of the founders of the Free Soil Party (1848), and an active supporter of the Republican Party. In 1876 he was appointed U. S. Minister to England, but he was the victim of a political intrigue in the Senate which prevented his confirmation. Consult Adams' *Richard Henry Dana.*

Dana, Richard Henry (1851–1931), American lawyer, the son of R. H. Dana (1815–82), was born in Cambridge, Mass. He was graduated from Harvard (1874) and from the Harvard Law School (1877), and was admitted to the Boston bar. In 1878 he married Edith Longfellow, daughter of the poet. He organized the Associated Charities of Boston (1878), drafted the Civil Service Reform Act of Massachusetts (1884), and the first Australian ballot law in operation in the United States (Massachusetts, 1888), and was chosen president of the National Civil Service Reform League. He edited *The Civil Service Record* (1889–92). His writings include: *Double Taxation in Massachusetts* (1895); *The Corrupt Practices Act* (1906); *The Australian Ballot System of Massachusetts* (1911); *Trent Affair: An Aftermath* (1912); introduction and notes to a new edition of *Two Years Before the Mast* (1911); *Speeches in Stirring Times* (1910); *Hospitable England in the Seventies* (1921).

Dana, William Parsons Winchester (1833–1927), American artist, was born in Boston, Mass. He studied in Paris at the École des Beaux Arts and under Le Poittevin. From 1862 to 1870 he maintained his studio in New York City, but after that time lived abroad. In 1863 he was elected to membership in the National Academy of Design. His work embraces marine, landscape, and figure paintings, among the best known being *Solitude* (gold medal at the Paris Exposition, 1878); *Heartsease* (Metropolitan Museum of Art); *Emby's Admiral* (Pennsylvania Academy of Design); *Burning Wreck; Chase of the Frigate Constitution; Ebb Tide at Yport.*

Danaë, dan'*a*-ē, the daughter of Acrisius, king of Argos. An oracle having announced that she would one day give birth to a son who should kill his grandfather, Acrisius shut her up in a dungeon, where she was visited by Zeus in a shower of gold, and became the mother of Perseus. Acrisius next put both the mother and child into a chest, and exposed them on the sea. The chest, however, drifted ashore on the island of Seriphos, and Danaë and her child were saved. She accompanied Perseus to Argos. On his arrival, Acrisius fled, but was subsequently slain accidentally by Perseus at Larissa. The union of Danaë and Zeus has been made the subject of paintings by Titian, Rembrandt, and Correggio.

Danaïdae, da-nā'i-dē, or Danais, a genus of tropical butterflies, which includes certain species noteworthy for their protective coloration (see Mimicry). The Milkweed Butterfly (q. v.) of the United States belongs to this genus.

Danaides, the daughters of Danaüs (q. v.), fifty in number, who married the fifty sons of Aegyptus (q. v.), and, in obedience to their father, slew their husbands on their wedding night, with the exception of Hypermnestra, who spared her husband Lynceus. The poets tell how in the underworld the Danaides were compelled, as a punishment, to pour water forever into a vessel full of holes.

Danakil, dä-nä'kil (singular, Dankali), the Arab name for one of the Ethiopic branches of the Hamitic race, inhabiting the southwestern shore of the Red Sea and the highlands of Abyssinia. They are a handsome, warlike race of nomad cattle breeders, and have been nearly always independent. They call themselves Afar (singular, Afri).

Danao, dä-nä'ō, pueblo, Cebu Island, Philippines, on the east coast, at the mouth of the Danao River; 17 miles northeast of Cebu. The town is very old; there are coal mines in the vicinity. Pop. (1939) 28,387.

Danaüs, dan'ā-us, in Greek mythology, the son of Belus and twin brother of Aegyptus, originally ruler of Libya. Fearing his brother he fled to Argos, with his fifty daughters, the Danaides (q. v.), and was chosen king. Tradition says that he built the acropolis of Argos; his tomb was shown there in the days of Pausanias (about 150 A.D.).

Dan'bury, city, Connecticut, Fairfield county, on the New York, New Haven and Hartford and the Central New England railroads; 20 miles northwest of Bridgeport, and 60 miles northeast of New York City. The city stands first in the United States in the manufacture of hats. Other manufactures include hat-making machinery, paper and wooden boxes, silk, felt, silverware, cutlery, and electrical supplies. On the outskirts is an artificial lake, Lake Candlewood. Danbury was settled in 1684, incorporated as a borough in 1822, and received its city charter in 1889. In April, 1777, a British force under General Tryon destroyed the military supplies here, and burned a large part of the town. Pop. (1930) 22,261; (1940) 22,339.

Dan'by, Francis (1793–1861), Irish landscape painter, was born at Common in Wexford, Ireland, and came to England in 1813. He won fame by *The Upas Tree* (1820), a work evincing marked power of interpreting nature under her aspects of the vast and the terrible. Other important works are: *Sunset at Sea after a Storm* (1824); *The Delivery of Israel out of Egypt* (1825); *Opening of the Sixth Seal* (1828); *Departure of Ulysses from Ithaca* (1854); *Fisherman's Home, Sunset* (Tate Gallery, London).

Danby, Frank (1864–1916), pen name of Mrs. Julia Frankau, English author. She was married in 1883 to Arthur Frankau. Her published works include: *Dr. Phillips* (1887); *A Babe in Bohemia* (1889); *Eighteenth Century Color Prints* (1900); *Life of John Raphael Smith* (1902); *Pigs in Clover* (1902); *The Lives of James and William Ward* (1904); *Baccarat* (1904); *The Sphinx's Lawyer* (1906); *A Coquette in Crape* (1907); *The Heart of a Child* (1908); *An Incomplete Etonian* (1909); *Let the Roof Fall in* (1910); *The Story of Emma, Lady Hamilton* (1910); *Joseph in Jeopardy* (1912); *Concert Pitch* (1913); *Full Swing* (1914); *Nelson's Legacy* (1915); *The Story behind the Verdict* (1915).

Dance, George (1700–68), the Elder, English architect, designed the Mansion House, London (1739), and the London churches of St. Leonard's, Shoreditch, and St. Botolph's, Aldgate (1741–44).

Dance, George (1741–1825), the Younger, English architect, was born in London. He designed Newgate Prison (1770), and was professor of architecture at the Royal Academy (1798–1805), of which he was one of the original members.

Dance of Death, Todtentanz, or Danse Macabre, an allegorical representation of the supremacy of Death over mankind, in which all ages and all conditions of men are represented in a sort of dramatic progression. *The Triumph of Death,* painted by Orcagna on the walls of the Campo Santo at Pisa, in the fourteenth century, is one of the earliest known pictorial renderings of the theme. The same subject was pictured on the walls of the Dominican cemeteries of Basel and Bern—on the former about 1431–43, and on the latter by

Deutsch in the following century. Frescoes of the Dance of Death formerly existed on the walls of the Tower of London, the cloister of St. Paul's, and in many other churches of England. Holbein is pre-eminently associated with this subject, which he illustrated in a series of wood cuts, each containing two or three figures.

The Dance of Death was, however, primarily a dramatic performance. This drama was most simply constructed, consisting of short dialogues between Death and four-and-twenty or more followers, and was undoubtedly enacted in or near churches by religious orders in Germany during the fourteenth century. It would appear that the seven brothers, whose martyrdom is recorded in II. Maccabees vii., either played an important part in the drama, or the first representation, which took place at Paris in the Monastery of the Innocents, fell upon their festival, and hence the origin of the ancient name, *Chorea Machabæorum*, or *La Danse Macabre.* As early as 1400, the dramatic poem was imitated in Spain, and appears there in seventy-nine strophes of eight lines each (*La Dança General de los Muertos*). The French, having a love for pictorial representation, very early affixed an illustration to each strophe, and in 1425 painted the whole series on the churchyard wall of the Monastery of the Innocents, where the Dance of Death was habitually enacted. We find the subject treated in painting, sculpture, and in tapestry, in the churches of Anjou, Amiens, Angers, Rouen. From Paris, both poem and pictures were transplanted to London (1430).

But nowhere was the subject so variously and so strikingly treated as in Germany. A picture in one of the chapels of the Marienkirche at Lübeck, still, in spite of repeated repaintings, bearing the unmistakable impress of the fourteenth century, exhibits the simplest form of the drama, and has some Low German verses attached to it. The celebrated Dance of Death on the cloister walls of the Klingenthal, a convent in Basel, Switzerland, though painted probably not later than 1312, exhibited a departure from the simplest form. About the middle of the fifteenth century, the drama being altogether laid aside, the pictures became the main point of interest. It long survived in England in the form of the allegorical drama, *The Shaking of the Sheets, or The Dance of Death.* The old English ballad of *Death and the Lady* has a similar history. Rowlandson's *English Dance of Death* (1815–16) is a modern adaptation of the mediæval idea.

Consult Douce's *Holbein's Dance of Death;* Deuchar's *The Dances of Death;* Peignot's *Recherches sur les Danses des Morts;* Seelmann's *Die Todtentanze des Mittelalters.*

Dancette, the zigzag form of ornamentation common in Saxon and early Norman architecture. In Heraldry, one of the lines of partition. See CHEVRON.

Dancing, a form of exercise or amusement in which one or more persons make a series of more or less graceful movements with measured steps in accord with music. In its most refined phases, dancing expresses the poetry of rhythmic movement, and rises to the level of an art. In its earliest forms among simple races it is a mode of outward expression for strong emotions of joy and sorrow, love and rage, and even for the most solemn and impassioned religious feelings; in more civilized strata of human society it is employed as a means of recreation and amusement.

Dancing corresponds to a universal primitive instinct in man. In many parts of the world, and in every age, it has been the custom to arouse the battle fury, as well as to celebrate the conclusion of peace, by means of dancing; and the war dance of the Zulus is still a noble exercise for warriors, as was the Pyrrhic dance of the ancient Spartans. Dances have been held at seed time, to insure a good harvest; in drought, to produce rain; on many high social and tribal occasions; and in honor of the sun and other gods.

Into savage dancing, moreover, the idea of magic frequently enters. The Mandan Indians perform their buffalo dance to bring game when supplies of food are low; the rain doctors of Central Africa dance mystic dances to bring down rain; and the wives of Gold Coast negroes dance a battle dance to give their absent husbands courage in the fray.

Everywhere in ancient religions is dancing one of the chief acts of worship. Religious processions went with song and dance to the Egyptian temples; the Cretan chorus, moving in measured pace, sang hymns to the Greek god Apollo; and one of the Muses (Terpsichore), themselves daughters of Zeus, was the special patroness of the art. The Phyrgian Corybantes danced in honor of Rhea to drum and cymbal; at Rome, during the yearly festival of Mars, the Salian priests sang and danced, beating their shields; among the ancient Jews, Miriam danced to a song of triumph—itself an act of worship, and David danced in procession before the Ark of God. Religious dances long flourished in the Christian Church. *La bergerette* was danced at Easter at Besançon until 1737. Christmas carols were formerly circular dances, with song accompaniment. At Seville, in Holy Week, and at Alaro in the Balearic Isles, religious dances still continue. The Indians of North and South America, the 'devil dancers' of Ceylon, the Bodos of India the 'whirling dervishes' of Persia and the Mohammedan East, all seek divine inspiration through the ecstasy of the dance.

Of kindred origin was the dancing madness, or *choreomania*, of mediæval Europe. Emanating in 1374 from a sect of fanatics in Flanders (who became known as the Dancers), this quasi-religious frenzy soon spread into other European countries. As the devotees 'danced in honor of St. John,' their paroxysm was styled St. John's Dance, otherwise St. Guy's and St. Vitus'. This last name became eventually transferred to the purely physical disorder with which it is now associated. (See CHOREA.)

Dancing attained high excellence among the ancient Greeks, where it ranked with the arts of poetry and music. The intricacy and variety of rhythm of the Greek dance are embodied in the poetry of Æschylus, Aristophanes, and others, and its beauty of pose and movement in the works of the great sculptors. The festivals in honor of Dionysos and Demeter were celebrated with elaborate dance movements, out of which later developed Greek comedy and tragedy.

The Spartans practised dancing as a gymnastic exercise, and made it compulsory upon all children from the age of five. Romans in general considered it disgraceful for a free citizen to dance, except in connection with religious ceremonies. The early Christians practised choral dances, which came into discredit with the love feasts of *Agapæ.*

Many of the mediæval dances were solemn and stately in character, like the *danses basses*, danced to psalm tunes at the court of Charles IX. of France; while it is said the members of the Council of Trent danced at a ball given in 1562 to King Philip II. of Spain. The more lively *galliarde* and *volta* were introduced into France from Italy by

DANCING: 'LE MOULINET.' FROM A PAINTING BY NICHOLAS LANCRET (1690–1743).

Catherine de' Medici; but it was not till the reign of Louis XIV. that dancing reached its height in France, where a Royal Academy of Dancing was founded in 1661.

Modern Dancing. — The *Quadrille* (q. v.), probably the oldest of popular dances, was known in Europe for centuries before its modern revival in the first decade of the nineteenth century. The *Waltz,* of German origin, and dating from the fourteenth century, became fashionable in the days of Napoleon, and since that time has enjoyed uninterrupted popularity. The *Polka* (q. v.), a Bohemian dance, became popular about 1835, and had a great vogue throughout Europe during the middle of the nineteenth century. The *Lancers* was also introduced about 1835; the *Schottische,* which resembles the polka, about 1850. The *Two Step,* invented in America about 1890, enjoyed a high degree of popularity for more than a decade. The *Cotillon* (q. v.), of French origin, holds a prominent place among fashionable dances in the United States; while the stately *Minuet* (q. v.) is still sometimes indulged in.

The *Ballet,* which has contributed much to modern dancing, was originally a carefully designed mimetic drama, and first attained high artistic value in Rome. During the Middle Ages it was utilized by the Church for teaching moral lessons, and was then adopted by secular bodies for pageants and other ceremonies. In the nineteenth century it had deteriorated into an exhibition of technical skill confined to the stage (see BALLET). The artistic traditions of the ballet, however, as created in Italy and France, were kept alive in the Russian Imperial School of Ballet, established in 1735, where the dance continued to be practised with elaborate technique. During the past decade this form of dancing has received new inspiration largely through the efforts of Isadora Duncan, an American dancer. Well-known dancers of the Russian school are Pavlowa, Lopoukowa, Karsavina, Nijinsky, and Mordkin. Maud Allan and Ruth St. Denis have also sought to revive dancing as an art in the United States.

Everywhere the people have preserved their own dances, stamped with a distinct impress of nationality. Representative of these are the Basque *Mutchiko;* the Spanish *Seguidilla, Cachucha, Fandango,* and *Bolero;* the Italian *Tarantella, Saltarello,* and *Forlana;* the Polish *Mazurka* and *Polonaise;* the Scottish *Reel, Highland Fling,* and *Strathspey;* and the Russian *Cainca.* The Catalan *Bail* and the kindred Neapolitan dance have this peculiarity, that at one point the cavalier raises his partner shoulder high. The Russian peasant executes some of his figures in a squatting posture. The *Carmagnole* stirred and inflamed the revolutionary passions of France in 1793. Notable among modern erotic dances are the French *Cancan* (q. v.), invented about 1830 by a French dancer, and the *Danse du Ventre* of the North African *almehs.* The *Cake Walk,* in which a cake was awarded to the champion, was popular in Ireland before 1680; was thereafter zealously adopted by the negroes of the Southern States; and in recent years enjoyed a temporary vogue among fashionable society.

In the Orient, dancing is chiefly pantomimic, and is executed by trained dancers. The Bayaderes (q. v.) of India are professional mimes, composed of *devâdasi* who are associated with the worship of Hindu deities, and *nautchis* who travel about the country. In Japan are the Geisha dancers.

Folk Dancing has recently been revived in many of the schools of England and America. Its advocates claim that it constitutes an enjoyable form of exercise especially for girls, developing the æsthetic sense and encouraging self-expression.

In 1910 the first of the 'animal dances,' the *Turkey Trot,* was introduced, followed by such variations as the *Bunny Hug* and the *Grizzly Bear,* and these spread rapidly throughout the United States and Europe. During 1912–14 these steps, along with the Argentine *Tango* and the Brazilian *Maxixe,* were so universally danced, notwithstanding their doubtful character, that they incurred the serious displeasure and the condemnation of many churches and respectable people. In January, 1914, an official disapproval was issued by the paper of the Vatican in Rome. As a result, the societies of dancing masters of the United States and Europe in 1914 formulated a standard set of artistic figures for the more popular society dances, and adapted the various steps and positions to accepted moral standards. The standard list of dances was augmented by the *Boston Waltz* and the *Hesitation Waltz;* the *One Step,* a modification of the turkey trot; and the *Fox Trot.*

Consult Grove's *Dancing;* Vuillier's *History of Dancing* (Eng. trans.); Giraudet's *Traité de la Danse;* Storck's *Der Tanz;* Zorn's *Grammar of the Art of Dancing* (Eng. trans., 1905); Gulick's *The Healthful Art of Dancing* (1910); Caffin's *Dancing and Dancers of To-Day* (1912); Flitch's *Modern Dancing and Dancers* (1912); Mr. and Mrs. Vernon Castle's *Modern Dancing* (1914); T. and M. Kinney's *The Dance* (1914), and *Social Dancing of To-Day* (1914); Rath's *Æsthetic Dancing* (1914).

Dancing Girls. See BAYADERES.

Dancing Mania, an epidemic disorder allied to hysteria. Epidemics of this sort were common in Germany during the Middle Ages; in Italy, *Tarantism* (q. v.), a somewhat similar disease, was ascribed to the bite of a spider called the tarantula; and similar convulsive affections have been witnessed in Abyssinia and India, and even in comparatively modern times and in the most civilized countries of Europe, under the influence of strong popular excitement, especially connected with religious demonstrations.

Dancourt, dän-ko͞or′, FLORENT CARTON (1661–1725), French actor and dramatist, was born in Fontainebleau. From 1685 to 1718 he was a member of the Comédie Française, distinguishing himself in comedy. In his plays, of which he wrote upward of forty, he was especially successful in depicting the life of his time. Among his best are: *Le Chevalier à la Mode* (1687); *La Foire de Bezons* (1695); *Les Bourgeoises de Qualité* (1700); *Le Galant Jardinier* (1704).

Dandelion (*Taraxacum officinale* or *Leontodum Taraxacum*), a common weed found in several varieties throughout Europe, and so extensively naturalized in North America that it is one of the familiar spring flowers. Its golden, many-rayed, composite flower heads are easily recognized, as are the feathery white globes of fruit, with their tiny parachutes, which the wind sows broadcast. The plant abounds in a milky juice containing a peculiar crystalline principle called *Taraxacin* or *Taraxicum,* which has a bitter taste and valuable medicinal properties. The elongated, jagged leaves are bitter, and in France are much cultivated for salad; they may also be boiled and eaten as a vegetable. The dried and roasted roots are sometimes used to make a drink resembling coffee.

Dandie Dinmont, a breed of terriers of Scottish origin, little known in the United States except among dog fanciers. There are two colors, blue and yellow, usually called 'peppers' and 'mustards.' The head is covered with a topknot of light, silky hair; weight, under 24 lbs.

Dandie Dinmont Terrier.

Dandolo, dän′dō-lō, one of the twelve great families of Venice, which gave four doges to the republic. The most distinguished were: ENRICO DANDOLO (1108–1205), doge, who helped the crusaders with money and ships, and accompanied them to Constantinople. He subdued Trieste and Zara, the coasts of Albania, the Ionian Islands, and Constantinople. He was the 'blind old Dandolo, the octogenarian chief, Byzantium's conquering foe,' of Byron's *Childe Harold.*—ANDREA DANDOLO (1317–54), doge, the personal friend of Petrarch, through his successful warfare against the Turks opened the ports of Asia Minor and Egypt to Venetian trade.—FRANCESCO DANDOLO, doge, under whose administration (1327–39) the Venetian sequin was first coined.—COUNT VINCENZO DANDOLO (1758–1819), a friend of Lavoisier and Berthollet, was appointed by Napoleon governor of Dalmatia.

Dandruff. See HAIR, DISEASES OF.

Dandurand, däṅ′dū-räṅ′, RAOUL (1861), Canadian public official, was born in Montreal, and was educated at Montreal College and Laval University. In 1883 he was admitted to the bar, and became a Queen's Counsellor (1897). In 1898 he entered the Dominion Senate, and was Speaker from 1905 to 1909. In the latter year he became a member of the Privy Council, and in 1910 served on the Quebec Royal Commission of Education. He published, in collaboration with Charles Lanetot, a *Treatise on Criminal Law,* and a *Manual for Justices of the Peace.* Died Mar. 11. 1942

Dandy Fever. See DENGUE.

Dane, NATHAN (1752–1835), American lawyer and legislator, was born in Ipswich, Mass., and was graduated from Harvard (1779). He studied law at Beverly, Mass., and was admitted to the bar in 1782. He was in turn a member of the Massachusetts House of Representatives, the Continental Congress, and the Massachusetts senate. He is best remembered as the joint author, with Manasseh Cutler (q. v.), of the Ordinance of 1787 (see NORTHWEST TERRITORY), which he reported to Congress on July 11, 1787. He was also a member of the famous Hartford Convention of 1814. He contributed liberally to the founding of the Harvard Law School, and the Dane professorship of law was named in his honor. He published *A General Abridgment and Digest of American Law* (1825–29).

Danebrog, dan′*e*-brog, a Danish order of knighthood, instituted by Christian V. in 1671, and remodelled in 1693 and 1808. It consists of five classes: grand commanders (with the title of 'excellency'), knights grand cross, commanders, chevaliers, and a lower order with an oblong cross of silver instead of gold, as in the other four.

Danegeld, dān′geld, a tax levied by Ethelred the Unready, king of England, for the purpose of buying exemption from the attacks of the plundering Danes in 994. It was not abolished till the time of Henry II. Before the Conquest it was levied at the rate of two shillings on every hide of land, but the Conqueror raised the rate to six shillings a hide.

Danelagh, dä′n*e*-läk (DANELAW), was the land granted to the Danes by Alfred the Great after their defeat by him at Ethandune in 878. The general boundary between the Danes and the Anglo-Saxons was Watling Street—the provinces north and east of that road being the Danelagh.

Danenhower, dä′nen-hou-*e*r, JOHN WILSON (1849–87), American explorer, was born in Chicago, Ill., and was graduated from the U. S. Naval Academy (1870). In 1879 he was promoted lieutenant, and accompanied the *Jeannette* Expedition to the Arctic Ocean as second in command to Lieut. George W. De Long (q. v.). Sailing from San Francisco in July, the vessel passed Bering Strait, was caught in the pack two months later, and drifted with the ice until June, 1881, when she was crushed. Melville, Danenhower, and their boat's crew escaped to the Lena Delta, and were rescued by Tunguses. During the greater part of the sojourn in the Arctic, Danenhower suffered from ophthalmia, and on his return was compelled to abandon Arctic exploration. He published *The Narrative of the Jeannette* (1882).

Danes Island is one of the numerous small islands which lie off the Spitzbergen group on the northwestern coast of West Spitzbergen. Andrée started from here on his ill-fated balloon voyage to the North Pole (July 11, 1897).

Daniel. The Book of Daniel falls naturally into two parts—chaps. i.–vi., the history of Daniel at the Babylonian court, and chaps. vii.–xii., his visions; ii. 4–vii. 28 is written in Aramaic, the rest of the book in Hebrew. In the first part Daniel rises to great eminence in the service of Nebuchadnezzar, chiefly by his skill in the interpretation of dreams. This royal favor continues into the reign of Cyrus. In the second part we have the visions of the four beasts, the man and the he-goat; the revelation of the meaning of the seventy years of Jer. xxix. 10, and of the experiences of the Jewish nation under subsequent rulers; finally, the assurance given to Daniel that he shall 'stand in his lot' in the coming restoration.

The unity of the book is the prevailing hypothesis. It was formerly believed to have been written in the sixth century B.C. by Daniel himself, who was identified with the individual mentioned in Ezek. xiv. 14, 20; xxviii. 3. But as early as the third century A. D. the Neo-Platonist Porphyry assigned the composition of the book to the reign of Antiochus IV. Epiphanes (about 165 B.C.); and although in the nineteenth century a number of famous exegetes (Hengstenberg, Pusey, Keil) maintained the older date, recent authorities, even such moderate critics as Delitzsch, Sayce, and Driver, ascribe it to the age of Antiochus. In some versions the *Song of the Three Children, Susanna,* and *Bel and the Dragon* (see APOCRYPHA) are attached to Daniel. Consult the Commentaries of Pusey, Bevan, Prince, Driver; Wright's *Daniel and His Prophecies* (1905).

Daniel, ANTONY (1601–48), French Jesuit, accompanied Champlain to Canada, and labored as a missionary among the Hurons. He first worked in Cape Breton, but in 1634 was transferred to the station at St. Joseph, which was attacked and burned by the Iroquois (July 4, 1648). Father Daniel arrayed himself in his vestments and tried to parley with the foe, but was shot through the heart, and perished in the flames which destroyed his church.

Daniel, JOHN MONCURE (1825–65), American editor and soldier, born in Stafford co., Va.

He was educated at home by his father, a physician. After 1847 he edited the Richmond *Examiner*, which he made one of the most influential newspapers in the South. From 1853 to 1861 he was U. S. minister to Sardinia. Though an ardent advocate of State rights, he did not at first favor secession; but finally exerted all his influence to bring about Virginia's withdrawal from the Union. As a volunteer aide to Generals Floyd and A. P. Hill he saw active service, and was wounded in June, 1862, during the Seven Days' Battle. He published a *Life of 'Stonewall' Jackson.*

Daniel, John Warwick (1842-1910), American legislator, was born in Lynchburg, Va. He was educated at Lynchburg College, and during the Civil War served in the Confederate Army as adjutant-general on General Early's staff, until disabled in the Wilderness (May, 1864). After the war he studied law at the University of Virginia, and, in association with his father, William Daniel, gained a large practice. He was a member of the Virginia legislature (1869–70 and 1871-2), of the State senate (1875–81), and of Congress (1885–7). From 1887 till his death he was a member of the U. S. Senate, where he served on numerous important committees.

Daniel, Samuel (1562–1619), English poet, was probably born near Taunton, Somersetshire. He spent some time at the Earl of Pembroke's house at Wilton, meanwhile gaining a reputation as a poet, by the use of various characteristic Elizabethan forms of verse. In 1600 he became tutor to Lady Anne Clifford, daughter of the Countess of Cumberland and at the accession of James I. gained the favor of Queen Anne, composing a series of court masques for her. Later he held various court appointments, and in 1615 was concerned in the establishment of a theatrical company at Bristol. His poems include: *Sonnets to Delia* (1592); *History of the Civil War* (1595 *et seq.*). Plays and Masques: *Cleopatra* (1594); *Philotos* (1604); *Tethys' Festival* (1610). Prose: *Defence of Rhyme* (1603); *History of England* (1612, 1617).

Daniels, Josephus (1862-   ), American editor and public official was born in Washington, N. C. He was educated at the Wilson (N. C.) Collegiate Institute and at the University of North Carolina. In 1880 he became editor of the Wilson *Advance*, and in 1885 of the Raleigh *State Chronicle.* He served as State printer (1887–93), and as chief clerk in the U. S. Interior Department (1893–5). In 1894 he consolidated *The State Chronicle* with *The News and Observer*, of which he has since been the editor. He was for sixteen years a member of the Democratic National Committee and in 1913–21 was Secretary of the Navy under President Wilson. His publications include *The Navy and the Nation* (1919); *Our Navy at War* (1922); *Life of Woodrow Wilson* (1924).

Danilo I., dä-nē′lō, (1826–60), Prince of Montenegro, succeeded his uncle, Peter II., as *vladika* on Oct. 31, 1851. He separated the spiritual and temporal functions of the Montenegrin rulers by appointing one of his relations metropolitan and did much to civilize the country, and established (1855) the Danilo order of merit. He was assassinated by Todoro Kadic, a personal enemy.

Danish Church in America. See Lutherans.

Danish Language and Literature. See Denmark.

Danish West Indies. See West Indies.

Danites, dan′īts, a secret society, said to have been formed by Mormons about 1837 to exact blood vengeance from the Gentiles. It has been held responsible for the Mountain Meadows Massacre (q. v.) and other atrocities. The Mormons, however, deny all knowledge of, or connection with, any such organization. Consult Miller's *Danites* (1910).

Dankara, dän′kä-rä, or Denkera, native state of the Gold Coast, in Upper Guinea, West Africa, under an English protectorate. It has gold mines.

Dan′nat, William T. (1853–1929), American figure painter, was born in Hempstead, L. I. He studied in Munich, and in Paris under Munkácsy. He is a member of the National Institute of Arts and Letters, a commander of the Legion of Honor, and a grand officer of the Crown of Italy; and is president of the Paris Society of American Painters. Many of his pictures represent phases of Spanish life. His manner is unconventional and free, his technique brilliant, though somewhat daring. His *Belle Otero* and *Spanish Women*—a café chantant scene—are examples of the originality of his treatment of artificial light. Other characteristic pictures by him are *A Sacristy in Aragon* (Art Institute, Chicago); *A Lady in Red* and *Aragonese Smuggler* (Luxembourg Museum, Paris); *A Quartette* (Metropolitan Museum of Art); *Portrait of the Duchess of Mecklenburg-Schwerin* (Berlin Museum). D 12 Mar 29

Dannecker, dän′e-k*er*, Johann Heinrich von (1758–1841), German sculptor, was born in Waldenbuch, near Stuttgart. He studied at Paris (1783–5), and later at Rome, where he obtained valuable help from Canova. In 1790 he was appointed professor of sculpture at Stuttgart. His genius developed along two lines—the pagan and the Christian—and in both he produced masterpieces, such as *Sappho, Psyche, Ariadne on the Panther, Christ, John the Baptist.* He also executed busts of *Schiller, Glück, Lavater.*

Dannemora, dan-*e*-mō′*ra*, village and township, Clinton county, New York, on the Delaware and Hudson Railroad; 14 miles west of Plattsburg. It is the seat of Clinton State Prison, whose inmates are employed in the mining and manufacture of iron and on the highways. Pop. (1910) 4,203 (1920) 2,263.

Dannemora, iron field in Sweden; 25 miles northeast of Upsala. The ore can be melted without alloy, as its refuse forms an excellent slag. It yields from sixty to seventy thousand tons annually. It has been regularly worked since 1579.

D'Annunzio, dän-no͞on′dzē-ō, Gabrielle (1864–1938), Italian writer and political leader, was born near Pescara. His poetical genius was quickened into activity by Carducci's *Odi Barbare* and at the age of fourteen he published a collection of lyrics, *Primavera*, which, despite puerilities and eroticism, stamped the author as a poet of undoubted merit. This was soon followed by *In Memoriam* (1880), the *Canto Nuovo* (1881), and *Intermezzo di Rime* (1883)—the first of these a pathetic elegiac strain, but the last two, with all their rhythmic grace and imaginative power, disfigured by sensualism. In the next ten years his work included *L'Isotteo* (1885), *La Chimera* (1888), *Elegie Romane* (1892), *Poema Paradisiaco, Odi Navali* (1893), two volumes of *Laudi* (1904), *L'Orazione e la Canzone in Morte d' Giosuè Carducci* (1907), *Canzoni della gesta d'Oltremara* (1912). He also produced an epic, *La Canzone di Garibaldi* (1901), which contains some surpassingly beautiful passages all of which exhibit beauty of style and keenness of psychological insight although marred by sensuality.

His first novel *Il Piacere* appeared in 1889 and was followed by *Il Trionfo della Morte* (1894), *La Vergine delle Rocce* (1895), *Il Fuoco* (1900), and *Forse che si Forse che no* (1910). In 1897 he turned his attention to the drama, and the *Sogno d'un Mattino di Primavera* (1897), *Sogno d'un Tramonto d'Autunno* (1898), *La Citta Morta* (1898), *La Gioconda* (1899), *Francesca da Rimini* (1902), *La Fiaccolo Sotto il*

Maggio (1905), *Più che l'Amore* (1906), *La Nave* (1908), *Fedra* (1909), and *Le Martyre de Saint Sébastien* (1911) reveal unusual dramatic force united to power of characterization and profound tragic intensity.

At the outbreak of the Great War D'Annunzio was in France but he at once urged Italian coöperation with the Allies. In 1915 he returned to Italy and volunteered for active service, eventually joining the aviation corps in which he attained high distinction as a bold and daring airman. In one flight he lost an eye and in another received injuries to his wrist. At the close of the War his bitter antagonism to President Wilson caused somewhat strained relations between the United States and Italy and the dispute over Fiume led him to head an expedition of volunteers into that city, where for fifteen months he ruled in defiance of his government's wishes. At length his refusal to recognize the Rapallo Treaty necessitated the use of force by the Italian government and he was obliged to leave Fiume (1921) and removed to Gardone where he has since resided. He is a strong supporter of Fascism. His later works include *Per la piu grande Italia* (1915); *La Beffa di Buccari* (1918); *Notturno* (1921); *La faville del Maglio* (1924). Most of his novels and plays have been translated into English.

Died March 1, 1938

Dan River, a river of Virginia, which with the Staunton forms the Roanoke. It rises in the Blue Ridge Mountains, and in its course of 180 miles several times crosses and recrosses the North Carolina border. It is navigable for the greater part of its length.

Dansville, village, Livingston County, New York, on Canaseraga Creek, and on the Delaware, Lackawanna, and Western and the Dansville and Mount Morris Railroads; 42 miles south of Rochester. It is the seat of Jackson Hotel and Health Resort. Its nurseries are important, and there are manufactures of paper, pulp, woollen goods, flour, agricultural implements, oil condensers, and heaters. Pop. (1910) 3,938 (1920) 4,631.

Dante Alighieri, dän'tā ä-lē-gyā'rē (1265–1321), the greatest poet of Italy, and one of the greatest poets of the world, was born in Florence in May, 1265, of a Guelf family that had probably been ennobled. Little is known of his early years. He probably fought for the Guelfs at Campaldino (1289), and took part in the capture of the Pisan garrison at Caprona in the same year. The year 1290 was one of great grief to the poet, for in it occurred the death of Beatrice, the daughter of Folco Portinari, whom he had first met when he was nine and she eight years of age, and who—though they had hardly exchanged a word—had since then been the centre of his life and aspirations. Dante's love was not returned, and he appears to have been fully resigned to the girl's marriage with Simone de' Bardi (1287).

In order to qualify for participation in the government of the city, Dante, in 1295 or 1296, joined one of the guilds—that of the physicians and apothecaries; and about the same time he married Gemma di Manetto Donati, by whom he had four children. In 1295–1300 Dante voted and was otherwise active in the public affairs of the city; and in 1300 he filled one of the highest offices. During his priorate he consented, for the sake of peace and order, to the banishment of the heads of the Black and White Guelfs—the former being the partisans of Pope Boniface viii., and eager for Charles of Valois to settle the affairs of Florence; while the latter were opposed to the papal schemes. Dante himself was a White, and one of the exiles was his dearest friend, Guido Calvacanti.

In October, 1301, Dante appears to have gone to Rome with an embassy charged to effect a settlement; and in his absence (Nov. 1), Charles entered Florence and the following January, Dante was sentenced to a heavy fine, and to temporary banishment for opposition to the Guelf party. In March, 1302, he was sentenced to be burned alive, if he should fall into the hands of the commune. He appears to have remained at or near Arezzo till 1304; but after a stay at the court of the Scaligers at Verona, he was a wanderer throughout Italy. We catch a glimpse of him at Padua in August, 1306, and later in the same year at Sarzana, where he was acting as agent for the Malaspini. To this period may be ascribed his visit to Paris, which is very fairly authenticated; but it seems doubtful if he was ever at Oxford.

At the end of 1310 and the beginning of 1311 certain epistles prove that Dante was in Italy again. It seems probable that he was at Lucca with the Ghibelline captain, Uguccione della Faggiuola, in 1314; to this time, too, must be ascribed his relationship with the Lucchese Gentucca (*Purg.* xxiv. 37 *ff.*). In August, 1315, Uguccione defeated the Florentine and Tuscan Guelfs at Montecatini; and in November a fourth Florentine edict was hurled against Dante, sentencing him to be beheaded as a rebellious Ghibelline.

In 1316 Dante apparently had a chance of returning to Florence; but the conditions were not honorable, and he expressed his determination to refuse them in a beautiful letter (for it is probably authentic), addressed to a Florentine friend. His last refuge was with Guido Novello da Polenta at Ravenna, where he died. He was buried at Ravenna, where his remains still rest.

Besides the *Commedia*, Dante wrote the following works, of which (1) to (3) are in Italian, and the remainder in Latin:

(1) The *Vita Nuova*, a pearl in the world's love-literature, consists of lyrics strung together by a prose narrative, and accompanied with a curious commentary to the verses in the scholastic manner. Its subject is Dante's youthful love for Beatrice. The little book falls into three distinct parts, dealing with 'the love inspired by Beatrice's beauty' (sec. 2-17), 'the miracles wrought by the splendor of her soul' (sec. 18-28), and the poet's 'worship of her memory' (sec. 29-41) (Gardner). It is safe to say that the whole was put together between 1290 and 1295. The first edition is that of 1576; the best are those of D'Ancona and Casini. The most beautiful English version is that of D. G. Rossetti; while Sir T. Martin and C. E. Norton have striven to be more literal.

(2) The *Canzoniere* is unequal in merit, but contains some of the most perfect lyrics in Italian literature. It embraces 'poems connected with Beatrice and *La Vita Nuova*; poems of the second love, for the allegorical lady of the *Convivio;* poems of passion; ethical and didactic *canzoni*' (Gardner). Most of the pieces were written before the poet's exile. The first group is the 'overflow,' as it were, of *La Vita Nuova:* several of the pieces thus crowded out are in every way worthy of that work. The 'allegorical lady,' forming the subject of the second group, is the *donna gentile* who (in *La Vita Nuova*) comforts the poet when Beatrice dies, and whom he subsequently (*Convito*, ii. 16) identifies as 'Philosophy.' The third group is devoted to Dante's earthly loves, which seem, for the most part, to fall within the period of his moral aberration (1290–1300). The three *canzoni* of the fourth group deal with Rectitude, and appear more mature in conception, thought, and form than the other lyrics, but they rarely equal in sheer beauty of expression the best of the lyrics of the other groups. The *Canzoniere* has been edited by Fraticelli in *Opere Minori di Dante Alighieri;* by Santi (1907); and by Zoozmann, in *Opere Poetiche di Dante* (vol. iv., 1908; Italian and German).

Lyell produced a very respectable English version of all Dante's lyrics, including those of *La Vita Nuova*, in 1835. Plumptre's translation, in metre (1892), is not a success.

(3.) The *Convivio*, or 'Banquet,' was undertaken by Dante with the double object of showing the Florentines what they had lost by exiling him, and of proving to the world that his whole youth had not been devoted to mere love-making. To achieve this end he set himself to comment upon fourteen of his *canzoni*. The work was to consist of fifteen treatises, the first being introductory. Four treatises only were written—*i.e.* we have the introduction and the commentary to three *canzoni*. Single words and phrases are made the pretext for elaborate dissertations on every conceivable subject—ethical, philosophical, scientific, and political. Dante's philosophy is derived from Aristotle by way of Albertus Magnus and Thomas Aquinas. The book was almost certainly written in the first decade of the 14th century, perhaps between 1306 and 1308. The first edition is that of Florence (1490). We have as yet no critical edition. The English versions of E. Sayer (1887) and K. Hillard (1889) have been supplanted by that of P. H. Wicksteed, with an excellent commentary (1903).

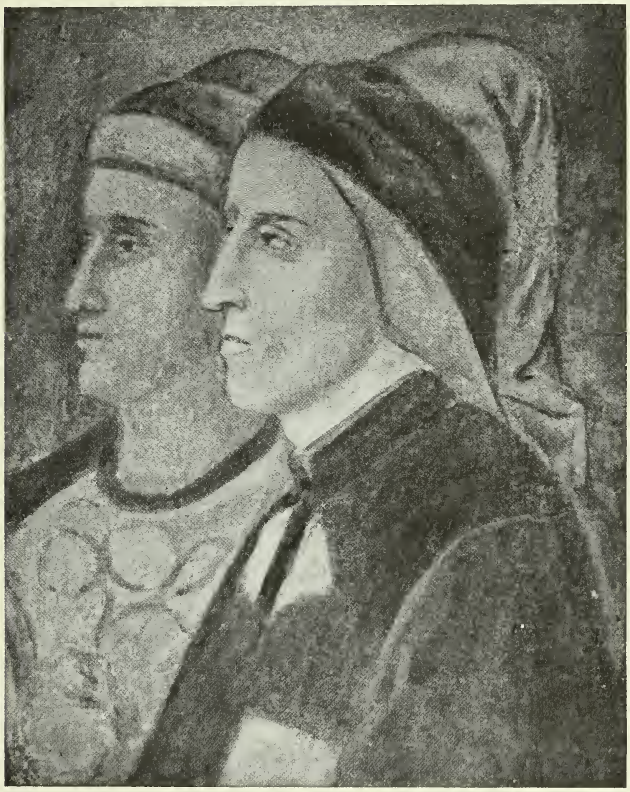
(4.) The *De Vulgari Eloquentia* is also a fragment; it was to have consisted of four books, and we have only two. The first deals with the origin of language, with the Germanic, Greek, and Latin tongues, with Provençal, French, and Italian. The Italian dialects come in for prolonged treatment, and Dante concludes that the one universal literary tongue of Italy must be culled from the cream of all the dialects. The second book is occupied with a long dissertation on the *canzone* as the noblest form of lyrical poetry. The date of its composition has given rise to the most varied conjectures. On the whole, it seems best to place it in the same period as the *Convivio*—perhaps between the years 1305 and 1309. The first edition was the Italian version by Trissino (1529); the Latin text did not appear till 1577, at Paris. All the editions have been supplanted by the admirable one prepared by Pio Rajna for the Italian Dante Society (1896)—a society which promises critical editions of all the *Opere Minori*; an *edizione minore* of the text alone was published by the same scholar in 1897. A good English version by A. G. F. Howell was published in 1890.

(5.) The *De Monarchia* is a most valuable book for students of the relations between church and state. The three books deal respectively with (1) the political and moral necessity of a universal monarchy; (2) the historical and natural right of the Roman people to the world's dominion; and (3) the sharp division between the secular and spiritual authority. Dante's idealism, earnestness, and enthusiasm convert a mere political tract into literature. Scholars are hopelessly divided as to the date at which the work was written. The first edition appeared in 1559. Witte's edition (1874) is good. There are excellent English versions by F. C. Church (1878) and P. H. Wicksteed (1896).

(6.) Of the various Latin epistles—there are ten in all—which have been ascribed to Dante, some certainly are spurious, but four or five appear to be genuine. Among the latter are the three political epistles addressed to the princes and people of Italy, to the Florentines and to Henry VII. The letter to a Florentine friend refusing the amnesty is very generally received as genuine, while the epistle to Can Grande is now almost universally accepted. English versions were made by Latham and Carpenter (1892), and by Wicksteed (1898).

(7.) The two Latin eclogues written by Dante in reply to two sent him by Giovanni del Virgilio of Bologna belong to the last years of his life (1318-21). They are charming productions, conceived in a spirit of delightful banter. Ample justice has, for the first time, been done to these little pieces by Wicksteed and Gardner in their elaborate *Dante and Giovanni del Virgilio* (1902).

(8.) The *Quæstio de Aqua et Terra* was long regarded with suspicion by most Dantists. It was not printed till 1508, and certain of the statements it contains were held to be in advance of Dante's age. However, Dr. Moore has put forward a number of weighty reasons on behalf of its genuineness (*Studies in Dante*, 1896, ii. 303-357). If he is right, it was delivered in the form of a



Dante Alighieri.
From the painting by Giotto, in the Bargello, Florence.

discourse at Verona on Jan. 20, 1320.

The *Commedia*—which probably occupied Dante at intervals during about twenty or twenty-five years of his life, but which, to judge from certain historical allusions and from the evidence of the eclogues, could not have assumed its final shape till between the years 1314 and 1321—is, without comparison, the greatest epic of Christendom. It consists of one hundred cantos (containing in all 14,233 lines), of which the first may be regarded as introductory to the whole, so that thirty-three fall to each of the three *cantiche*—the *Inferno, Purgatorio,* and *Paradiso.* The poet feigns that in the holy week of the year 1300—the year of the great jubilee—he was privileged to pass through the realms of the other world, at the intercession of his Beatrice. Virgil (Earthly Wisdom) is his guide through Hell and Purgatory, while Beatrice (Heavenly Wisdom) leads him on from the Earthly Paradise through the heavens of Paradise itself. After encountering three wild beasts, which may be taken to represent Lust, Pride, and Avarice (politically — Florence, the House of France, and Rome), and passing through the Gate of Hell, Dante comes to the Ante-Hell, devoted to those contemptible spirits 'who lived without blame and without praise.' He then crosses the Acheron, and enters the first of the nine concentric circles of Hell proper, Hell being conceived as a huge funnel-shaped abyss. These circles are apportioned as follows: (1) Unbaptized children and virtuous heathen — Limbo; (2) the lustful; (3) the gluttons; (4) the avaricious and prodigal; (5) the wrathful and the sullen—Styx; (6) the heretics; (7) those guilty of violence or 'bestiality'—(*a*) against their neighbors, (*b*) against themselves, (*c*) against God, Nature, and Art; (8) those guilty of fraudulent malice—(*a*) panders and seducers, (*b*) flatterers, (*c*) simonists, (*d*) soothsayers and sorcerers, (*e*) barrators, (*f*) hypocrites, (*g*) thieves, (*h*) evil counsellors, (*i*) schismatics (the ten subdivisions of this circle are the *Malebolge*—Evil Pouches); (9) those guilty of treacherous malice—(*a*) to their kindred (*Caïna*), (*b*) to their country (*Antenora*), (*c*) to their guests (*Tolomea*), (*d*) to their lords and benefactors (*Giudecca*). Dante, having now reached the bottom of Hell and the centre of the earth, makes his way up through the other half of the bowels of the earth until he sees daylight again at the antipodes of Jerusalem — *i.e.* at the foot of the Mount of Purgatory. Ante-Purgatory is devoted to the expiation of negligence in matters spiritual, while the seven terraces that circle the slopes of the mountain from the bottom upwards are occupied by spirits atoning for—(1) sins of the spirit, or love distorted—(*a*) pride, (*b*) envy, (*c*) anger; (2) defective love; (3) sins of the flesh, or love excessive—(*a*) avarice and prodigality, (*b*) gluttony, (*c*) lust. This division of the vices is set forth in *Purgatorio,* xvii.; while a similar explanation of the divisions of Hell will be found in *Inferno,* xi. Dante now reaches the Earthly Paradise, whence, his gaze steadily fixed on the eyes of Beatrice, he is rapt up through the ten Heavens of Paradise. The first nine are the Heavens of Space, in which the spirits are *manifested* to the poet, while the tenth is the Heaven of Light and Love, beyond space and time, wherein the spirits *abide.* First come the seven Planetary Heavens, each with its special attribute: that of—(1) the Moon (inconstancy); (2) Mercury (ambition); (3) Venus (earthly love); (4) the Sun (prudence); (5) Mars (fortitude); (6) Jupiter (justice); (7) Saturn (temperance). In the eighth heaven, or that of the fixed stars, are manifested the redeemed souls; and in the ninth, or *Primum mobile,* the angelic hierarchies; while in the tenth, or empyrean, dwell God, His angels, and His redeemed. Each circle of Hell, each terrace of Purgatory, each heaven of Paradise, is peopled by spirits lost, expiating, or redeemed—the spirits of figures belonging to past history, to legend, or to the poet's own times, famous, notorious, or unknown, who discourse of themselves, of their age, of matters historical, ethical, scientific. Dante is the protagonist of the whole: whether speaking or listening, it is his figure that dominates the picture. His unfailing sense of justice, his tender love, his burning hate, no less than the absolute perfection of the *form* of the poem, caused posterity to add the word *divina* to the title its creator had himself given it. The metrical perfection is a marvel in itself.

The earliest editions—those of Foligno, Mantua, and Jesi (1472), and that of Naples (1477)—were reprinted by Lord Vernon and by Panizzi (1858). Since 1472 there have been more than 400 editions. The first attempt to constitute a scientific text was made by Witte. Good modern editions are those of Fraticelli (1881) and Giuliani (1880), which include the *Opere Minori;* of Scartazzini (both the elaborate Leipzig commentary in 3 vols., 4th ed. 1903, and the *edizione minore*); of Moore, whose *Oxford Dante* (1900), text only, with admirable index by Paget Toynbee, is the only available complete one-volume Dante, marred, however, by defective editing of the *Canzoniere.* There are a number of English versions. Cary's (1814; new ed. 1903) and Longfellow's (1886), in blank verse, are the most popular, the former being the more literary, the latter the more literal. Dr. Carlyle published (3d ed. 1882) an unsurpassed prose version of the *Inferno,* together with the Italian and with arguments and notes. A. J. Butler has, on the same plan, produced a most scholarly translation of all three *cantiche* (1880-92). The Temple Classics edition (1899-1901) is also based on Carlyle's arrangement, whose version was reprinted for the *Inferno,* while Okey and Wicksteed made new translations of the *Purgatorio* and *Paradiso* (1899-1901). C. E. Norton's prose version (1891-92) is always worth consulting.

There are a number of general introductions to the poet and his works. Scartazzini, a great but erratic Dantist, embodied most of his final views in the *Dante Handbuch,* translated into English by A. J. Butler (1893). Dean Church's brilliant *Essay* (1878), J. A. Symonds's *Introduction to the Study of Dante* (1899), Maria Francesca Rossetti's *A Shadow of Dante* (1871; 4th ed. 1884), and E. G. Gardner's admirable little *Dante Primer* (1900) should be mastered by all English students. See, too, A. J. Butler's *Dante, his Times and his Work* (1895), and Federn's *Dante and His Times* (1902). Among recent foreign works, those of Ricci (*L'Ultimo Rifugio di Dante Alighieri,* 1891), Scherillo (*Alcuni Capitoli della Biografia di Dante,* 1896), Kraus (*Dante, sein Leben und sein Werk,* etc., 1897), and Bassermann (*Dantes Spuren in Italien,* 1896; a smaller edition, 1898) deserve special mention. W. C. Lane has compiled a catalogue of the Harvard Dante Collection; and T. W. Koch, of the Cornell Collection (1898-1900). Paget Toynbee's *Dictionary of Dante* (1898) is well-nigh indispensable to the earnest student. The same scholar is now engaged on a complete *Vocabolario* of the poet's works. Fay's *Concordance* (for the *Commedia* only) is absolutely trustworthy, as also the *Remario* appended to Brunona Bianchi's excellent edition of the *Commedia* (1854).

Danton, GEORGE JACQUES (1759-94), French revolutionist, was born at Arcis-sur-Aube, went to Paris in 1780, and in 1790 founded the Cordeliers' Club. He was attached to Mirabeau, and after his death attached himself to Marat and Robespierre, forming one of the revolutionary triumvirate. After the attack on the Tuileries (Aug. 10, 1792) he rose to office as minister of justice. One of the organizers of the commune, though he had no share in the infamous September massacres, he justified them as inevitable excesses in the movement. When the Prussians invaded France to restore the monarchy, Danton by his eloquence, succeeded in arousing that spirit of enthusiastic patriotism which made the raw levies of France irresistible in the field. He voted for the execution of the king (January, 1793), and was one of the original members of the Committee of Public Safety. In the Convention he was the leading member of the 'Mountain,' as the Paris party was called, and devoted his strength to the crushing of the Girondists. Danton strove hard to abate the excesses of the triumphant party of the Mountain, but only directed suspicion against himself. He became the object of the bitterest hatred to Robespierre, and in April, 1794, he, with Camille Desmoulins and others of his party, were brought before the revolutionary tribunal, condemned and executed (Apr. 5, 1794). Consult *Lives* by A. H. Beesley; L. Madelin; H. Belloc; in French, A. Bourgeat; Gronlund, *Danton in the French Revolution;* Carlyle's *French Revolution.*

Elmendorf Photo © Ewing Galloway. N. Y.

The Danube at Budapest

Dantzig. See DANZIG.

Danube, one of the most important rivers in Europe, second only to the Volga, has a total course of 1,725 miles through Germany, Austria, Hungary, and the Balkan States, with a drainage basin of some 320,000 square miles. The river has its source in the union of two small streams rising in the Black Forest and uniting at Donaueschingen, 2,264 feet above sea level. It flows in a general northeasterly direction to Regensburg (Ratisbon), where it reaches its most northerly point, then turns to the southeast, and enters Upper Austria a little below Passau, Germany. Before it leaves German territory it is joined by the Iller, a few miles above Ulm, from which point it is navigable for larger vessels; by the three large alpine streams, the Lech, Isar, and Inn on the right; and by the Altmühl and Regen on the left. From Passau it flows east through Austria to Bratislava with little variation of course, receiving the Enns from the south and the March or Morava from the north; it forms the boundary, for a short distance, between Czechoslovakia on the north and Austria and Hungary on the south, passing through the Carpathian gate between the Leitha chain and Lesser Carpathians. Between Bratislava (Czechoslovakia) and Waitzen (Hungary) the main stream, by dividing, forms the islands of Great Schutt and St. Andreas, and its waters are further augmented by the Waag and the Gran. At Waitzen, a little above Budapest, the river turns sharply, flowing south through the Hungarian plain for a distance of 230 miles. In this distance it again divides to form the islands of Csepel and Margitta, and is joined, just as it enters Jugoslavia, by the Drave, after which it turns again southeast and, increased by the waters of the Theiss and Temes, sweeps past Belgrade, receives the Save from the west and the Morava from the south, and continues its eastward course as the boundary line between Roumania and Bulgaria.

Near Belgrade the river is 1,706 yards wide and 46 feet deep; as it approaches the Roumanian frontier the width is greatly contracted by spurs of the Transylvanian and the Serbian mountains, and just below Orsova, at the famous Iron Gate, it has breadth of only 129 yards, while the piled-up waters attain a depth of 28 fathoms.

From this point the Danube enters on the Wallachian depression, and flows in a wide stream through a fertile district, constantly broadening into a lake, or overspreading its banks with swamps. At Silistria it turns north, skirting the Dobruja, and flows between marshy banks to Galatz (Roumania). From Galatz it flows east, and after being joined by the Pruth from the north, southeast, to the Black Sea.

The delta of the Danube, which begins 5 miles west of Tuldja, is a vast wilderness, covering an area of 1000 square miles and resembling an immense green sea of rushes, cut up by numerous channels and lakes. Two-thirds of the Danube's volume passes through the Kilia, but this arm forms a secondary delta near its outlet, and the southern or St. George branch also forms two channels; it is consequently by the middle or Sulina mouth that ships enter, although it discharges only a small proportion of the river's waters.

The improvements of this mouth have increased the depth over the bar and straightened and regulated the Sulina arms. The Danube is connected with the Rhine by means of the Ludwigs Canal; with the Elbe by means of the Moldau and Mühl; and by the Danube-Oder Canal, which connects with the Middle Elbe, and also with the river Vistula. Other projects and works under construction are intended to link up the whole Rhine and Danube systems across Europe from the North Sea to the Black Sea.

Danube Commissions.—The navigation of the Danube was declared free to all nations by the Treaty of Paris (1856), which provided for an *International Danube Navigation Commission* to be composed of delegates of all the Great Powers to take such steps as would render the river navigable. The jurisdiction of this Commission, originally limited to that portion of the Danube between Isacoea and the sea, was extended at the Congress of Berlin (1878) to Galatz and afterwards to the Iron Gate.

The *International Danube Commission* with headquarters at Vienna, was created by the Treaty of Versailles (1919), the States represented by the treaty terms being Austria, Bulgaria, Czechoslovakia, France, Great Britain, Hungary, Italy, Roumania and Jugoslavia. The Commission was to maintain the liberty of navigation and the equal treatment of all flags of the Danube from Ulm in Württemberg to Braila in Roumania and its international system, obtaining funds for administrative expenses from equal contributions of all the States represented.

From Braila to Sulina (the mouth of the Danube) the navigation is controlled by the *European Commission of the Danube,* referred to above as the Navigation Commission of 1856, with representation confined to France, Great Britain, Italy and Roumania.

Consult B. Newman, *The Blue Danube* (1935); J. D. Evans, *That Blue Danube* (1935); A. Šašek, *The Danube, Link of Central Europe* (1936); C. Sidgwick, *Whirlpools on the Danube* (1937).

Danube Navigation Commission. See DANUBE.

Danu'bian Principalities, a name formerly applied to Moldavia and Wallachia, now forming part of the kingdom of Roumania. Serbia and Bulgaria were sometimes also included under the term.

Dan'vers, town, Massachusetts, Essex county, on the Boston and Maine Railroad; 19 miles northeast of Boston. It is the seat of the Danvers State Hospital, of St. John's Preparatory School (R. C.), and the Essex County Agricultural School. Historic points of interest include Oak Knoll, the home of Whittier, the birthplace of Israel Putnam, the home of Rebecca Nourse (a victim of the Salem witchcraft), the Endicott Pear Tree, the Page House, and the Judge Holten House. Shoes, leather, paper boxes, crayons and electric lamps are manufactured. Danvers was a part of Salem until 1757, and is memorable as the locality in which the witchcraft delusion first appeared, when ten inhabitants were sent to the gibbet. Pop. (1920) 11,108; (1930) 12,957.

Dan'ville, city, Illinois, county seat of Vermilion county, on the Vermilion River, and the Wabash, the Chicago and Eastern Illinois, the Cleveland, Cincinnati, Chicago and St. Louis, and the New York Central Railroads; 123 miles south of Chicago. The city has a Veterans' Facility (the largest hospital for ex-service men in the United States), Carnegie library, Y. M. C. A. building, Y. W. C. A., Masonic Temple, court-house, Elks' Home, Federal building, and a new State armory. It is an important railroad junction, and has railroad shops, one of the largest face brick plants in the country, a number of steam mills and foundries, and window glass, brick, automobile, hardware, mattress, and clothing factories. There are important mines of bituminous coal in the vicinity. Pop. (1920) 33,776; (1930) 36,765.

Danville, city, Kentucky, county seat of Boyle county, on the Southern Railroad; 31 miles southwest of Lexington. It is the seat of Centre College for Men (Presbyterian), the Kentucky School for Deaf Mutes, and Kentucky College for Women (Presbyterian). Agricultural interests are important, grain, fruit, tobacco, hemp, and horses being raised. In 1809 the first abdominal operation was performed here by Dr. Ephraim McDowell. Pop. (1930) 6,729; (1938) 8,500.

Danville, borough, Pennsylvania, county seat of Montour county, on the north branch of the Susquehanna River, and on the Delaware, Lackawanna, and Western, the Pennsylvania, and the Philadelphia and Reading Railroads; 42 miles S.W. of Wilkes-Barre. It is the seat of a State insane hospital, and has the Thomas Beaver Library, a modern Y. M. C. A., athletic field (Rotarian), Masonic Temple, and the George F. Geisinger Memorial Hospital. The Reading ironworks here is the oldest establishment in the United States for the manufacture of railroad iron, and has the distinction of having rolled the first iron 'T' rail. There are also puddling mills, muck bar mills, foundries and rolling-mills, machine shops, tube works, stove and heater works, art bronze and brass works, a clothing factory, knitting mills, and silk throwing mills, the latter having a complete modern recreation building for its female employees. Pop. (1920) 6,952; (1930) 7,185.

Danville, city, Virginia, Pittsylvania county (but independent thereof), on the Dan River and the Southern Railroad; 140 miles S.W. of Richmond. It is the seat of Roanoke Institute (Bapt.), the Danville School for Boys, and Randolph-Macon Institute (Meth.), and has a public library and various philanthropic institutions. The river furnishes ample water power for large cotton, flour, and lumber mills, clothing factories, and other enterprises. There is also a flourishing tobacco trade. Danville succeeded Richmond as the capital of the Confederacy just before the close of the Civil War. Pop. (1920) 21,539; (1930) 22,247.

D'Anville, dän-vēl', JEAN BAPTISTE BOURGUIGNON (1697–1782), French geographer and mapmaker, devoted himself to geographical studies, and was appointed geographer to the king (1719). He published in all 211 maps; the most notable collections were the *Atlas Général* (1737–80), and the *Atlas Antiquus Major,* with its accompanying three volumes of *Géographie Ancienne* (1769).

Danzig, dänt'si*ck*, a Baltic seaport, formerly a fortified German city, constituted a Free City under Article 102 of the Treaty of Versailles (1919), and placed under the supervision of the League of Nations. Wedged in between East Prussia and the Polish Corridor, the City lies at the mouth of the Vistula (Weichsel) in a most favorable commercial position, 250 miles by rail N.E. of Berlin. The City, with adjoining hinterland, covers about 754 sq. miles, and includes three other cities—Zoppot (pop. 30,835); Neuteich (pop. 3,160), and Tiegenhof (3,250), besides 252 rural communes and two forest-estate districts.

The population of the entire area in 1937 was estimated at 407,000, of which 291,000 lived in Danzig proper. The most interesting part of the City is the old town, with the Gothic townhall (14th and 16th centuries); the Artushof (15th century), formerly the rendezvous of the Danzig patrician families, now the exchange; the old Franciscan monastery, used as a museum and picture gallery; the High Gate (16th century); the Church of St. Mary, rebuilt in 1400–1502, one of the handsomest churches along this part of the Baltic coast; and the old Armory (1602–5). There are many fine modern buildings, charitable and educational institutions, and a municipal library. Public gardens occupy the area formerly given over to defenses on the north and west sides of the city; fortifications on the east remain. Many of the streets are narrow and crooked, but the *Langgasse,* intersecting the town, presents a picturesque appearance, with its lofty gable houses of the 16th and 17th centuries.

Under a constitution approved by the League of Nations, the government of the Free City is vested in a High Commissioner appointed by the League, a president, a vice-president, a Senate of 22 members, and an elective *Volkstag* (diet) of 72 members. The High Commissioner is authorized to settle disputes subject to appeal to the League, though the Senate is the highest State authority. Danzig forms a single customs union with Poland, though the latter has no sovereign rights in the Free City, which was created solely for the purpose of giving Poland access to the sea. Poland, however, conducts all foreign relations for Danzig. There is universal suffrage for all citizens over 20. The City has an efficient educational system.

Copyright by Underwood & Underwood, N. Y.

The City of Danzig

Established as a free city by the Treaty of Versailles (1919).

Only 12 miles N.W. of Danzig lies the Polish port of Gdynia, a serious competitor to the Free City. Gdynia is a 'free zone,' and is patronized by Finland, Czechoslovakia, Hungary, Latvia, Estonia and Lithuania.

The harbor of Danzig is administered by a mixed board of Danzigers and Poles under a neutral chairman. The principal exports are grain, sawn timber, coal, cereals, cement, bacon, eggs, mineral oils and sugar; imports include herring, iron ore, machinery, fats and foodstuffs and textiles. Shipbuilding and repairing are flourishing industries in Danzig; others are sugar refining, distilling, brewing, iron works and rolling mills, machine construction, oil, flour, and sawmills, tobacco factories, gun works, brickyards, and amber cutting.

Danzig has its own distinct currency.

Danzig first appeared in history in 997 and was founded as a German settlement early in the 13th century. Even to-day, the population is 95 per cent German, or at least German-speaking. In 1308 it came under the rule of the Teutonic Knights, and about 1358 it joined the Hanseatic League. It soon became one of the most important medieval commercial cities. In 1466 it placed itself under the protection of the kings of Poland as a 'free city.' However, the city had extensive rights of self-government, fought its own wars and signed its own peace treaties. Developing rapidly in power and wealth, the city reached the height of its prosperity towards the end of the 16th century.

Its decline in the 17th and 18th centuries may be attributed to the uncertain conditions in Poland, the constant wars which troubled Northern Europe, and a great plague in 1709, by which some 24,500 persons perished. In 1793, after the second partition of Poland, Danzig was joined to Prussia, and remained a part of that kingdom until after the World War, except for the brief period from 1807 to 1814 when, under a Napoleonic edict, it became a free city. Once more in 1919, when the Paris Peace Conference was faced with the problem of providing the newly recreated Republic of Poland with access to the sea and a port on the Baltic, Danzig was constituted a free city.

From the beginning of the Free City's existence there had been considerable friction with Poland. The Nazi regime in Germany gained a large following in Danzig. At the end of 1938 demands were made for the abolition of the Polish and League of Nations commissioners, and also of the Polish customs union. At the same time persecution of the Jewish population was instigated in the Danzig region. Consult S. B. Fay, *Danzig: Its Stormy History Through More Than Six Centuries* (1937).

Danzig, Duke of. See LEFEBVRE, FRANÇOIS JOSEPH.

Daphne, daf'nē, in Greek mythology, a nymph, daughter of the river Peneus in Thessaly. When Apollo fell in love with her, and pursued her, she was changed by her mother, Earth, into a laurel.

Daphne, a beautiful park or garden, five miles south of Antioch, in Syria, which contained a famous temple and grove of Apollo (burned in 362 A.D.). It was a favorite place of residence of the Seleucid kings, of Pompey, and of the Emperor Commodus.

Daphne, a genus of plants of the order Thymelaceæ, consisting of a number of shrubs, nearly all with handsome foliage and fragrant flowers. The European Spurge Laurel is a low shrub (*D. laureola*), with shining, evergreen leaves and fragrant greenish-yellow flowers. The flowers are followed by nearly black, oval berries, which are poisonous. The best known of the varieties of daphne grown in gardens is the old Mezereon, *D. mezereum,* which bears fragrant, rose-colored flowers in very early spring, before the leaves appear. Another hardy species is the Garland Flower, *D. oneorum,* an evergreen trailer which bears fragrant masses of pink flowers in spring and autumn. The evergreen *D. pontica* is also common in gardens. In the greenhouse, the commonest species is *D. indica* or *D. odora,* an evergreen shrub introduced from Japan, bearing in spring and summer terminal heads of fragrant red or white flowers. From the pulp of the pounded inner bark of *D. cannabina,* in the East, the so-called nepal paper is made.

Daphnia. See Water Flea.

Daphnis, daf'nis, a Sicilian shepherd, said to have been the inventor of bucolic poetry. Consult Prescott's *A Study of the Daphnis Myth,* in *Harvard Studies in Classical Philology,* vol. x.

Dapitan, dä-pē-tän', town and district, Mindanao, Philippines. The district is on the north side of the western peninsula of the island, on the Sulu Sea, between Misamis and Zamboanga and has an area of 2,386 square miles. High mountains rise in the south and east, and there are forests of ebony.

The town is located on Dapitan Bay, and exports wax, maize, and cacao. Pop. about 13,000.

Dapsang. See Godwin-Austen.

Daqahlia. See Dakahlieh.

Darab, dä-räb', or Darabgherd, town, province of Fars, Persia; 130 miles S.E. of Shiraz. Dates, oranges, and lemons are exported. Excavations and sculptured rocks 3 miles south of the town are of interest. Pop. about 6,000.

Daraga, dä-rä'gä, pueblo, Albay province, Luzon, Philippines; 5 miles north of Albay. It supersedes the old town of Cagsaua, which was destroyed in the insurrection against the United States. The hemp industry is important. Pop. 19,000.

Daraiyeh, dä-ri'yeh, or Derayeh, town, Central Arabia; 6 miles west of Riad, the present capital of Nejd. Before its destruction (1819) by the Egyptians it was the capital of the Wahhabis, with some 60,000 inhabitants. Pop. about 1,500.

Darbanda, där-bän'dä, region in Northeast Africa, between 5° and 8° N., and to the east of 20°, on a tract dividing the waters that flow to Lake Chad by the Shari from those that flow to the Congo.

Darbhanga, dur-bung'*ga*, district and town, Bengal, India. The district has an area of 3,348 square miles, forming a large alluvial plain, intersected by a network of streams and covered with rice fields, bamboo, and mango-groves. Rice, indigo, linseed, mustard, and tobacco are the chief crops. Pop. 3,000,000.

The town is 78 miles northeast of Patna by rail. It has large bazaars and a handsome market place, a hospital, and the maharajah's palace, with fine gardens, menagerie, and aviary. There is an active trade in oil-seeds, grain, timber, salt, iron, etc. Pop. 60,676.

D'Arblay, Madame. See Burney, Frances.

Darboy, där-bwä', Georges (1813–71), archbishop of Paris, was born at Fayl-Billot, in Haute-Marne. He was ordained priest in 1836, became a professor at Langres in 1840; was appointed bishop of Nancy in 1859, and archbishop of Paris in 1863. At the Œcumenical Council of 1870 he strongly opposed the new dogmas, especially that of papal infallibility. With others, however, he made his submission when the dogma was promulgated. He was seized as a hostage by the communists in April, 1871, and shot on March 27 in the prison of La Roquette. He translated into French the works of Dionysius the Areopagite (1845), and wrote *Les Femmes de la Bible* (1846–9), and *Saint Thomas Becket* (1860).

Dar'by, borough, Pennsylvania, Delaware county, on the Darby River, and on the Baltimore and Ohio, and the Pennsylvania Railroads; 6 miles southwest of Philadelphia. Lumber, yarns and dolls are manufactured. Pop. (1930) 9,899.

Darbyites. See Plymouth Brethren.

Dardanelles, där-d*a*-nelz', Hellespont, or Strait of Gallipoli, the long, narrow strait between Europe and Asia Minor which connects the Sea of Marmora with the Ægean Sea. It is about 45 m. long from N.E. to S.W., and varies in width from one to five miles, being narrowest between Sestos and Abydos, the point at which Xerxes threw his bridge of boats across in 480 B.C. Alexander the Great crossed here from Europe into Asia. This spot is also celebrated in romance by the exploits of Leander and later of Lord Byron.

The northern shore is formed by the peninsula of Gallipoli, a tongue of land some 50 m. long, consisting of a mass of rocky ridges rising to over 700 ft. above sea level. The southern shore is also hilly, with high ground overhanging the water. The entrance from the Ægean is two miles wide; from this point the Asiatic side curves in cresent shape, while the European shore is almost straight, to the 'Narrows' between Chanak (Asia) and Kilid Bahr (Europe). Navigation is dangerous; there is practically no tide, but a strong current sets continuously down the straits from the Sea of Marmora.

The strait is of vast strategic importance, as it commands the entrance to Istanbul (Constantinople) from the Mediterranean, and is strongly fortified (since 1460) and the waters mined. At the entrance stand forts Sedd-el-Bahr and Kum Kaleh.

Not until 1774 were the Dardanelles opened to Russian merchantmen. The British admiral Duckworth forced the straits in 1807; by a treaty of 1841 (signed by Russia, Britain, Prussia, Austria and France) Turkey's right to keep the straits closed to war vessels was made part of the public law of Europe. These provisions were confirmed at London in 1871 and at Berlin in 1878. In the latter year, however, a British fleet passed through to protect Constantinople from the Russians. During the Russo-Japanese War Russian warships passed through under a commercial flag, but their operations were stopped by the Tsar, whose orders were delivered to them by British cruisers near Zanzibar (1904). In 1911, during the war with Italy, Turkey decided to close the Dardanelles to all vessels carrying grain and even neutral vessels bound to neutral ports.

During the Balkan Wars (1912–13) no attempt was made to force the entrance, but the Great Powers objected to the closing of the straits and sent warships to anchor off Constantinople to protect the Christian inhabitants if necessary.

Dardanelles in the World War.—A brief account of the Dardanelles campaign is given (with map) in Vol. IV, pp. 519^{38} and 519^{39} (q. v.). These operations were undertaken during the war for the purpose of relieving the pressure on Russia, deterring Bulgaria from joining the Central Powers, and driving Turkey out of the war. Its inception, which is usually ascribed to Mr. Winston Churchill, was opposed both by Lord Fisher, then first sea lord of the Admiralty, and Lord Kitchener, secretary for war. Fisher subsequently resigned on the question.

It involved the successful reduction of forts by ships, an operation constantly decried by the great Nelson. It was erroneously supposed, on the analogy of Liége and Namur, that the enormous power of modern naval guns would completely overwhelm the forts. Yet the military importance of the straits was tremendous. Allied possession of the channel would not only minimize the danger of German attacks on Egypt and India and cut off the Asiatic Turks, but would open an all-year route for Russian grain for France and England and for arms and munitions back to Russia; while the muchly desired city of Constantinople would come under Allied protection.

Already on Nov. 3, 1914, a French and British squadron shelled the outer forts to get the range, which only served to put the Turks on their guard. On Feb. 19, 1915, a combined British and French fleet opened an attack on the forts at the entrance.

The Turks, however, were strongly entrenched in the hills of Gallipoli and the swift current of the straits made the work of mine-sweeping so difficult and dangerous that after a month of fruitless and costly fighting, during the course of which three Allied warships were sunk and two disabled, it was decided to make a combined military and naval attack. Intermittent bombardment of the forts was continued, and by March 4 those at Cape Helles had been demolished. The entrance was cleared of mines and on the 6th the attempt to reduce the forts at the Narrows was begun. The hope was that once these had been destroyed, the fleet would then sail up to Constantinople and seize the two German cruisers, *Goeben* and *Breslau*, which had taken refuge in the Dardanelles. Then the Allies could overawe the city.

British forces, commanded by General Sir Ian Hamilton, including the Australian and New Zealand Army Corps (the *Anzacs*), were mobilized in Mudros Harbor and, on April 25, 1915, were landed, with appalling loss of life, at Gaba Tepe (Anzac Cove) and Cape Helles. There was fierce and constant fighting during May and June and the Allied losses were severe. On August 6–10, after waiting for the arrival of reinforcements during July, fighting was resumed at Suvla Bay, north of Anzac, and at Cape Helles, but the most desperate attempts failed to overcome the Turkish resistance. Finally, it was determined to abandon the whole enterprise. In December the Anzac and Suvla positions were evacuated and in January, 1916, the last British soldier left Cape Helles. The evacuation was accomplished with practically no casualties, but the losses of the campaign were heavy. See Europe, Great War of, page 519^{39} for statistics of losses.

The Treaty of Lausanne (between the Allies and Turkey) was not concluded till July, 1923. It provided for the demilitarization of the Dardanelles and the Bosporus. In 1936 a new convention gave Turkey the right of re-militarizing the straits, and in the same year the International Commission of the Straits was dissolved.

Consult C. E. Callwell, *The Dardanelles* (1920); Sir I. Hamilton, *Gallipoli Diary* (1920); E. Ashmead-Bartlett, *War Memories of the Dardanelles* (1928).

Dardania, a district of the Troad, adjoining the territory of Ilium. The Dardani, its inhabitants, were ruled by Æneas, and were closely allied with the Trojans.

Dardanus, son of Zeus and Electra, was the mythical ancestor of the Trojans, and through them of the Romans.

Dardanus, also called Dardanum and Dardanium, a Greek city in the Troad, about 10 miles from Troy. Here, in 84 B.C., peace was concluded between Mithridates, king of Pontus, and the Roman general Sulla. From it the name Dardanelles is derived.

Dardistan, a general geographical name for a number of small States or tribes on the southern slopes of the Karakoram and Hindu-Kush mountains, between Kashmir and Afghanistan. The Dards are an Aryan race, formerly Buddhists, but now Shiite Moslems, who speak a corrupt Sanskrit. Another name for them is Kanjut.

Dare. See Dace.

Dare, Virginia, the first child of English parents born in America. Her father, Ananias Dare, one of the court of assistants, married Eleanor, the daughter of John White, the governor of Virginia sent out by Sir Walter Raleigh in 1587. The child, baptized Virginia, was born at Roanoke about one month after the settlement was made. Her subsequent history is unknown.

Dar-el-Beida, or Casablanca, principal seaport town of Morocco, North Africa, on the west coast 15 miles northeast of Mazagan. It exports chick-peas, grain, leather and wool. The population is estimated at 25,000. Pop. Casablanca (French Zone) 257,430.

Dares, a priest of Hephæstus at Troy, who, according to ancient authorities, wrote an Iliad older than that of Homer. The Latin prose work, *The History of Dares the Phrygian of the Destruction of Troy,* which professes to be a translation by Cornelius Nepos of the poem above mentioned, is a late forgery, probably of the 5th, 6th, or 7th century A.D. The best editions are those of Dederich (1837), and Meister in the Teubner Series (1873).

Dar-es-Salam, seaport, East Africa, capital of Tanganyiha Territory, is situated on a spacious, land-locked harbor at the terminus of the Central Railway to Kigoma-Ujiji; 45 miles south of Zanzibar. It exports ivory, rubber, and copal. During the World War (1914–19), it surrendered to a combined land and naval force under Allied command (Sept. 4, 1916). Pop. 29,500.

Dar-Fertit, region in the Anglo-Egyptian Sudan, south of Darfur, north of 8°, a small part of it within the French and much of it within the English sphere of influence. A country of savannas, it is thinly peopled by Niam-Niam.

Darfur, country of Central Africa, the westernmost province of the Anglo-Egyptian Sudan. It is bounded on the north by the Libyan desert, west by Wadai, south by the Bahr-el-Ghazal and east by Kordofan. There are many fertile valleys which, during the rainy season (June–September) exhibit a rich vegetation. The principal products are wheat, millet, rice, maize, sesame, and tobacco and fruit abound. The wealth of the inhabitants consists principally in cattle.

Darfur, long a center of the slave-trade, was annexed to Egypt in 1874–5, but suffered with the rest of the Sudan from the desolating tyranny of the Mahdi and his successor the Khalifa, till the defeat of the latter by the British in 1898. Since 1899 it has been recognized as part of the Egyptian Sudan and under British influence. Its internal affairs are administered by its hereditary Sultan. The inhabitants, mainly Arabs (Fulbe) and Negroes (Furs), are estimated at about 750,000 and the area about 150,000 sq. m. The capital is El Fasha (pop. about 10,000).

Dargai, a hill-village of British Baluchistan, 30 miles northeast of Quetta. On Oct. 20, 1897, the fortified heights adjoining, then strongly held by the Afridis and Orakzais, were carried by a magnificent charge of the Gordon Highlanders, the 2d Ghurkas, and the 3d Sikhs.

D'Argens, Jean Baptiste de Boyer, Marquis (1704–71), French popular philosopher, was born at Aix in Provence. After serving in the French embassy at Constantinople and in the army, he turned to literature. His *Lettres Juives* (best ed. 1766), *Lettres Chinoises* (1739), and *La Philosophie du Bon Sens* (1744) won the patronage of Frederick the Great, who made him director of Berlin Art Academy. He wrote, also, *Histoire de l'Esprit Humaine* (1765–8) and *Lettres et Mémoires* (1735). A selection of his works appeared in 24 vols. in 1763.

Dargomyzsky, dār-gō-mizh'-ski, Alexander Sergeivitch (1813–69), Russian composer and pianist, was born in Tula, and at 20 was a brilliant pianist. He held a position in the government from 1831 to 1835, but after that time devoted himself entirely to music. In 1847 he produced at Moscow his opera *Esmeralda,* which was written in 1839; in 1856 he brought out his best opera, *Russalka,* in St. Petersburg; and in 1867 an opera-ballet *The Triumph of Bacchus.* From 1845 to 1855 he published over 100 minor works—songs and ballads, which enjoy great popularity. His opera *The Stone Guest,* founded on Pushkin's version of Don Juan, was produced posthumously in 1872.

Dargomyzsky was influenced to a great extent by Glinka, but his music is more realistic and dramatic. He was, with Glinka, the founder of the Russian National School of Music. In his later works, especially *The Stone Guest,* music is made subordinate to words and action.

D'Argenson. See Argenson, d'.

Daric, ancient Persian coin named for Darius I, who is said to have been the first to coin it. It was made of gold, and its value was about five dollars.

Dariel, a magnificent gorge from 20 to 25 miles south of Vladikavkas, Caucasus, on the Georgian military road, through which the Terek rushes between granite cliffs rising above at a height of from 4,000 to 5,000 ft. The Dariel ravine is the Caucasian or Iberian Gates of classic authors.

Darien. Gulf on the south shore of the Caribbean Sea, in the angle between the coasts of Colombia and Panama. It is 29 miles broad and 46 miles long. The name was formerly applied to the entire Isthmus of Panama.

Darien, town, Fairfield county, Connecticut, on the New York, New Haven and Hartford Railroad; 5 miles northeast of Stamford. It lies close to the shore of Long Island Sound, and is a favorite summer resort. Pop. (1930) 6,951.

Darien Scheme, a scheme launched in 1695 by William Paterson, who founded the Bank of England, for establishing a commercial *entrepôt* and colony on the Isthmus of Darien, near Panama. William III put himself in opposition to the scheme; but Scottish national feeling was sufficient to carry the undertaking through. The scheme, however, involved an encroachment of Spanish territory; and when the expedition, which left Leith in 1698, reached the Isthmus of Darien, the 1,200 colonists found themselves opposed by Spain. Moreover, the climate proved to be unhealthy, provisions failed, and the English colonies of America were hostile to the project. A mere handful of the adventurers, including Paterson, succeeded in returning to Scotland. Consult Bancroft's *History of Central America* (1883).

Darius, the name of several kings of the ancient Persian empire. Darius I, the son of Hystaspes, who reigned from 521 to 485 B.C., was really the founder of the Persian empire. He succeeded Cambyses, and introduced a new organization, dividing the empire into twenty satrapies, and introducing a fixed tribute. About 515 B.C. he subdued Thrace, and even advanced north of the Danube into Scythia (Southern Russia). His general, Megabyzus, reduced the Greek towns on the north coast of the Propontis and Ægean, and made the kingdom of Macedonia the vassal of Persia. In 499 B.C. the Ionian Greeks revolted, and with the aid of an Athenian force succeeded in burning Sardis. But the rebellion was ended by the Persian victory at Lade and the destruction of Miletus in 494. Darius then sent to Greece the expedition under Datis, which, after destroying Eretria, was defeated at Marathon in 490. While making preparations to conquer Greece he was called to Egypt by a revolt. The best authority on Darius I is the Behistun inscription. Herodotus also tells us much. Consult Tolman's *Old Persian Inscriptions* (1893).

Darius Ochus, or Nothus ('the bastard'), an illegitimate son of Artaxerxes I, reigned from 424 to 405 B.C., having obtained the throne by murdering his brother Sogdianus. He was a weak ruler, as the repeated insurrections of his satraps prove.

Darius Codomannus, the last king of Persia of the Achæmenian dynasty, who reigned from 336 to 331 B.C., was the grandson of a brother of Artaxerxes II, and was raised to the throne by the eunuch Bagoas, who murdered Arses, the youngest son of Artaxerxes III. See Alexander the Great.

Darjeeling, town in district of same name, Bengal, British India, is situated in the Himalayas, at over 7,000 ft. It has a fine sanatorium and a good water-supply, and is a popular summer-resort for visitors and invalids. The fashionable month is October, after the rains, when the clear atmosphere shows at its best a view of unsurpassed extent and grandeur. Pop. 22,258.

Dark Ages. See Middle Ages.

Dark and Bloody Ground is a popular name for Kentucky, because it was formerly the scene of savage Indian wars.

Darlaston, town, South Staffordshire, England. It has coal and iron mines and manufactures hardware. Pop. (1931) 19,736.

Darley, Felix Octavius Carr (1822–88), American artist and book-illustrator, was born in Philadelphia, Pa., and began to practice drawing when engaged in work for a merchant, at the age of fourteen. Achieving considerable success as a humorous illustrator in Philadelphia, he removed to New York in 1848, and undertook many important works, including the illustrating of editions of Irving, Cooper, Dickens, W. G. Simms, and Judd's *Margaret.* His illustrative work excelled in sharply-defined outline and freshness of design. His picture, *Cavalry Charge at Fredericksburg, Va.,* was exhibited at the Paris Exposition, 1867, and his *Street Scene in Rome* at the Centennial Exhibition, 1876. He was elected a member of the National Academy in 1852. In 1868 he published *Sketches Abroad with Pen and Pencil.*

Dar'ley, George (1795–1846), Irish poet, critic, and mathematician, was born in Dublin. His poems are mainly dramatic, and

2 6 1934

show the influence of the Elizabethan writers. He contributed dramatic criticism to the *London Magazine,* and art criticism, characterized by needless asperity, to the *Athenæum,* edited Beaumont and Fletcher's plays (1840), and contributed notes to Cary's *Dante.* His chief works include *Errors of Ecstasie* (1822), *Labors of Idleness* (1826), *Sylvia or the May Queen* (1827; ed. J. H. Ingram, 1892); *Nepenthe* (1839; ed. R. A. Streatfield, 1897); *Thomas à Becket* (1840); *Ethelstan* (1841); *Poems,* with memoir by R. and M. J. Livingstone (1899).

Dar'ling, range of mountains, Western Australia, extending nearly 300 miles north and south along the west coast. Highest point, 3,500 feet. The name is also given to a district in New South Wales (50,000 square miles).

Darling River, central river of Australia, formed on the Dividing Range between lat. 32° and 28° s., by the Condamine, the Peel Rivers, the Castlereagh, and the Macquarie. It pursues a southwesterly course for 140 miles, and falls into the Murray. Its total length is over 1,000 miles.

Darling, Grace Horsley (1815–42), was born in Bamborough, in Northumberland, daughter of a lighthouse-keeper on Longstone, one of the Farne Islands. On Sept. 7, 1838, she succeeded, along with her father, in rescuing the survivors of the *Forfarshire,* bound from Hull to Dundee. She is buried in the churchyard of Bamborough Castle.

Dar'lington, a parliamentary and municipal borough, Durham, England, 18 miles south of Durham. The principal features are the church of St. Cuthbert originally erected in the 12th century, Technical Institute, and Edward Pease Library, presented in 1885. There are locomotive works, also other engine factories, rolling mills, wagon works, iron and brass foundries, worsted mills, malt works, and tanneries. In the Bank Top station Stephenson's No. 1 locomotive is preserved. The Darlington and Stockton Railway, opened in 1825, was the first public railway in the world on which steam locomotives were used. Pop. (1931) 72,093.

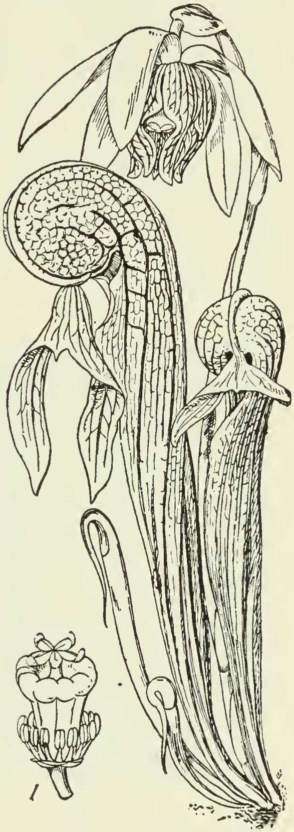
Darlington, town, South Carolina, county seat of Darlington county, on the Atlantic Coast Line Railroad; 70 miles northeast of Columbia. Manufactures include cotton, cottonseed oil and tobacco. Pop. (1930) 5,556.

Darlington, James Henry (1856–1930), American Protestant Episcopal bishop, was born in Brooklyn, N. Y. He was graduated from New York University (1877), and from Princeton Theological Seminary (1880), and was ordained deacon and priest in the Protestant Episcopal Church in 1882. He was rector of Christ Church, Brooklyn, from 1883 to 1905, and in the latter year was consecrated first bishop of the newly formed diocese of Harrisburg. During the World War he received the appointment of Lieutenant Colonel, was active in war work, and was decorated by numerous European governments for his services. Representing a Commission of the Episcopal Church, he obtained the approval of a Concordat with the Eastern Orthodox Churches and the Old Catholic prelates in Europe, and in July, 1920, was the first Western Bishop to be seated on the throne of the Ecumenical Patriarch in Constantinople (Istanbul). He was also selected to dedicate the statue of Abraham Lincoln, at Westminster Abbey, London. He edited *The Hymnal of the Church, In Memoriam,* and *Little Rhymes for Little People,* and wrote *Pastor and People* (1902) *Verses by the Way* (4th series 1929).

Darlingto'nia Califor'nica, a pitcher plant, a member of the order Sarraceniaceæ. Its leaves or pitchers are twisted spirally, and are largest at their summit, where they arch over so as to form a sort of hood or fiddlehead. At the mouth hangs a forked excrescence, like the tail of a gold-fish. The return of the insects trapped is prevented by many hairs that slope slightly downwards. The plant may be grown in a cool greenhouse, in a soil containing peat, sphagnum moss, sand, and limestone. In April it bears large white-and-green flowers.

Darmesteter, See Duclaux, Agnes.

Darmesteter, där-mes-t'-târ', Arsène (1846–88), French philologist, brother of James Darmesteter (q. v.), was born in Lorraine. He taught the history of the French language and literature, first at the Ecole des Hautes Etudes, then (from 1883) at the Sorbonne. Together with Hatzfeldt, he compiled an anthology of French 16th-century literature, which has become a standard work (1878); and he was at the time of his death engaged on a French dictionary (begun with the same collaborator, who completed it with A. Thomas), which is a rival to Littré's. His lectures were incorporated in the *Cours de Grammaire Historique de la Langue Française,* edited by Muret and Sudre (1891–5; English version by Hartog, 1899). Consult biography by James Darmesteter, prefixed to Arsène's *Reliques Scientifiques* (2 vols.).



Darlingtonia californica.
1, Stamens and pistil.

Darmesteter, James (1849–94), French Orientalist, was born in Lorraine. In 1875 he published a thesis on the mythology of the Zend Avesta; in 1877 became assistant professor of Zend, or ancient Persian language, at the Ecole des Hautes Etudes in Paris; and in 1883 published *Etudes Iraniennes,* followed by his essay on the Mahdi and the Messianic doctrines of Islam, *Origines de la Poésie Persane* (1887), and *Chants Populaires des Afghans* (1888–90). His great work is his translation, published (1880) in the *Sacred Books of the East,* of the whole of the *Zend Avesta,* except the Yacna and the Gâthâs. He also translated into French the poems of his wife (see Duclaux, Agnes) and Max Müller's *Origin and Growth of Religion.*

Darmstadt, därm'shtät, city, Germany, capital of the Republic of Hesse-Darmstadt, is situated at the northwestern foot of the Odenwald; 17 miles south of Frankfort-on-Main. The grand-ducal castle dates from the 15th century, and shelters a large library, picture gallery, and museums. In the vicinity of the palace are a 16th-century town hall, polytechnic high school, and armory. Other notable edifices are the new palace (1862–65), the former residence of the grand-dukes, the town church, Roman Catholic church, theatre, and law-courts. The industries include iron and boiler foundries, machine shops, and chemical works. Darmstadt owes its importance to the Grand-duke Ludwig I, who founded the new town. Liebig the chemist was born here in 1803. Pop. (1933) 93,222.

Dar'nel Grass, (*Lolium temulentum*), a troublesome weed occurring in the grain fields of Europe, whence it has been introduced into the United States. Its seed ripens at the same time as wheat, and thus is returned to the ground with the seed wheat. It is believed to be poisonous, by reason of a fungus which is commonly present in the grain. The darnel is said to be the 'tares' of Scripture.

Darning Needle. See Dragon Fly.

Darn'ley, Henry Stewart, Lord (1545–67), Scottish noble, son of the Earl of Lennox, great-grandson of Henry VII, married Mary Queen of Scots in 1565. He was implicated in the murder of Rizzio, Queen Mary's secretary, and was himself murdered in Kirk o' Field in 1567. He was the father of James I of England. See Mary Queen of Scots.

Darrow, Clarence Seward (1857–1938), American lawyer, was born in Kinsman, Ohio, and admitted to the bar in 1878. During his long career he was identified with many famous cases, particularly actions against monopolies. He was counsel for the anthracite miners in the coal strike arbitration at Scranton and Philadelphia, 1902–3. A rugged individualist, Darrow was a lifelong friend of labor and a fighter for lost causes. In 1902 he was elected to the Illinois Legislature, where he endeavored to force a bill through to abolish capital punishment. His most famous trials were murder cases, in which he strove eloquently to snatch defendants from the gallows or electric chair. In the sensational Scopes (evolution) trial at Dayton, Tenn., in 1925, he was pitted against the redoubtable William Jennings Bryan. There was hard hitting for three weeks, which the 'Great Commoner' did not long survive. Darrow was chairman of a committee appointed by President F. D. Roosevelt to study the effects of the N.R.A. on the small business man. The report was a stinging criticism of the encroachment of an omnipotent State into the lives of human beings. He published *The Story of My Life* in 1932; also *Prohibition Mania,* and works on crime and punishment.

Dart, a swift flowing river, 35 miles long, rising in Dartmoor, Devon, England, and entering the sea below Dartmouth.

Dart. See Dace.

Dart'er, or Snake-bird, a name applied to the birds of the genus *Plotus,* near allies of the cormorant. The American Darter (*P. anhinga*) occurs in tropical and sub-tropical regions, and is of a glossy greenish-black color with silver-gray markings on certain of the wing feathers, and white hair-like feathers on the head. The neck is very long, the tail fan-like, with strong, stiff feathers. Other darters occur in Africa, India, Australia, New Guinea, and New Zealand. All haunt lakes, rivers, or inlets of the sea, and apparently feed, at least chiefly, on fish. The flight is labored, but the birds swim well, the long neck having a very snake-like appearance.

Darter Fish, a small fresh-water fish of the perch family, abounding in pools and streams in the Central and Southern United States. It varies in length from 2 to 10 inches.

Dart'ford, market town, Kent, England, 17 miles E.S.E. of London. It has large powder and paper mills, and engineering, cement, and chemical works. The first rolling and slitting mill for iron in England was built here in the 16th century. Wat Tyler's insurrection (1381) began at Dartford. Pop. (1931) 28,928.

Dart'moor, a plateau in the s.w. of Devon, England, about 22 miles long (from north to south) by about 20 broad (east to west), with a mean elevation of about 1,500 feet. Numerous granite-topped hills or 'tors' rise above the general level, the highest points being High Willhayse (2,040 feet) and Yes Tor (2,030 feet). The central part of the moor has formed, since very early times, a royal 'forest' or reserve. The forest rights belong to the crown; but there are rights of pasturage exercised by holders of what are called venville tenures in certain border districts. The moor itself affords valuable mountain pasture to cattle, sheep, and large numbers of half-wild ponies. Tin, copper, iron, manganese, and kaolin occur. The Dartmoor convict prison at Princetown was built originally for French prisoners of war in 1806.

Dartmoor Massacre, the killing (April 6, 1815) of certain American prisoners-of-war who had been captured during the War of 1812 and confined in Dartmoor Prison, Devonshire, England, and who, the war being ended, apparently attempted to escape. Seven of the prisoners were killed and about sixty were wounded. While the British government exonerated the soldiers, it provided liberally for the wounded and the families of the slain.

Dartmouth, därt'muth, municipal borough and seaport, South Devonshire, England, near the mouth of the Dart, which here forms a spacious harbor. The town is of importance for its commerce and fisheries and as a yachting center. It is historically interesting as the port of embarkation of the Crusaders under Richard Coeur de Lion and for the old cadet training ship *Britannia* (now superseded by a Royal Naval College). Pop. (1931) 6,707.

Dartmouth, town, Mass., Bristol county, stands on the Paskamansett River; 5 miles south of New Bedford. Poultry raising, dairying, and the manufacture of box boards are the principal industrial interests. Pop. (1935) 9,440.

Dartmouth, town, Halifax county, Nova Scotia, on Halifax Harbor, opposite Halifax, with which it is connected by ferry, and on the Canadian National Railroad. Rope, leather, flour, and sugar are manufactured. Dartmouth suffered severely in the disaster of 1917 (see Halifax). Pop. (1931) 10,500.

Dartmouth College, an institution for higher education for men at Hanover, N. H., developed from a school for the education of Indian youths, established by the Rev. Eleazar Wheelock (q. v.) in 1754 at Lebanon, Conn., and known as Moor's Indian Charity School. Funds for the maintenance of the school were received from private sources, from the general courts of Massachusetts Bay and New Hampshire and from England, where £10,000 was raised and placed in charge of a board of trustees headed by the Earl of Dartmouth. As a result of this endowment the institution was removed to its present situation, and chartered as a college in 1769, with Dr. Wheelock as its first president. Moor's school was made an independent institution. For the famous *Dartmouth College Case* (1816–19), see that head, below. Dartmouth now includes the college, the Amos Tuck School of Administration and Finance, the Thayer School of Civil Engineering, and the Medical School. The collegiate courses lead to the bachelor's degree in arts and science. Degrees of M.A., M.S., C.E., and M.C.S. are awarded on the fulfilment of required conditions. There are a number of prizes and scholarships offered. The principal buildings are Parkhurst Hall, housing all the administrative officers; Wilson Hall, which contains the main library, with about 200,000 volumes; Butterfield Museum; Webster Hall; the Gymnasium and Memorial Field, the latter a memorial to the Dartmouth men who gave their lives in the Great War; Davis Varsity Field House; Spaulding Swimming Pool; College Hall; Robinson Hall; and Rollins Chapel. For recent statistics see Table under the heading College.

Dartmouth College Case, an important case decided by the U. S. Supreme Court in 1819. Dartmouth College was chartered by George III. in 1769, the government of the institution being placed in the hands of twelve trustees. In 1816 William Woodward, secretary and treasurer of the corporation, was removed by the trustees, retaining in his possession certain property of the college; a controversy was thus precipitated, and, the legislature of New Hampshire, having revised the charter so as greatly to increase the number of trustees who were to be appointed by the State government, Woodward was reappointed by the new board. The old trustees refused to be bound by the act of the legislature, and brought suit against Woodward for the recovery of the college's property in his hands. The New Hampshire court gave judgment in favor of Woodward, and the case was then carried on a writ of error to the Supreme Court of the United States. The trustees were represented by Daniel Webster, who in a famous speech argued that the New Hampshire legislature had, in passing the act mentioned above, violated Art. i., § 10 of the Federal Constitution, which prohibits any State from passing any law impairing contracts. In this he was sustained by the court, which decided (1819) that any charter issued to a private corporation was essentially a contract, and could not subsequently be modified without consent of the corporation unless power to do so were expressly conferred in the charter. The decision was of extreme importance owing to its bearing on the law of corporations. See Supreme Court Decisions.

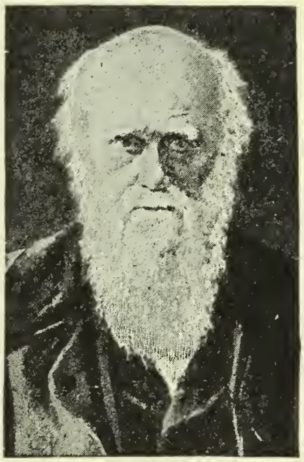
Daru, da-rü′, Pierre Antoine Noël Bruno, Count (1767–1829), French administrator and historian, was born in Montpellier. After the Revolution, on account of his supposed English sympathies, he suffered imprisonment (1791–4). He was a devoted follower of Napoleon and while acting as administrator of the army in Switzerland (1799), he published his *Cléopédie, ou la théorie des réputations en littérature*, and after Napoleon's return from Egypt became secretary of the war department. He rose successively to be councillor of state and superintendent of the emperor's household, commissioner for the execution of the treaty of Pressburg (1806), and for a time general administrator to the Grand Army. He was intendant-general in Austria and Prussia during the Restoration. His most important publications are the *Histoire de la république de Venise* (7 vols. 1819); *Histoire de Bretagne* (3 vols. 1826).

Daru, Napoleon, Count, (1807–89), son of Pierre Daru, was born in Paris. He was opposed to the *coup d'état* of 1851, and was banished by Napoleon III. He became minister of foreign affairs in 1870, as well as a member of the Committee of Defence appointed in August, 1870. He was returned to the National Assembly in 1871; and elected a senator in 1876.

Darwen, or Over Darwen, manufacturing town, England, in Lancashire, 3 miles south of Blackburn. The manufacture of cotton goods is the leading industry and there are also important paper works, calico printing establishments, manufactures of tiles and firebrick, and bleaching works. There are coal mines and stone quarries in the vicinity. Pop. (1921) 37,913.

Darwin, Mount, a mountain peak on the island of Tierra del Fuego, South America, rising to a height of nearly 7,000 feet.

Darwin, Charles Robert (1809–82), British naturalist, was born in Shrewsbury, his grandfather being Dr. Erasmus Darwin (q. v.). His mother was the daughter of Josiah Wedgwood, the famous pottery manufacturer. He was educated at Oxford and in 1831 was appointed naturalist to the *Beagle*, which made an expedition around the world. The voyage, which lasted five years, had a great influence on his future life, not only on account of the positive gain to his knowledge which resulted from it, but also because it suggested problems to the solution of which he devoted practically the remainder of his life. His narrative of the cruise, which extended from Brazil to the west coast of South America, and thence through the Pacific, was published in 1840 as the *Voyage of the Beagle*, and is one of the most charming books of its class. After his return, Darwin was for several years occupied with the publication of the scientific results of the cruise. After a few years in London he finally settled at Down, near Beckenham in Kent, where he lived during the remainder of his life.



Charles Darwin

(From the portrait by Hon. John Collier. By permission of the Linnean Society.)

His most important book, *The Origin of Species*, was first published in 1859; many of his later works being merely elaborations along different lines of its main thesis. A discussion of this thesis will be found under Darwinism, while in the article on Alfred Russel Wallace some reference will be found to the oft-told tale of the dramatic coincidence between the speculations of the two great scientists. After *The Origin of Species*, probably his most famous book is *The Descent of Man* (1871), containing the speculations on the probable ancestor of man which for many years were regarded by the non-scientific world as Darwin's chief contribution to philosophical theory. This book also contained the supplementary theory of sexual selection, which has been much less widely accepted than that of natural selection. In 1868 appeared *The Variation of Plants and Animals under Domestication*, a treasure-house of facts, and in 1872 *The Expression of the Emotions in Man and Animals*. Among his numerous botanical works are *Fertilization of Orchids* (1862), supplemented by his *Effects of Cross and Self Fertiliza-*

tion (1876), *Insectivorous Plants* (1875), *The Power of Movement in Plants* (1880), and *The Movements and Habits of Climbing Plants* (1865). His geological researches find expression in *The Structure and Distribution of Coral Reefs* (1842), *Geological Observations on Volcanic Islands* (1844), and *Geological Observations on South America* (1846), and zoölogy is represented by his book on barnacles, *A Monograph on the Cirripedia* (1851-3), and by his last book, *The Formation of Vegetable Mould through the Action of Worms* (1881). He died suddenly, and was buried in Westminster Abbey.

Darwin was a man of attractive personality, charming manners, and kindly disposition. He was a voluminous collector of data on all subjects in which he was interested, all of which he utilized in experimentation. The centenary of his birth and the fiftieth anniversary of the publication of *The Origin of Species* was celebrated at Cambridge, Eng., on June 22, 1909, by delegates from many universities.

Darwin, Erasmus (1731–1802), English physician and poet, grandfather of Charles Darwin (q. v.), was born at Elston Hall, near Newark. He practised medicine successively at Nottingham, Lichfield, and Derby (1781). He was a philosophic observer of nature and in some of his speculations he undoubtedly anticipated certain of Lamarck's views, although his direct influence on the work of his grandson was probably inconsiderable. His published works include *Zoönomia, or the Laws of Organic Life* (1794–96), *Phytologia, or Philosophy of Agriculture* (1799), and a long poem entitled the *Botanic Garden*, which contained the *Loves of the Plants* (1789). For some of his views on organic evolution see Packard's *Lamarck*.

Darwin, Sir Francis (1848–1925), third son of Charles Darwin, was born in Down, Kent. He was his father's assistant until the death of the latter (1882) and was then appointed university lecturer and reader in botany at Cambridge (1884). He was knighted in 1913. His works include *Life and Letters of Charles Darwin* (1887); *Charles Darwin* (1892); *Elments of Botany* (1895); *More Letters of Charles Darwin* (with A. C. Seward, 1903); *Foundations of the Origins of Species* (1909); *Rustic Sounds* (1917); *Springtime* (1920).

Darwin, George Howard (1845 – 1912), second son of Charles Darwin, was born in Down, Kent. He pursued investigations in astronomy and physical geography, and was appointed Plumerian professor of astronomy and experimental philosophy at Cambridge (1883). He was president of the British Association at the South African meeting in 1905. He was well known in the United States, where he lectured before universities and other learned bodies. His numerous scientific treaties include *A Paper on Periodic Orbits* (1896) and *The Tides and Kindred Phenomena in the Solar System* (1898).

Darwinism may be defined as the doctrine of natural selection, or the survival of the fittest, as put forward by Charles Darwin in *The Origin of Species* (first published 1859). Popularly it is usually regarded as equivalent to the theory of evolution, often considered only in its application to one organism—man; but, as has been frequently pointed out, this view of Darwinism is entirely incorrect. Its novelty lay, not in the conception of evolution (a doctrine already familiar to philosophers), but in an exposition of a probable cause of evolution so clear and cogent as to remove the theory from the sphere of philosophical speculation to that of practical life.

The chief contents of *The Origin of Species* may briefly be summarized thus. The author collected and presented a large number of facts showing the variability of domesticated and of wild animals, and in the first case emphasized the fact that man, by artificial selection, has produced new forms — *e.g.* among pigeons — which differ from one another so markedly that, if they were wild birds, they would undoubtedly be placed by ornithologists in separate species or even genera. In other words man has, by artificial selection, produced new species. Can existing wild species be supposed to have arisen after a fashion at all analogous? Darwin answers this question in the affirmative, showing that organisms tend to increase faster than their means of subsistence; that necessarily there must ensue a struggle for existence; that in this struggle the fittest will survive; that a continuation of this unconscious selecting process over successive generations will account for the characters of existing species.

A point on which Darwin dwelt relatively little, but on which much stress has been laid in later years, is the question of the origin of the variations which form the raw material for the evolutionary process. Darwin, in *The Origin of Species*, accepted the Lamarckian view of the hereditary nature of the effects of use and disuse, one of the points about which fierce controversy has raged in later days; but at first, certainly, he regarded these effects as subservient to natural selection. Speaking generally, we may say that Darwin was concerned with the *existence*, not with the *cause*, of variation, and with the endeavor to prove that 'the same laws . . . . have acted in producing the lesser differences between varieties of the same species and the greater differences between species of the same genus.' In other words, Darwin strove primarily to break down the impassable barrier which the older zoölogists had built up between varieties and species. In speaking of the struggle for existence and the survival of the fittest, he laid great stress on the organic environment of living beings, as in many cases the most important element in deciding the result of the conflict between rival species and varieties.

In the early statements of his theory, Darwin emphasized natural selection as the chief, if not the only effective, cause of the peculiarities of living beings, as not only primarily producing these peculiarities, but as maintaining their efficiency in each successive generation. Subsequently he put forward the hypothesis of sexual selection to account for certain of the characteristics of the male sex, especially in birds, where the cocks have often a beauty of color and of plumage and a power of song not apparently easy of explanation by the action of natural selection alone. The hypothesis of sexual selection has been abandoned by Wallace, but is still maintained by some others—*e.g.* Professor Poulton. (See Colors of Animals.)

Apart from the chapters in *The Origin of Species* whose contents have been briefly noted above, there are a number of others which deal more with what may be described as the general evidences of evolution than with the theory of natural selection in particular. In regard to these chapters, it may be said that the progress of knowledge since Darwin first penned their contents has immeasurably strengthened his arguments, and that much of this progress has been directly due to the inspiration of *The Origin of Species*. In his tour round the world Darwin had been greatly struck by the many peculiarities in the geographical distribution of mammals, and the difficulty of explaining these on the hypothesis of special creation. He shows how largely these difficulties disappear if the theory of evolution is adopted. Similarly, he shows how the theory is supported by the evidence of the rocks; by the evidence derived from the structure of animals (morphology), from their life-history (embryology), and from the occurrence of rudimentary organs—a characteristic otherwise so inexplicable. For further details on these points, see the article Evolution.

See Alfred Russel Wallace's *Darwinism* (1889); also critical expositions by T. H. Huxley, Asa Gray, J. G. Romanes, St. G. Mivart and E. D. Cope; and the other works of Darwin, especially *The Variation of Plants and Animals under Domestication* (1868); *The Descent of Man, and Selection in Relation to Sex* (1871); and *Life and Letters of Charles Darwin*, by Francis Darwin (3 vols., 1887).

Dasent, Sir George Webbe (1817-96), English Scandinavian scholar, born at St. Vincent, in the W. Indies. Called to the bar in 1852, he was for twenty-five years assistant-editor of the *Times.* He did much to familiarize British readers with Scandinavian and Icelandic literature. Among his works may be mentioned his translations of *The Prose or Younger Edda* (1842); *Popular Tales from the Norse* (from Asbjörnsen), with a valuable introduction (1859; new ed., with memoir by his son, 1903); *The Story of Burnt Njál* (translation of the *Njáls Saga*, 2 vols., 1861; new ed. 1900); his lectures, *The Norsemen in Iceland* (4 vols., 1858); *The Story of Gisli the Outlaw* (1866); his striking novel, *Annals of an Eventful Life* (1870); and the 10th-century Norse tale, *Vikings of the Baltic* (1875). In 1874 he assisted Vigfusson to complete Cleasby's *Icelandic-English Dictionary.*

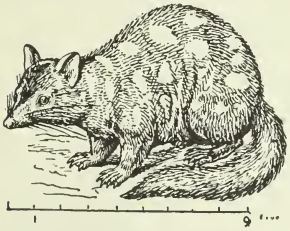
Dash, Comtesse de, pen name of Gabrielle Anne de Cisterne de Courtiras, Vicomtesse de Poilon de Saint-Mars (1804–72), French author of many novels dealing with the loves and intrigues of *le grand monde.* Under the stress of misfortune she sometimes produced five or six books in a year; they are readable, but none are of permanent value. Among them are *Le Jeu de la Reine* (1839); *La Pomme d'Eve* (1853); *Les Galanteries de la Cour de Louis XV.* (1861); *La Belle aux Yeux d'Or* (1860); *La Chambre Rouge* (1870).

Dashkoff, Ekaterina Romanovna, Princess (1743-1810), a Russian woman of learning. From jealousy of her sister, Peter III.'s mistress, she took an active part in the conspiracy that raised Catherine II. to the Russian throne; but later, having lost the favor of the empress, she travelled abroad, where she met Garrick, Robertson, Diderot, and Voltaire. On returning, she founded (1783) and became president of the Russian Academy, also director (1783-96) of the Russian Academy of Sciences, and superintended the production of a Russian dictionary. Paul I. banished her to her estates. She wrote plays; also her *Memoirs,* edited in English (1840).

Daskam, Josephine Dodge (Mrs. Selden Bacon) (1876), American author, was born at Stamford, Conn., and fitted there for Smith College, where she graduated in 1898. Her stories of life at Smith soon began to attract attention in the magazines, to which she also was a contributor of verse. In 1900 she was married to Selden Bacon, a lawyer of New York city. Her books include *Smith College Stories* (1900), *The Imp and the Angel* (1901), *Middle Aged Love Stories* (1903), *Memories of a Baby* (1904) and *Poems* (1903).

Dass, Petter (1647–1708), Norwegian author, son of a Scotsman (Dundas) who had emigrated to Bergen. He received (1689) the benefice of Alstadhaug in Nordland, where he remained until his death. His best-known work is a poetic description of the diocese of Tromsö, called *Nordlands Trompet,* begun in 1678, but not published till 1739. The fresh and humorous *Dale-Vise* (1696), descriptions in verse of the peasantry, is even better. See collected works, with biography by Erichsen (1874-7).

Dasyures are small polyprotodont marsupials with a gray or brown coat spotted with white, a long tail thickly clothed with hair, narrow and pointed ears, and the general aspect of a civet. Most of the species live on the Australian continent or in Tasmania, where they take the place of the small carnivores found in other parts of the world. Common Australian forms are the 'native cat' (*Dasyurus maculatus*), and *D. viverrinus; D. albopunctatus* is found in New Guinea. The diet consists of small birds and mammals, and the habit is nocturnal.

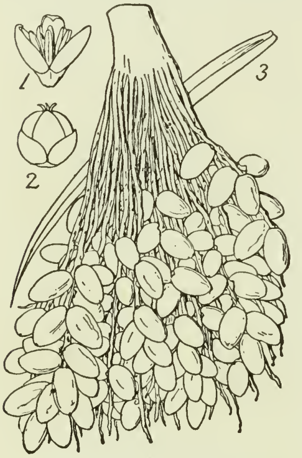


Dasyurus viverrinus.

Date and **Date-Palm.** Dates are the fruit of a diœcious palm (*Phœnix dactylifera*). De Candolle thinks that in times long before the earliest Egyptian dynasties the date-palm already existed wild, or was sown here and there by wandering tribes, in a narrow zone extending from the Euphrates to the Canaries, that its cultivation extended later, and that its area of distribution has remained very nearly the same for about five thousand years, though it is now grown also in China and in California. Dates are the staple food of the desert folk of Africa and Asia, either raw or dried, and are cooked in many ways. The Arabs dry dates in the sun and grind them to meal for future use. While somewhat soft they are pressed into goat skins, and sewed firmly, making the well-known 'date-cake.' Date syrup is obtained by pressing the fruits, especially the sweeter kinds; and a wine is obtained by decapitating the tree (the crown of which is eaten, and is the 'palm-cabbage') and making a hollow in the top of the trunk; or, at flowering time, the leaf-stalks are cut one by one, without destroying the whole crown, and the juice which flows from the wounds is collected. This 'palm milk' is almost nauseatingly sweet, but it soon turns to wine, and ultimately to vinegar.

Date-Palm.

The date-palm can be grown in sandy, arid, alkaline soils, so long as it can reach water with its roots, even if this water be alkaline. But, although the palm will often flourish under such conditions, the fruit will not ripen unless the summer season be rainless and, indeed, without moisture, and the temperature be at least 90° in the daytime. Artesian wells and irrigation often assist in the cultivation of the date, and in one Algerian oasis, where the water is so remote that the trees cannot reach it, pits are dug, in the bottom of which the trees are set out, and whence their roots may reach moisture; these pits are kept clear of sand with the greatest difficulty. Only the crown may be seen above the sand, but the fruits reach great perfection in their sheltered place. The date-palm lives to a great age, and attains a height of from ninety to a hundred feet. Under cultivation, it is necessary to ensure artificially the fertilization of the female flowers; this is done by growing one male tree to every thirty female trees, and cutting sprays of pollen-bearing flowers when the pollen is ripe and hanging them over the female flowers.



Fruit of the Date-Palm.
1, Male flower; 2, female; 3, pinnule of leaf.

The flowers are borne in white or yellow spikes, and calyx and corolla consist each of three parts. The leaves are pinnate and terminal and are often used in connection with Palm Sunday. The fruits are borne in clusters of about two hundred, weighing from twenty to thirty pounds each, and are more or less oblong, often translucent, and amber-colored, and contain a large proportion of sugar. The stone is cylindrical, with a groove on one side.

Date Plum is a name given to certain trees belonging to the genus Diospyros of the Ebenaceæ. *D. lotus*, also called the lotus, was introduced from the Mediterranean district in the 16th century, *D. kaki* from China in the 18th century. They bear yellow fruit, the pulp of which is edible and pleasant. For the allied American variety, the Virginian date plum, see PERSIMMON.

Datia, chief tn. of Datia state, Bundelkhand, Central India, 55 m. S.E. of Gwalior. The town, on a rocky hill, is walled. There are Jain temples in the neighborhood. Pop. (1901) 24,071.

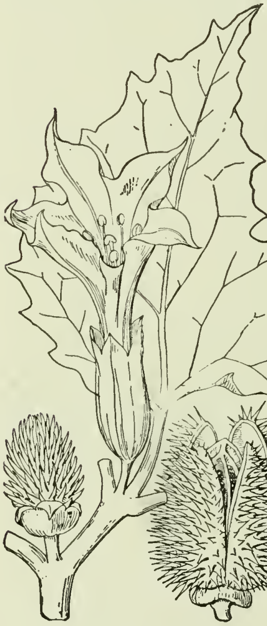
Datis, a Mede, who commanded the expedition sent by Darius against Athens in 490 B.C., which captured Eretria, but was defeated at Marathon by the Athenians under Miltiades.

Dative. See DECLENSION.

Datolite, a boro-silicate of lime, $CaB_2(SiO_4)_2$, which occurs in colorless or pale greenish or yellowish crystals (sp. gr. 2.95) of the monoclinic system, and is found principally in cavities and fissures in weathered igneous rocks, such as diabase and serpentine.

Datum Line, the base-line of a section, or profile of the ground, when drawn on paper. Horizontal distances are marked along this, and vertical heights plotted, normal to it, usually to a larger scale. The datum line represents a horizontal surface at some arbitrary height above a fixed 'datum' point—usually mean-tide level.

Datura is a genus of herbs, trees, and shrubs belonging to the Solanaceæ. Many of its species produce brilliantly-colored, trumpet-shaped flowers. *D. stramonium*, the thorn-apple, is cultivated in Europe for the sake of its seed and leaves. There are used in medicine two officinal preparations—an extract and a tincture. The active principle, daturin, greatly resembles atropine, and is mostly used for asthma and bronchitis, owing to its relaxing effect on the spasm of bronchial involuntary muscular fibres. The leaves are used in cigarettes for the same purpose. All the daturas are easy of culture, in a light, moderately rich soil. The shrubby species are best treated as greenhouse plants, but the annuals may be grown as half hardy. Among the shrubby species are *D. cornigera*, its flowers, which appear in summer, being white, pendulous, horned, and night-scented; *D. arborea*, the angel's trumpet, which reaches a height of six feet or more; *D. fastuosa*, the 'horn o' plenty,' with double or triple trumpets; and *D. sanguinea*, which bears orange-red flowers in summer. From this the ancient Peruvians used to prepare a narcotic intoxicant (*tonga*), which they swallowed before communicating the answers of a famous oracle at Sogamoso in Boyaca, Colombia. Similarly, *D. metel* produces a strong intoxicant, with which the Thugs of India used to stupefy and sometimes kill their victims. *D. meteloides*, of the Western states, was similarly used, it is said, by the Indians there. The most important annual species is *D. stramonium*, which produces in July white, long-tubed flowers, followed by the prickly fruit which gives the plant its popular name of 'thorn-apple'; *D. Tatula*, with purple stems and violet corollas, like the former, is a naturalized weed. Both are dangerous to children who eat the little black seeds, and they are known as 'jimson-weeds.'



Datura stramonium.
1, Ripe fruit.

Daub, KARL (1765–1836), German theologian, was born at Kassel, and was (1795) professor of theology at Heidelberg till his death. His very abrupt changes of view probably testify to the simplicity and sincerity of his nature. His chief works are *Judas Ischariot* (1816–18), an ingenious and profound discussion of the relations of good and evil, and *Die dogmatische Theologie jetziger Zeit* (1833). His posthumous works were published by Marheineke and Dittenberger (1838–44), in 7 vols. See *Memoir*, in German, by Rosenkranz (1837).

Daubenton, LOUIS JEAN MARIE (1716–99), French naturalist, was born in Montbard in Burgundy. In 1742 he was asked by Buffon to contribute to the famous *Histoire Naturelle*, and wrote the anatomical part of it. He was professor of mineralogy (1793) in the Jardin du Roi, and for a time also professor of natural history (1778) in the College of Medicine. He wrote much also for the first *Encyclopédie*, and published papers on acclimatization, the improvement of the breeds of horses and sheep, etc.

Daubeny, dōb'ni *or* dô'be-ni, Charles Giles Bridle (1795–1867), English scientific author, was born in Stratton, Gloucestershire. He became professor of chemistry (1822) and of botany (1834) at Oxford, and took part in the first meeting of the British Association (1831), of which he became president in 1856 at Cheltenham. He visited the United States in 1837, and wrote *Notes of a Tour in North America* (privately printed, 1838). Other works include: *Active and Extinct Volcanoes* (1826, enlarged, 1848), *Sketch of the Geology of North America,* and *Lectures on Agriculture* (1841), and *Miscellanies* (2 vols., 1867).

D'Aubignac, dō-bē-nyak', François Hédelin, Abbé (1604–67), French author, born in Paris, owes his reputation to his *Pratique du Théâtre* (1657; Eng. trans. 1685), a long exposition of the 'dramatic rules' of Aristotle. He illustrated his precepts in *Zénobie,* a dull prose tragedy, and anticipated Wolf in denying that the Homeric poems were the work of one author. Consult Arnaud's *Etude sur l'Abbé d'Aubignac.*

D'Aubigné, dō-bē-nyā', Jean Henri Merle (1794–1872), French theologian and ecclesiastical historian, was born in Eaux Vives, near Geneva. He was appointed pastor of the French Protestant church at Hamburg (1818), was court preacher at Brussels (1823), and after the revolution of 1830 returned to Geneva, where he served as professor of church history until his death. His greatest work, which in its day was very popular in Great Britain and the United States, is the *History of the Reformation in the 16th Century* (5 vols., 1835–53; Eng. trans. 1846–53). He also wrote the following works, all of which have been translated into English, most of them by the author: *The Protector: a Vindication* (1847); *Germany, England, and Scotland* (1848); *Three Centuries of Struggle in Scotland* (1849); *History of the Reformation in Europe in the Time of Calvin.* Consult *Life* by Bonnet.

D'Aubigné, Théodore Agrippa (1550–1630), French scholar and historian, was born in Saintonge. In the civil war he fought on the Huguenot side, and by Henry IV, was appointed vice-admiral of Guienne and Brittany. After the assassination of Henry, in 1610, D'Aubigné went to Geneva, and devoted himself to literature. He was possessed of a spirit of biting satire, and his writings are frankly critical of the times. His principal work *L'Histoire Universelle, 1550–1601,* produced between 1616 and 1620, was condemned to be burned by the hangman. His other books include a brilliant satire, the *Confession Catholique du Sieur de Sancy* (1660), and the *Histoire Secrète* of himself. His *Life* appeared in 1772, and his *Mémoires* were published by Lalanne in 1854. An edition of his *Oeuvres Complètes* appeared in Paris in 1873–92, in 6 vols.

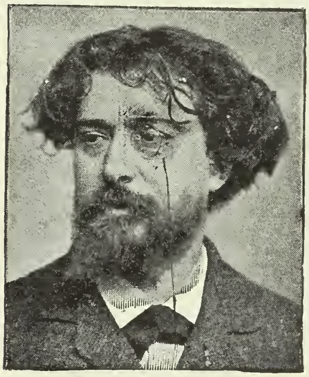
Daubigny, dō-bē-nyē', Charles François (1817–78), French landscape painter and etcher, closely allied with the Barbizon group, was born in Paris, a son of the painter Edward Daubigny. He studied with his father, and later under Delaroche, and exhibited continuously from 1838. In 1848 he built his famous houseboat, the *Botin,* on which he lived season after season, painting nature under all conditions. He visited England during the Franco-Prussian war, and made many sketches of the Thames. Daubigny is pre-eminently the painter of the river. He had a marvelous gift for composition and his intense love of nature and sympathy with its many phases are strikingly evident in his canvases. Among his most famous paintings are *Pond at Gylien; Lock in the Valley of Optevoz,* and *Vintage,* in the Luxembourg; *Springtime,* generally considered his masterpiece; *Moonlight; The Sea; The Banks of the Oise; Windmills of Dordrecht.* Many of his works are to be seen in American galleries. He is also known as an etcher and book illustrator. Consult Tryon's *Daubigny* in Van Dyke's *Modern French Masters;* Hoeber's *The Barbizon Painters.*

Daubigny, Karl Pierre (1846–86), French painter, son of Charles François Daubigny (q. v.), was born in Paris. He studied and worked under his father and at first imitated him but later developed a style of his own. Among his works are *Return of the Fishing Fleet to Tourville; View in Picardy; Seine-Net Fishing; Sunrise in Normandy; Road from Paris to Fontainebleau.*

D'Aubusson. See Aubusson, Pierre d'.

Daucus. See Carrot.

Daudet, dō-dā', Alphonse (1840–97), French novelist and satirist, was born in Nîmes. After living for a time in Lyons, he went to Paris, where he was for several years private secretary to the Duc de Morny, during which time he was also engaged in his own literary work. His first work, a volume of poems, *Les Amoreuses,* was published in 1858; this was followed in 1863 by *Le Roman du Chaperon Rouge,* and in 1868 he produced *Le Petit Chose,* a work based on the trials of his early years. His other works include *Lettres de mon Moulin* (1866); *Robert Helmont* (1871); *Tartarin de Tarascon* (1872), a trenchant satire on the foibles of the inhabitants of southern France, followed many years later by a second part, *Tartarin sur les Alpes; Contes du Lundi, Lettres à un Absent, Les Femmes d'Artistes* (all produced in 1873); *Jack,* a touching story of labor and Bohemia (1876); *Fromont Jeune et Risler Aîné* (1874), probably his best work, and one to which the French Academy awarded the Jouy prize; *Le Nabab* (1877), a study of Parisian manners, in which the private life of the Duc de Morny was minutely described: *Les Rois en Exile,* in which living persons were again requisitioned; *Numa Roumestan* (1881), in the characterization of which Gambetta is said to be delineated; *L'Evangéliste* (1883), based on the Salvation Army movement; and *Sapho* (1884), recording the infatuation of a youth for an artist's model. In 1888 Daudet wrote *L'Immortel,* a severe satire on the French Academy, followed by *Trente Ans de Paris,* an autobiographical work; *Souvenirs d'un Homme de Lettres* (1888), also of a personal character; *Port Tarascon* (1890); *Rose et Ninette* (1892); *Le Petite Paroisse, Moeurs Conjugales* (1895); *Soutien de Famile* (1898); *Entre les Frises et la Rampe* (1894); *Notes sur la Vie* (1899); *La Belle Nivernaise* and *Le Trésor d'Arlatan* (1897). Daudet takes rank as one of the ablest French novelists of the last quarter of the 19th century. He drew the life of his period with somewhat of the fidelity though not with the intensity of



Alphonse Daudet.

Balzac. His *Oeuvres Complètes* began to appear in 1899 and are to be had in English translation. Consult Jules Claretie, *Alphonse Daudet;* A. Gerstmann, *Leben von Alphonse Daudet;* R. H. Sherard, *A. Daudet;* L. M. Daudet, *Alphonse Daudet.*

Daudet, Ernest (1837–1921), an elder brother of Alphonse Daudet, acquired distinction both as a man of letters and as a prominent political writer associated with the republican party. His chief political works are *La Terreur Blanche* (1878), and *Souvenirs de la Présidence du Maréchal Macmahon* (1880). His novels include *Therèse* (1859), *Le Prince Pogoutzine, Jean le Gueux, Fils d'Emigré* (1890), *Don Rafaël* (1895), *Henriette* (1897), *Poussière du Passé* (1897), *Les Deux Evêques* (1898), *Coeur Blessé* (1900), *Poste Restante* (1902), and a biography, *Vie d'une Ambassandrice* (1903)—*i.e.,* the Princess Lieven, the 'Princesse de Cadignan' of Balzac.

Daudet, León (1867–1942), French novelist, son of Alphonse Daudet (q. v.), was born in Paris, studied medicine, but devoted himself chiefly to literature. Among his works are *L'Astre noir; Les morticoles,* a satire upon doctors; *Le voyage de Shakespeare; Suzanne; La flamme et l'ombre; Alphonse Daudet; La romance du temps présent; Le pays des parlimenteurs; La France en alarmes; Le partage de l'enfant; La lutte; Le bonheur d'être riche; La fausse étoile; L'Avant guerre; Le vermine du monde; Hors du jour Allemand; Le coeur et l'absence; Souvenirs* (4 vols.).

Daugherty, Harry M. (1860–1941), American lawyer and cabinet official, was born in Washington Courthouse, Ohio. He was educated in the University of Michigan, was graduated from the law department (1881), and practiced law in his native town until 1893, when he removed to Columbus. There he organized the law firm of Daugherty, Todd, and Rarey, of which he was senior member until his appointment, in 1921, as Attorney General in President Harding's cabinet. He served in the Ohio state legislature from 1890 to 1894.

Daughters of the American Revolution. See Revolution, Daughters of the American.

Daughters of the Confederacy. See Confederacy, United Daughters of the.

Daughters of the King. See King, Daughters of the.

Daughters of the Revolution. See Revolution, Daughters of the.

Dauin, dou-ēn', pueblo, Philippines, province of Negros Oriental, on the southeast coast of the island of Negros; 9 miles south of Dumaguete. In the neighborhood are hot and sulphur springs remarkable for therapeutic qualities. Pop. 10,000.

D'Aulnoy, dō-nwä', or D'Aunoy, Marie Catherine Jumelle de Berneville, Comtesse (1650–1705), French author remembered for her successful fairy stories (*Contes des Fées,* 1698) in the manner of Perrault, which have been translated and adapted for pantomimes (*White Cat, Yellow Dwarf, Cinderella,* etc.). She wrote also romances (*Hippolyte; Le Comte de Douglas,* etc.), now long forgotten, and historical memoirs of little value.

D'Aumale. See Aumale.

Daumier, dō-myā', Honoré (1808–79), French caricaturist, was born in Marseilles, and as a young lad was placed with an usher of the law courts, where he acquired his knowledge of the men of the law whom he later caricatured so successfully. He joined the staff of *La Caricature,* and in 1832 was imprisoned in Ste. Pelagie for six months for his *Gargantua,* a caricature of Louis Philippe. When *La Caricature* was suppressed in 1835, Daumier devoted himself almost exclusively to *Le Charivari,* a new satiric paper, to which he contributed sketches of high and low society. During his later years he was afflicted with failing eyesight, but was made comfortable by the generosity of his friends, especially Corot, who gave him a cottage in the village of Valmondois. His paintings, which during his life attracted little attention, have, since exhibitions in 1900 and 1901, received much commendation. Among his most famous series of caricatures are *Les représentants représentés; Robert Macaire; Les Bohémiens de Paris; Les Actualitiés; Masques de 1831; Les Bas Bleus: Idylles parliamentaires.* Consult Alexandre's *Life;* Frantz and Uzanne, *Daumier and Gavarni.*

Daun, doun, Leopold Joseph Maria, Count (1705–66), Austrian field-marshal, was born in Vienna. He served (1728) in Sicily, and took part in the campaigns against the Turks (1737–9), in the war of the Polish succession, and in the war of the Austrian succession. But he won his chief fame during the Seven Years' War, where he was opposed to Frederick the Great. In 1757 he gained a great victory at Kolin, in 1758 at Hochkirch, and in 1759 at Maxen, where he captured Finck's army. These victories were discounted by the successes of Frederick at Liegnitz and Torgau in 1760. Daun had many of the qualities of a great general, being wary and prudent—sometimes too much so, for which he was styled the Austrian Fabius Cunctator. He was (1751) founder and director of the Military Academy at Wiener-Neustadt. He was made field-marshal in 1754.

Dauphin, dô'fin, the title granted to the eldest son of the king of France, was originally that of the lords of Dauphiné, whose crest was a *dolphin;* it was abolished after the revolution of 1830.

Dauphiné, dō-fē-nā', former province of France, between the Alps on the east, the Rhone on the north and west, and Provence on the south. It corresponds to the modern departments of Isère, Drôme, and Hautes-Alpes.

Dauphiné Alps, western portion of the Cottian Alps. The main mass is connected by the isthmus of the Col du Lautaret (6,808 ft.) with the Col du Galibier, and is a vast snow-clad region, forming a horse-shoe round the Vénéon valley. The most frequented climbing centers are La Bérarde (5,702 ft.), at the head of the Vénéon valley, and La Grave (5,007 ft.), in the Romanche valley. Around this central mass cluster several minor groups including the Grande Chartreuse (Grand Som, 6,670 feet).

Daurat, dō-rȧ', or Dorat, Jean (1507–88), called in Latin Auratus, one of the seven poets who formed the Pléiade, a group including also Ronsard, Du Bellay, Baïf, Jodelle, Pontus de Thyard and Belleau. Daurat, who was successively director of the Collège de Coqueret and the Collège Royal (1560) at Paris, himself wrote a good deal of Greek and Latin verse (*Poëmata,* 1586).

Davao, dä'vou, district, Philippines, Mindanao, occupying the south-eastern part of the island, bordering on the Pacific Ocean and the Celebes Sea, and contiguous to the provinces of Surigao, Misamis and Cottabato. It has an area of 8,976 square miles; 25 islands with 195 square miles. The central mountain range of the island, running north and south, forms the western boundary of the district, and a long, narrow bay running north 70 miles into the interior cuts off the great peninsula of Davao on the east. The forest growths are of great value; there are indications of rich mineral deposits, and cinnamon, cloves, nutmegs and betel nuts grow spontaneously. Hemp-raising has been undertaken with success. Pop. (1941) 103,000.

Davenant, dav'*e*n-*a*nt, Sir William (1606–76), English poet and dramatist, was, according to scandal, a natural son of 'Shakespeare.' He became a 'hanger on' about the court, and succeeded (after an interregnum) Ben Jonson as poet laureate in 1638, and was appointed governor of the king's and queen's players at the Cockpit in London in 1639. In the civil war he took arms on the royalist side, but eventually sought refuge in France. Attempting a royalist mission to Virginia, he was captured, and was imprisoned in Cowes Castle and in the Tower (1650–2), and is said to have owed his life to the good offices of Milton. In prison he wrote his rather heavy epic of *Gondibert* (1651), upon which his reputation as a poet chiefly rests. In 1658 he reopened the Cockpit, but in the following year was again in prison, this time for sedition. At the restoration he was licensed to manage a theatrical company known as 'the Duke's,' which included Betterton. Davenant produced several adaptations of Shakespeare's plays, in particular of *The Tempest* (in conjunction with Dryden). Consult his *Collected Works* edited, with a memoir, by Laing and Maidment (5 vols.).

Davenport, dav'*e*n-pōrt, city, Iowa, county seat of Scott county, is situated on the west bank of the Mississippi River opposite Rock Island, Ill., and on the Chicago, Rock Island and Pacific, the Chicago, Burlington, and Quincy, the Chicago, Milwaukee, and St. Paul railroads; 182 miles by rail southwest of Chicago. It is the largest of the tri-city group of Davenport, Rock Island (Ill.), and Moline (Ill.). Notable buildings and institutions are the Academy of Science, Masonic Temple, St. Luke's and Mercy Hospitals, St. Katherine's School for Girls, the Academy of the Immaculate Conception, Marycress College, the Palmer School of Chiropractic, and the State Orphanage. The Rock Island Arsenal, the government's largest manufacturing plant, is located on an island one thousand acres in extent, between Davenport and Rock Island. A magnificent government-owned bridge crosses the Mississippi here.

Davenport is located in a region rich in coal and agricultural products, which constitute the chief articles of commerce. Manufactured products include railroad cars and locomotives, flour and cereals, washing machines, foundry products, typesetting machines, and agricultural implements.

Davenport was founded in 1836 by Antoine LeClaire and named for Colonel George Davenport, first white settler in the locality. It is sometimes known as 'The Gateway to the West,' by reason of the fact that the first bridge across the Mississippi was built here (1853) and the first railroad west of the Mississippi started from this point. The locality is rich in history connected with the conflicts with the Indians. Pop. (1930) 60,751; (1940) 66,039.

Davenport, Charles Benedict (1866–1944), American zoologist, was born in Stamford, Conn. He was graduated from Harvard in 1889 (ph.d., 1892), served there as instructor in zoology until 1899, and was then associated with the University of Chicago, holding the position of associate professor of zoölogy and assistant curator until 1904. In 1898 he became director of the Cold Spring Harbor biological laboratory, and in 1904 director of the Station for experimental Evolution of the Carnegie Institution at Cold Spring Harbor. Among his works are *Experimental Morphology* (1897–9); *Statistical Methods in Biological Variation* (1899); *Introduction to Zoölogy* (1900); *Inheritance in Poultry* (1906); *Inheritance of Characteristics of Fowl* (1909); *Eugenics* (1910); *Heredity in Relation to Eugenics* (1911); *Elements of Zoology* (1911); *Heredity of Skin Color in Negro-White Crosses* (1913); *The Feebly-inhibited—Monadism and Temperament* (1915); *Naval Officers—Their Development and Heredity* (1917). He was co-editor of the *Journal of Experimental Zoölogy of Genetics,* and other publications.

Davenport, Edward Loomis (1816–77), American actor, was born in Boston, Mass., and made his first appearance in Providence, R. I., in 1836. He acted in New York, Philadelphia, and Boston until 1847, when he visited England and remained there until 1854, playing with Anna Cora Mowatt, Macready, and others, and achieving special success as William in *Black-Eyed Susan.* Returning to the United States he managed the Howard Athenaeum at Boston from 1859 to 1869, and was for some time manager of the Chestnut Street Theatre at Philadelphia. His most noted impersonation was that of Brutus in *Julius Caesar.*

Davenport, Fanny Lily Gipsy (1850–98), American actress, daughter of Edward L. Davenport and Fanny Vining (Davenport), an English actress, was born in London, England. She appeared on the stage as a child at the Chambers Street Theatre, New York, in 1857, but her first speaking part was as King of Spain in *Faint Heart ne'er Won Fair Lady* at Niblo's Garden in 1862. While playing in Mrs. John Drew's company at the Arch Street Theatre, Philadelphia, she was engaged by Augustin Daly for his Fifth Avenue Theatre in New York, and was highly successful in a long list of leading parts from 1869 to 1873, beginning with Lady Gay Spanker in *London Assurance,* and especially as Mabel Renfrew in *Pique,* which ran for 250 nights. She subsequently toured the country as a star, visited England and France, and in 1882 began the production of a series of French plays in the United States, including *Fédora, La Tosca, Gismonda,* and Sardou's *Cleopatra.* She was twice married—in 1879 to Edwin F. Price; in 1889 to W. M. MacDowell; both of whom were actors.

Davenport, Homer Calvin (1867–1912), American cartoonist, was born in Silverton, Ore., and was brought up on a farm. He passed a miscellaneous existence as railroad fireman, jockey, circus clown, and in other capacities until 1892, when he became connected with the San Francisco *Examiner,* and developed on that paper his skill in choosing salient characteristics of public men for exaggeration in his cartoons. He came to New York in 1895, on the purchase of the *Journal* (now *New York Journal-American*) by William Randolph Hearst, was afterward associated with that paper and still later with the *Mail.* He published *Davenport's Cartoons* (1898); *The Bell of Silverton,* fiction (1899); *The Dollar or the Man* (1900); *The Diary of a Country Boy* (1910).

Davenport, John (1597–1670), American colonial divine, was born in Coventry, England, son of the mayor of that town. He received his education at Merton and Magdalen Colleges, Oxford, and took his degree in divinity at Oxford in 1625. He was for a time vicar of St. Stephen's church in Coleman street, London, but coming under the notice of Laud on account of his non-conformist tendencies, he resigned his living and in 1633 withdrew from the Church of England and retired to Holland, where he became co-pastor of the English church at Amsterdam. There he became involved in controversies as to the baptism of infants, and returned to England in 1636. He had previously busied himself with the attempt to secure a charter for the Massachusetts Bay Company, and, having received through John Cotton a favorable impression of the new colony, he, with other refugees, sailed to Boston in 1637. He attended the synod of Cambridge in August, and in March of 1638 proceeded by boat with his company to Quinnipiac and there founded the colony of New Haven on April 14. The constitution of the new colony was definitely settled the following year, with seven 'pillars of state' as the governing body of whom Davenport was one. While at New Haven he concealed the regicides Whalley and Goffe in his own house for more than a month and preached sermons in their behalf. He was called to Boston as pastor of the First Church in 1668, and was installed in the following year. His objection to the 'half way covenant' (q. v.), recognizing infant baptism under certain contingencies, led to a split in the congregation, part of whom withdrew and organized the 'Old South Church.' Davenport died during the contest. His works include *Allegations of Scripture against the Baptising of some Kinds of Infants* (1634); *The Saints' Anchorhold in all Storms and Tempests* (1661); and *A Discourse about Civil Government in a New Plantation* (1663).

Davey, RICHARD PATRICK BOYLE (1848–1911), English journalist, novelist, and playwright. His play *Inheritance* had a successful run in New York. He wrote *A Royal Amour* (1882); *Weatherleigh* (1894); *Victoria, Queen and Empress* (1897); *Mary Tudor* (1897); *Cuba, Past and Present* (1898); *Historical London* (1902); *Lucrezia Borgia* (1903); and *The Pageant of London* (1905).

Da'vid, the second, and by far the greatest, king of Israel, was born at Bethlehem in Judah, the youngest son of Jesse. By his subjugation of the Philistines and other hostile tribes, he raised Israel to the position of dominant power in Canaan. His reign began toward the close of the eleventh century B.C., and lasted for forty years. In early life David was a shepherd, and more than once displayed remarkable prowess against wild beasts (1 Sam. xvii, 34 *f.*); while the fact that the prophet Samuel anointed him, while yet an obscure youth, to be the future king of Israel, indicates his possession of still higher qualities. Two accounts are given of his introduction to Saul, his predecessor. In 1 Sam. xvi, 14–23, David is summoned to the court as a man of valor and a skilled musician and becomes the king's armor-bearer; but in the other account (1 Sam. xvii), he is brought to Saul as a stripling, who volunteers to do battle against Goliath, the Philistine champion, gaining the royal favor by his success. He married Michal, Saul's daughter, and became the sworn friend of Jonathan, his son. With David's increasing popularity, Saul growing jealous of him, took steps to procure his death; and David, seeking refuge in flight, was an exile and an outlaw during Saul's later years (1 Sam. xxi–xxxi).

On the death of Saul the tribe of Judah invited David to become their king. Proceeding at once to Hebron, in the middle of the Judahite territory, which he made his capital, he found his sovereignty disputed by Ishbosheth, the son of Saul, whom Abner set up in Mahanaim as successor to his father. After about seven years both Abner and Ishbosheth were assassinated, though not at David's instigation, and David became the uncontested sovereign of all Israel. This was the signal for an invasion of the country by the Philistines but the incursion was checked by decisive engagements at Baalperazim and Rephaim, The establishment of a new capital, Jerusalem, on Mt. Zion, a Jebusite fortress, was an all-important step in the amalgamation of the people. David made the city the religious center of the nation by bringing the ark thither. Joab, David's nephew, was made commander in chief of the army; Zadok joined Abiathar in the high-priestly office; and a complex scheme of civil, military, and religious administration was carried into operation. Then came David's wars of conquest against Ammon, Moab, Syria, and Edom, in all of which he was successful, thereby securing the kingdom against external foes. His later years were clouded by some sinister incidents: his sin with Bathsheba, and the murder of Uriah (1 Sam. xi); Absalom's assassination of his half-brother Ammon, and his rebellion (in which David's crown and life were endangered), and death by the hand of Joab (2 Sam. xiii–xviii); and a further revolt under Sheba (2 Sam. xx).

In estimating the character of David, it must be borne in mind that recent literary criticism of the Bible, even of a very conservative type, is disposed to question his authorship of nearly all the psalms immemorially associated with his name. That he was 'the man after God's own heart' (1 Sam. xiii, 14) probably implies no more than that he was naturally fitted to be an able ruler. His sins were many, and sometimes of the blackest—witness the cruelty shown in his wars, his deceit at Ziklag, his craft in dealing with Hushai, and the foul matter of the murder of Uriah. He seems to have but too easily fallen into underhand dealings. Yet, he stands out as a truly heroic figure with many noble qualities; only an essentially lovable personality could have so won the hearts of Jonathan and of the people as a whole, while his generosity appears in his twice sparing Saul's life, his kindness to Mephibosheth, his sorrow over the fall of his enemies, and the beautiful incident of the water from the well of Bethlehem. Consult Ewald, *History of Israel;* Kittel, *History of the Hebrews;* W. J. Deane, *David* (Men of the Bible Series).

David, or DEWI (d. 601?), the patron saint of Wales, said to have been born of royal parentage at Menevia (St. David's) and educated under Paulinus at York. He is credited with the foundation of monasteries at Glastonbury, Leominster, Bath, Repton, Raglan, and Crowland; and was consecrated to the archbishopric of Caerleon, which carried with it the primacy of Wales. He silenced the Pelagians at the synods of Brefi and Lucus Victoriae; the latter meeting being long characterized as the 'Synod of Victory.' He transferred his see from Caerleon to Menevia—thereafter styled St. David's. He was canonized by Pope Calixtus II in 1121, his day being March 1.

David I (1084–1153), king of Scotland, was the youngest son of Malcolm Canmore and Margaret (see MARGARET, SAINT), sister of Edgar the Atheling. He was early sent to England with his sister Matilda, who married Henry I of England in 1100; and this visit had much influence in determining his subsequent policy as king. He became prince of Cumbria in 1107, and further increased his power by his marriage with Matilda, Countess of Northampton (1110), becoming thereby an English baron. Having succeeded to the Scottish throne in 1124, he consolidated his realm, and, by the help of Norman knights, created the feudal kingdom of Scotland. He completed the triumph of the Catholic Church over the Culdees, and endowed out of the crown lands many abbeys, of which Kelso, Melrose, Jedburgh, Newbattle, and Holyrood were the most important. He also encouraged the growth of the towns, promulgating on their behalf a code of laws and establishing a court of the four burghs, which eventually developed into the Convention of Royal Burghs. The general aim of his domestic policy was to strengthen the Saxon and Norman elements, on whose support he relied. This policy was naturally resisted by the Celtic chiefs, and David had to face a dangerous revolt in the province of Moray, which he suppressed by calling in the assistance of Norman knights from England.

Having sworn, along with the other great barons of England, to maintain the right of his niece, Matilda, to the English crown, David took up arms on her behalf in 1135, when Stephen mounted the English throne, and penetrated into England as far as Durham, where peace was made. He undertook a second invasion in 1138 and met with a disastrous defeat at Northallerton, in the Battle of the Standard, and again unsuccessfully invaded England in 1140. Consult Skene's *Celtic Scotland* and P. HumeBrown's *History of Scotland.*

David II. (1324–71), king of Scotland, succeeded his father, Robert Bruce, in 1329. During his long minority Scotland suffered from the pretensions of Edward Baliol, and after the English victory at Halidon Hill in 1333 he was sent to France (1334), where he remained till 1341. In 1346, in accordance with the terms of his alliance with France, he invaded England, but was disastrously defeated at Neville's Cross and taken prisoner. He remained a prisoner until 1357, being released on promise to pay a heavy ransom (100,000 merks). As Scotland was unable to pay such a sum, David became practically a dependent of England.

David, Félicien César (1810–76), French musical composer, was born in Cadenet in Vaucluse. He studied music in the Paris Conservatory, joined the Saint-Simonists, and followed the leaders of that socialistic-mystical party to Constantinople and Egypt after the dissolution of the brotherhood in 1832. Returning to Paris in 1835, he published his *Mélodies Orientales.* This received little notice, but his next work, the 'symphonic ode' *Le Désert* (1844) achieved an instantaneous success. Other works followed, including an oratorio, *Moise au Sinai* (1846); a symphony, *Christophe Colomb* (1847); a serious opera, *Herculaneum;* three comic operas, *La Perle du Bresil* (1851), *Lalla Roukh* (1862), and *Le Saphir* (1865). David succeeded Berlioz as librarian of the conservatoire.

David, Ferdinand (1810–73), German violinist and musical composer, was born in Hamburg, and educated under Spohr. In 1836 he became a musical director at the Leipzig Gewandhaus under Mendelssohn, and violin instructor in the conservatorium at Leipzig. He wrote many concertos and arrangements for the violin, and a valuable instruction book for the same instrument. Consult *Life,* in German, by Eckhardt.

David, Gerhard (*c.* 1450–1523), early Flemish painter, was born in Oudewater, entered the Painters' Guild in Bruges, and in 1501 became its dean. David was one of the foremost painters of the Early Netherlands School and is well represented in American and European collections. His *Rest on the Flight to Egypt* (in the Morgan collection) and a *Crucifixion* may be seen in the Metropolitan Museum, N.Y., and his *Marriage of St. Catherine* in the New York Historical Society.

David, Jacques Louis (1748-1825), the painter of the French Revolution, was born in Paris. He studied with his uncle, Boucher, and with Vien, and in 1774 won the 'Prix de Rome.' He acquired a reputation with his *Belisarius* (1781) and *Andromache Bewailing the Corpse of Hector,* and followed these with *Vow of the Horatii* (Louvre) in 1784, and *Brutus* (Louvre) in 1789, both of which were the embodiment of the democratic ideals of the age. During the Revolution, constituting himself dictator in French painting, sculpture, and decoration, he extinguished the frivolous and licentious art of the successors to Watteau. His most realistic paintings, the dead *Marat* and *Lepelletier,* and the portrait of *Barrère,* belong to this period, in which he also executed a remarkable sketch-portrait of Napoleon. His portraits of the Emperor, the Pope, Cardinal Caprara, and Murat express the prevailing worship of brute strength, but his portraits of women, notably the famous one of Mme. Récamier (Louvre), show spiritual qualities. As court painter under Napoleon David painted his famous *Coronation* and *Distribution of the Eagles.* Banished at the Restoration to Brussels, he painted *The Three Fates* (1810), the greatest example of his vivid naturalism and artistic deftness. Apart from his portraits, his work, after *The Death of Socrates* (1787), became increasingly hard, though archæologically correct. The *Oath in the Tennis Court* (Versailles) and *Rape of the Sabines* (Louvre) are typical of this barren classicism. Consult *Le Peintre Louis David—Souvenirs et Documents Inédits,* by J. L. Jules David, and Stranahan's *History of French Painting.*

David, Laurent Olivier (1840–), Canadian writer and public official, was born in Sault-au-Récollet, Quebec, was educated in the College of St. Thérèse, and was called to the bar in 1864. He was one of the founders and chief editor (1870–84) of *L'Opinion Publique* and one of the founders of *Le Bien Public* (1874), and of *La Tribune* (1880). He exercised a notable influence among the French Canadian element and attended the French Canadian National Convention at Nashua, N. H., as a delegate in 1888. In 1886 he entered the Quebec legislature as a Liberal and in 1903 he was appointed to the Senate. He became city clerk of Montreal in 1892. His published works, which are notable for their beauty of style, include *Biographies et portraits* (1876); *Les patriotes de 1837–38* (1884); *Mes contemporains* (1894); *Les deux Papineau* (1896); *Le clerge canadien: sa mission et son œuvre* (1896); *L'Union des deux Canada* 1841–1867 (1898); *Le drapeau de Carillon* (1901); *Laurier et son temps* (1905); *Biographies et souvenirs* (1910); *Histoire du Canada depuis la Confédération; Gerbes Canadiennes* (1921).

David, Pierre Jean (1788–1856), called David of Angers, from his birthplace, French sculptor, was a pupil of Roland and of the painter David. Having won the *prix de Rome* in 1811, he went to Italy, where he studied the work of Canova and Thorwaldsen. He also visited London and later Germany, and there he met the Prussian sculptor Rauch, the subject of one of his many remarkable busts. David's first great success was a monument to the Grande Condé now in the Court of Honor at Versailles. His most celebrated works are the front of the Paris Panthéon, the tomb of General Gobert, the medallion portrait of Bonaparte, and the *Philopœmen* (Louvre), a nude study of unusual vigor. He also executed busts of Lafayette and Washington, and a statue of Jefferson. Consult H. Jouin's *David d'Angers.*

David, Touissant Bernard (1755–1839), French archæologist, was born at Aix in Provence. In 1800 he won the first prize of the Institute for an essay on *The Causes of the Perfection of Sculpture in Antiquity.* He wrote many works on art and archæology, and contributed to *L'Histoire Littéraire de France.*

David City, city, Nebraska, county seat of Butler county, on the Union Pacific, the Burlington and Missouri River, and the Chicago and Northwestern Railroads; 90 miles west of Omaha. The city is located in an agricultural region, cattle, hogs, and sheep are raised in the vicinity, and bricks are manufactured. Pop. (1910) 2,177; (1920) 2,216.

Davids, THOMAS WILLIAM RHYS (1843–), English Orientalist, was born in Colchester. He was educated at Breslau, and in 1866 entered the Ceylon civil service. From 1882 to 1912 he was professor of Pali and Buddhist literature in University College, London, from 1887 to 1904 secretary and librarian of the Royal Asiatic Society, and from 1904 to 1915 professor of comparative religion at Manchester. He is the author of *Ancient Coins and Measures of Ceylon* (1877); *Buddhism* (1878; 23d ed., 1914); *Buddhist Birth Stories* (1880), *Buddhist Suttas* (1881); *Translation of the Vinaya Texts* (with H. Oldenberg, 1881–5); *Buddhism, Its History and Literature* (1896, composed from American lectures); *Sacred Books of the Buddhists* (1899); *Buddhist India* (1902); *Early Buddhism* (1908). He contributed articles on Sanskrit and Pali to *Nelson's Loose-Leaf Encyclopædia.*

Died Dec. 27, 1922

Da'vidson, ANDREW BRUCE (1831–1902), Scottish Semitic scholar, was born in Kirkhill in Aberdeenshire. He was appointed professor of Semitic languages and literature at the New College, Edinburgh, in 1863, and was a member of the Old Testament Revision Committee (1870). His chief published works are *Outlines of Hebrew Accentuation* (1861); *Commentary on Job* (unfinished, 1862); *Introductory Hebrew Grammar* (1874; 9th ed. 1888); primers on *Job, Ezekiel, Hebrews* (1877), and the volume *Isaiah* in the Temple Bible (1902); two volumes of sermons, *The Called of God* (1903) and *Waiting upon God* (1904), the former with a short biography by Mr. Taylor Innes. His *Biblical and Literary Essays* were issued in 1902 by Professor Paterson.

Davidson, GEORGE (1825–1911), American astronomer, was born in Nottingham, England, and in 1832 went with his family to Philadelphia. He was engaged on the U. S. Coast Survey (1845–95), on field duty from Maine to Texas, and on the Pacific coast. He became professor of geography in the University of California in 1895. He had charge of various astronomical expeditions, devised astronomical instruments, and wrote a number of books on California and Alaska.

Davidson, JAMES WOOD (1829–1905), American author, was born in Newberry district, S. C. He was graduated (1852) from South Carolina College, was professor of Greek at Mount Zion Collegiate Institute, S. C. (1854–9), served in Lee's army during the Civil War, and subsequently resided in Washington and New York until 1884, when he removed to Florida and engaged in fruit culture. He was at one time literary editor of the N. Y. *Evening Post,* and was American correspondent of the London *Standard* (1873–8). His books include *The Living Writers of the South* (1869); *A School History of South Carolina* (1869); *The Poetry of the Future* (1888).

Davidson, JOHN (1857–1909), Scotch poet and playwright, was born in Renfrewshire, and in 1890 settled in London. His first published works were dramas —*Bruce* (1886), *Smith: a Tragic Farce* (1888), *Scaramouch in Naxos* (1889). In 1890 he published a romance entitled *Perfervid,* followed by two volumes of poems—*In a Music Hall* (1891), and *Fleet Street Eclogues* (1893), a remarkable set of impressions of London life, a second series of which appeared in 1896. The chief of his subsequent works were *Ballads and Songs* (1894), *Baptist Lake* (1894), *New Ballads* (1896), *Godfrida* (a play, 1898), *Self's the Man* (a tragedy, 1901), *Testaments* (1901–2), *A Rosary* (1903), *The Testament of a Prime Minister,* and *Selected Poems* (1904). *The Man Forbid and Other Essays* was published posthumously (1910). His observation of life was keen and sincere, and is well interpreted by a style at once vigorous and direct in its appeal. Consult Archer's *Poets of the Younger Generation.*

Davidson, JOHN WYNN (1824–1881), American army officer, was born in Fairfax county, Va. He was graduated from West Point, and served in the Mexican War, in the defences of Washington in 1861 and 1862, and subsequently with the Army of the Potomac. In 1866 he was made lieutenant-colonel of the Tenth United States Cavalry and in 1879 colonel of the Second Cavalry.

Davidson, LUCRETIA MARIA (1808–25), American poet, was born in Plattsburg, N. Y., daughter of Dr. Oliver Davidson. She is said to have begun to compose verses in her fifth year, and pieces written from her tenth year onward are given in *Amir Khan and Other Poems* published, with an introduction by S. F. B. Morse, in 1829. Her sister, MARGARET MILLER DAVIDSON (1823–38), also began the writing of verse at an early age, and was the author of a drama, *The Tragedy of Aletheia,* written at the age of ten years. The poems of the two sisters were edited by Washington Irving (1850).

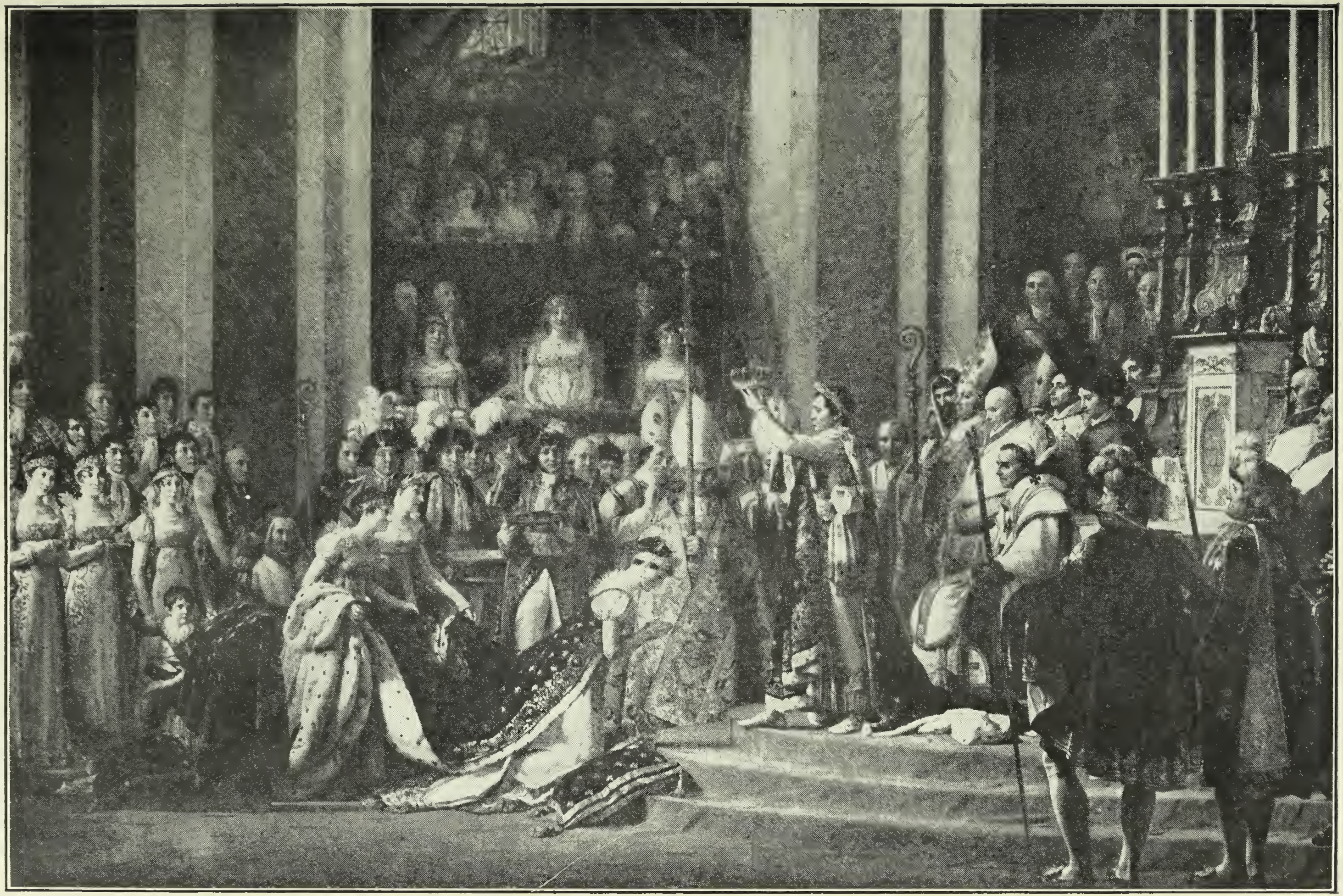
Davidson, SAMUEL (1806–99), Irish Biblical scholar, was born in Kellswater, near Ballymena. He was educated at Belfast, where he became (1835) professor of Biblical criticism in the Royal Academical Institution. Abandoning Presbyterianism for Congregationalism, he became (1842) professor of Biblical literature and Oriental languages at Lancashire Independent College, Manchester, but resigned in 1857. Besides valuable works on the text and interpretation of Scripture, he published *Introductions* to the Old and New Testament. He was a member of the Old Testament Revision Committee.

Davidson, THOMAS (1840–1900), Scottish-American philosopher, was born in Banffshire, Scotland. Graduating in 1860 from the University of Aberdeen, he went to America, laboring for nearly thirty years as a lecturer and teacher in St. Louis, New York, the Adirondacks, and Canada. He edited the *Western Educational Monthly* and wrote *Aristotle and Ancient Educational Ideals* (1892) and *Rousseau and Education according to Nature* (1898) in the 'Great Educators Series;' *Education of the Greek People* ('International Education Series,' 1895); *A History of Education* (1900).

Davidson College, a Presbyterian institution of learning founded in 1837 at Davidson, N. C. It is under the control of a board of fifty-two trustees elected by the presbyteries of North Carolina, Georgia and Florida, and the Alumni Association. The college has classical, scientific, and graduate courses, leading to degrees B.A., B.S., and M.A. For latest statistics, see table of American Colleges and Universities under COLLEGE.

Davies, dā'vēz, BEN (1858–), Welsh tenor singer, was born near Swansea and studied at the Royal Academy of Music in London. He appeared in English and Italian opera, but later devoted himself to concert and festival work. He visited the United States in 1893, 1894, and every year thereafter to 1905–06.

Davies, CHARLES (1798–1876), American mathematician, was born in Washington, Conn. He entered the United States Military Academy in 1814, was commissioned brevet second lieutenant of light artillery in 1815, and was transferred to the engineer corps in 1816. In the same year he was made instruc-



'THE CORONATION OF JOSEPHINE.' FAMOUS HISTORICAL PICTURE BY JACQUES LOUIS DAVID, THE PAINTER OF THE FRENCH REVOLUTION.

tor in the Military Academy, where he later became professor of mathematics (1823–36). He was professor of mathematics in Trinity College, Hartford, from 1837 to 1841, in the University of New York from 1848 to 1849, and in Columbia College from 1857 to 1865, when he retired from active work. He edited *Legendre's Geometry* and *Bourdon's Algebra,* and wrote several mathematical textbooks and a *Dictionary of Mathematics* (in conjunction with his son-in-law, William G. Peck).

Davies, Sir John (1569–1626), English poet and statesman, was born in Tisbury, Wiltshire. He was educated at Oxford, studied law and was called to the bar in 1595. He was appointed solicitor-general for Ireland by James i., in 1603, and became speaker of the Lower House in the Irish Parliament in 1613. Following his return to England (1619), he was nominated lord chief-justice (1626) but he died before assuming office. He was one of the founders of the Society of Antiquaries. His poetical works include *Orchestra, or a Poem of Dancing* (1596), *Nosce Teipsum* (1599), and *Hymns to Astræa,* a collection of clever acrostics (1599).

Davies, Sir Louis Henry (1845–1924), Canadian jurist, was born in Charlottetown, Prince Edward Island. He was graduated from Prince of Wales College in 1867, was solicitor general, Prince Edward Island, in 1869 and in 1871–2, and premier and attorney-general in 1876–9. In 1882 he was elected to the Dominion House of Commons, being returned continuously until his election as a judge of the Supreme Court of Canada in 1901. He was counsel for Great Britain in the International Fisheries Arbitration in 1877, a joint delegate with Sir Wilfrid Laurier to Washington in 1897, on the question of the Bering Sea seal fisheries, one of the joint High Commissioners on the part of Great Britain (1898) for the settlement of all differences with the United States in respect of Canada, and Minister of Marine and Fisheries for Canada from 1896 to 1901. He became Chief Justice of the Supreme Court of Canada in 1918, and Imperial Privy Councillor in 1919.

Davies, Samuel (1724–61), American clergyman, was born near Summit Ridge, Newcastle County, Del. He received his religious instruction at the seminary of the Rev. Samuel Blair of Fogg's Manor and was ordained as a Presbyterian missionary in 1747. He went to Virginia, then hostile to dissenters, entered into a controversy with Peyton Randolph, the King's Attorney, as to the extension of the English Act of Toleration to Virginia, and in 1753 visited England and obtained a favorable decision on this point, at the same time soliciting funds for the College of New Jersey (now Princeton), of which he was president from 1759 until his death.

Davila, dä-vē-lä, Enrico Caterino (1576–1631), Italian historian, was born near Padua. He was attached to the French court as page to Henry iii., entered the army (1594), and served with distinction at Honfleurs and Amiens. Returning to Italy in 1599, he joined the Venetian army and was entrusted with military and civil commissions in Candida, Friuli, and Dalmatia. In 1631 he was appointed governor of Crema, and on his arrival at St. Michel near Verona, was assassinated. His *Historia delle guerre civili di Francia* is notable for its concise style and general accuracy.

Davila, Pedrarias. See Pedrarias Davila.

Da Vinci. See Leonardo da Vinci.

Da'vis, town, West Virginia, in Tucker County, on the Black Water River and on the Western Maryland Railroad; 75 miles southwest of Cumberland, Maryland. It is situated in a lumbering region and produces lumber, boxes, leather, and coal. Pop. (1910) 2,615; (1920) 2,491.

Davis, Charles Harold (1856–1933), American painter, was born in Amesbury, Mass. He studied under Grundman in Boston, and with Boulanger and Lefèvre at the Académie Julien in Paris and lived for some years in France. He was elected a member of the Society of American Artists in 1886 and of the National Academy of Design in 1906. His pictures, many of which are in American galleries, include *Evening, August, The Brook, Close of Day, Twilight, The Deepening Shadows,* and *Time of the Red-winged Blackbird.*

Davis, Charles Henry (1845–1921), American naval officer, was born in Cambridge, Mass. He was graduated from the U. S. Naval Academy in 1864, and rising through the different grades, became rear admiral in 1904, and was retired in 1907. He commanded the cruiser *Dixie* in the Spanish-American War; was division commander of the fleet of battleships in 1904–5; and represented the United States on the international commission of inquiry into the Russian attack on British trawlers in the North Sea. He is the author of *Chronometer Rates as Affected by Temperature and Other Causes; Telegraphic Determination of Longitude; Life of Rear Admiral Davis,* his father.

Davis, Cushman Kellogg (1838–1900), American political leader, was born in Henderson, N. Y. He was graduated from the University of Michigan in 1857, studied law, and practised in Waukesha, Wis. In the Civil War he became assistant adjutant general on the staff of General Gorman, with whom he was later associated in the practice of law in St. Paul. He was a member of the Minnesota legislature (1867), U. S. district attorney for Minnesota (1868–73), and governor of that State (1874–5). From 1887 until his death he was United States senator; and as chairman of the Committee on Foreign Relations (1897–9) did much to determine the policy of the United States at the time of the annexation of Hawaii and the Spanish-American War. He was one of the commissioners who negotiated the treaty of peace with Spain (1898). He published *The Law in Shakespeare.*

Davis, David (1815–86), American jurist, was born in Cecil County, Maryland. He was graduated from Kenyon College, Gambier, Ohio, in 1832, studied law, was admitted to the bar in 1835, and entered upon the practice of his profession in Bloomington, Illinois. He was a member of the Illinois legislature (1844) and of the State Constitutional Convention of 1847; was a State circuit judge (1848–62), in which capacity he met and formed a close friendship with Abraham Lincoln; and in 1862, by Lincoln's appointment, became an associate justice of the United States Supreme Court, from which he resigned in 1877. He was in sympathy with the Liberal Republican revolt of 1872 and was a prominent candidate for the presidential nomination. From 1877 to 1883 he was a member of the U. S. Senate, having been elected by a fusion of Independents and Democrats.

Davis, Dwight Filley (1879–), American public official, was born in St. Louis, Mo. He was graduated from Harvard in 1900, and became a successful business man, serving on many boards and commissions in his native city. He served in the Great War and was decorated for gallantry in action. From 1921 to 1923 he was a director of the War Finance Commission, was acting Secretary (1923–5) and later Secretary of War in President Coolidge's cabinet and in 1929 was appointed Governor-General of the Philippine Islands.

Da'vis, George Breckenridge (1847–1914), American soldier, was born in Ware, Mass. He served in the State militia; was graduated from the U. S.

Military Academy in 1871; bebecame judge-advocate-general and brigadier general, U. S. Army, in 1901; and in 1911 was retired with the rank of major general. He made a special study of international law; and represented the army at the Peace Congress at The Hague in 1907. His published works include *Elements of International Law* (1887); *Military Law* (1898); *Military Laws of the United States* (1907); *The Second Peace Conference* (1907).

Davis, HENRY GASSAWAY (1823–1916), American capitalist, was born in Baltimore, Md. After serving as a railroad brakeman, conductor and agent, he became a merchant, and engaged in railroad construction and management. In 1865 he entered the West Virginia House of Delegates, was State senator from 1868 to 1871, and United States senator from 1871 to 1883. He was Democratic candidate for vice-president in the election of 1904.

Davis, HENRY WINTER (1817–65), American lawyer and political leader, was born in Annapolis, Maryland. He was graduated from Kenyon College, Gambier, Ohio, in 1837, studied law at the University of Virginia, and practised first in Alexandria, and after 1850 in Baltimore, Md. He became prominent in politics, first as a Whig, then as a Know-Nothing, and finally as a Republican; was a representative in Congress (1855–61 and 1863–5), and on the approach of the Civil War was a leader of the 'Unionists' in Maryland. As chairman of the 'Committee on the Rebellious States' in the House, he joined with Benjamin F. Wade, chairman of the corresponding committee in the Senate, in preparing what is known as the Wade-Davis Bill, the fundamental basis of which was that Congress alone had power to reconstruct the South, and that the various members of the Confederacy should be dealt with not as States but as territories or districts completely subject in every respect to the authority of the central Government. This bill was passed by Congress (1864), but was 'killed' by 'pocket-veto' by President Lincoln. Davis and Wade thereupon issued the 'Wade-Davis Manifesto' denouncing the President. He published *The War of Ormuzd and Ahriman in the Nineteenth Century* (1853), an arraignment of slavery.

Davis, JAMES. See HALL OWEN.

Davis, JAMES JOHN (1873–), American public official, was born in Tredegar, Wales. He was brought to America at the age of eight years, at the age of thirteen went to work as a puddler's helper in the Sharon, Pa., steel mills, and at sixteen became a puddler. He was later employed in the tin-plate mills at Elwood, Ind., was elected city clerk of Elwood (1898–1902), and later, county recorder of Madison County (1902–06). He early became interested in labor problems, and has held various offices in the Amalgamated Association of Iron, Steel, and Tin Workers. He became director general of the Loyal Order of Moose in 1907, and as chairman of the Moose War Relief Commission visited American military camps and the battlefields of France, Belgium, and Italy. In 1921 he became Secretary of Labor in President Harding's Cabinet, was reappointed by President Coolidge and again by President Hoover in 1929. He has received several honorary degrees.

Davis, JEFF (1862–1913), American lawyer and public official, was born in Little River County, Arkansas. He studied law at Vanderbilt University, was admitted to the bar in 1884, was attorney general of Arkansas (1898), and served as governor for three consecutive terms (1901–07). He was elected to the U. S. Senate in 1907 and again in 1913.

Davis, JEFFERSON (1808–89), American statesman, the President of the Confederate States, was born on June 3, 1808, in what is now the village of Fairview, Todd County, Kentucky. He was of mixed Scotch-Irish and Welsh descent. His father, Samuel Davis, served on the American side in the Revolutionary War, and soon after the son's birth removed with his family to Mississippi. The son studied for a time at Transylvania University, Lexington, Ky., was graduated from West Point in 1828, served in the Black Hawk War, and in 1835 resigned from the army. Soon afterward he married a daughter of Col. (later Gen.) Zachary Taylor and removed to a cotton plantation in Warren County, Miss. His wife soon died, and in 1845 he married Miss Varina Howell.

For several years he devoted himself assiduously to the raising of cotton and to study, but in 1843 began to take an active part in politics as a States Rights Democrat. In 1845 he was elected to the national House of Representatives, but resigned in June, 1846, to take part in the Mexican War, and as colonel of a Mississippi regiment served under General Taylor at Monterey and at Buena Vista, where he particularly distinguished himself and was severely wounded. In May, 1847, he was appointed by President Polk brigadier general of volunteers, but declined 'on the ground that volunteers are militia and the Constitution reserves to the State the appointment of all militia officers.' From 1847 to 1851 he was a member of the U. S. Senate and was a conspicuous opponent of the Compromise Measures of 1850. In 1851, he was the unsuccessful candidate of the extreme States Rights Democrats for the governorship of Mississippi, against Senator Foote. From 1853 to 1857 he was an efficient Secretary of War in the Cabinet of President Pierce, and from 1857 to January, 1861, when he resigned, he was again a member of the Senate.

In the period immediately before the outbreak of the Civil War, Davis was preëminently the spokesman of the South. He took the extreme Southern position as regards Kansas; he contended that the Federal government should give positive protection to slave property in the Territories; himself a slaveholder, he defended slavery; he long believed in the right of secession, and in 1858 at Jackson, Miss., he declared that if any Abolitionist (in which category he classed Seward, Chase, and Lincoln) were elected President, Mississippi should immediately secede from the Union. Before the inauguration of President Lincoln he withdrew (Jan. 21, 1861) from the Senate, and soon afterward, on Feb. 8, 1861, was elected provisional President of the Confederate States. He was inaugurated on Feb. 18, was unanimously reëlected President under the permanent Confederate Constitution in November, 1861, and held office throughout the Civil War.

Though his high character and his devotion to the Confederacy were everywhere recognized, his administration met with severe criticism almost from the beginning, and the general opinion of historians is that he was not equal to the demands which the great and devastating Civil War made upon him. During much of the war, and to some extent almost necessarily, his government was virtually a military autocracy, and he seems, without question, to have interfered injuriously with his generals in the actual prosecution of campaigns. Throughout, however, he did much to encourage the people of the Confederacy, and he himself was one of the last to despair of success. A week before the surrender of General Lee he left Richmond, but on May 10, 1865, was captured by Federal troops near Irwinville, Ga. For two years thereafter he was confined as a prisoner at Fortress

Monroe, awaiting trial for treason, but was released on bail in May, 1867, and the judicial proceedings against him were abandoned in February, 1869, by an order of *nolle prosequi*. After his release he travelled abroad in Canada and England, and on his return became president of an insurance company at Memphis, Tenn. In 1879 he retired to his estate at Beauvoir, near Biloxi, Miss., where he devoted himself to study and writing, and in 1881 published his *Rise and Fall of the Confederate States*, narrating the stirring events of 1861–5. He died of a congestive chill on Dec. 6, 1889, and was buried in New Orleans, whence his body was removed to Richmond in 1893.

Consult biographies by his second wife, by Pollard, by Alfriend, and by Dodd.

Davis, Jefferson C. (1828–79), American soldier, was born in Clark county, Ind. He served through the Mexican War as a volunteer, later entered the U. S. Army, and was one of the officers at Fort Sumter during its bombardment (April, 1861). In December, 1861, he was made a brigadier-general, after having captured a superior force and stores at Milford, Pa. He was present at Pea Ridge, Corinth, Stone River, and Chickamauga, and was with Sherman in his march to the sea. He was brevetted major-general in 1865, and became colonel U. S. A. in 1866. In 1873 he put down the Modoc rising in Northern California.

Davis, or Davys, John (*c.* 1550–1605), English navigator, was born in Sandridge, Devonshire. In 1585, 1586, and 1587 he was in charge of expeditions in search of a northwest passage to China and India; on the first voyage discovered Davis Strait, and on the third sailed up this strait to 72° 12′ N. In 1591 he accompanied Cavendish's second voyage to the South Sea, and discovered the Falkland Islands. In 1601 he was pilot to James Lancaster on the first voyage undertaken on behalf of the East India Company, and in 1604–5 filled the same office when Edward Michelborne proceeded to the East in the *Tiger*. On that voyage Davis was murdered by shipwrecked Japanese, whom he picked up off the coast of Penang. He published *The World's Hydrographical Description* and *The Seaman's Secrets*, and invented the back staff or Davis' quadrant.

Davis, John Chandler Bancroft (1822–1907), American lawyer and diplomat, was born in Worcester, Mass. He was graduated from Harvard in 1840; was admitted to the bar in 1844; and practised at Worcester and New York City. He was secretary of the U. S. legation in London (1849–53); American correspondent of the London *Times* (1854–61); Assistant Secretary of State (1869–71 and 1873–4); Minister to Germany (1874–7); judge of the U. S. Court of Claims (1878–82); and reporter of the U. S. Supreme Court (1883–1907). He served as agent of the United States before the Geneva Court of Arbitration that settled the *Alabama* Claims in 1871–2.

Davis, John William (1873–) American diplomat, was born in Clarksburg, W. Va. He was graduated from Washington and Lee University in 1892, was admitted to the bar in 1895, served as assistant professor of law in Washington and Lee University in 1896–7, and from 1897 until 1911 practised law in Clarksburg. He was elected to the 62d and 63d Congresses (1911–15), resigning to become Solicitor-General of the United States in 1913. From 1913 to 1918 he served as Counselor for the American Red Cross, and in the latter year was a member of the American delegation for conference with the Germans on the treatment and exchange of prisoners of war, at Berne, Switzerland. In 1918 he was appointed by President Wilson as Ambassador to Great Britain, a post which he resigned in April, 1921. Upon his return to America, he took up the practice of law in New York City, as senior member of the firm of Stetson, Jennings, Russell, and Davis. In 1924 he was the Democratic nominee for the presidency of the United States. Mr. Davis holds honorary degrees from a number of universities and is an Honorary Bencher of the Middle Temple, London. He was president of the American Bar Association in 1922–3.

Davis, Katharine Bement (1860–1935), American sociologist, was born in Buffalo, N. Y., and was educated at Vassar College and at the University of Chicago (PH.D. 1900). On the opening of the New York State Reformatory for women at Bedford in 1901 she became its first superintendent, holding that office for thirteen years. In 1914–16 she was Commissioner of Correction for New York City, the first woman to become head of a municipal department in that city. In 1915–17 she served as chairman of the Parole Commission of the City of New York, and in 1918 became general secretary of the Bureau of Social Hygiene.

Davis, Matthew L. (1766–1850), American author, was born in New York City. For many years he was the Washington correspondent of the New York *Courier and Enquirer*, under the pseudonym of 'The Spy in Washington.' He contributed also to the London *Times*, and started, along with Freneau, the short-lived *Timepiece and Literary Companion*. In politics he associated himself with Aaron Burr, and after the latter's death published his *Memoirs* (2 vols., 1836).

Davis, Nathan Smith (1817–1904), American physician, was born in Greene, N. Y., and was graduated from the College of Physicians and Surgeons, Fairfield, N. Y. (1837). He practised medicine in Binghamton, New York City, and Chicago; was professor of physiology and pathology at the Rush Medical College, Chicago (1849–59); and professor of the principles and practice of medicine at the Chicago Medical College from 1859 to 1886, when he became dean of the faculty. He edited *The Annalist*, New York (1847–9); organized and edited *The Northwestern Medical Journal* (1855–75), *The Medical Examiner* (1860–73), and *The Journal of the American Medical Association* (1883–9); and was one of the founders of Northwestern University, the American Medical Association, the Chicago Academy of Sciences, the Chicago Historical Society, and the Union College of Law, where he was professor of medical jurisprudence for forty years.

Davis, Noah (1818–1902), American jurist, was born in Haverhill, N. H. He was admitted to the New York bar in 1841, and practised in Gaines and Buffalo. He was a justice of the New York Supreme Court from 1857 to 1868, and again from 1872 to 1887; and he presided at the trial of E. C. Stokes for the murder of James Fisk (qq. v.), and of William M. Tweed (q. v.) for official malfeasance.

Davis, Rebecca Harding (1831–1910), American novelist, was born in Washington, Pa., and married the journalist L. Clarke Davis in 1863. She was the author of many short stories and novels, the latter including: *Dallas Galbraith* (1868), *A Law Unto Herself* (1878), *Dr. Warrick's Daughters* (1896), *Kitty's Choice* (1874), and *Frances Waldeaux* (1897).

Davis, Richard Harding (1864–1916), American journalist and author, the son of L. Clarke Davis and Rebecca Harding Davis (q. v.), was born in Philadelphia, Pa., and was educated at Lehigh University and at Johns Hopkins. After working as a reporter on Philadelphia papers, in 1889 he joined the staff of the New York *Evening Sun*, where he attracted attention by his sketches of society life. He became managing editor of *Harper's Weekly* in 1892, but resigned in 1894 to devote himself to travel and the writing of fiction. He acted as war correspondent for the London *Times*, New York *Herald*, and New York *Tribune* in the Spanish, the Boer, and the Russo-Japanese Wars, the revolutions in Mexico, and the Great War of Europe. In August, 1914, he was captured by the Germans and narrowly escaped being shot as a spy.

Richard H. Davis was a prolific writer of fiction, plays, and stories embodying his experiences as a war correspondent. His first long story was *The Princess Aline*, published in 1895. His most popular novel, and the one he liked best, *Soldiers of Fortune*, appeared in 1899. Others of his long list are: *Gallagher and Other Stories* (1891); *Van Bibber and Others* (1892); *The West from a Car Window* (1892); *Three Gringos in Venezuela* (1896); *The Cuban and Porto Rican Campaigns* (1898); *The King's Jackal* (1899); *With Both Armies in South Africa* (1900); *Captain Mackin* (1902); *The Bar Sinister* (1904); *Kits and Outfits* (1905); *Real Soldiers of Fortune* (1907); *The Man Who Could Not Lose* (1911); *The Lost Road* (1913); *With the Allies* (1914); *Somewhere in France* (1915). Plays produced by him are *Soldiers of Fortune, The Taming of Helen, Ranson's Folly, The Dictator, The Yankee Tourist,* and *Vera the Medium.*

Davis, Thomas Osborne (1814–45), Irish poet and patriot, was born at Mallow. He was graduated from Trinity College, Dublin, and was called to the bar (1838). In 1842 he founded the *Nation* (newspaper), in conjunction with John B. Dillon and Charles Gavan Duffy, and for its columns wrote stirring ballads and articles on historical and patriotic subjects, striving to unite all Irishmen. Owing to differences with O'Connell and his sympathizers, Davis and his friends founded the Young Ireland Party. He wrote an 'Essay on Irish Songs' for Barry's *Songs of Ireland* (1845), and edited the *Speeches of Curran* (1853). His *Poems* were published in 1846, and his *Literary and Historical Essays* in 1847.

Davis, Varina Anne Jefferson (1864–98), American author, was born in Richmond, Va. She was the youngest child of Jefferson Davis (q. v.), and was affectionately called 'the Daughter of the Confederacy.' She published: *A Sketch of the Life of Robert Emmet; The Veiled Doctor; A Romance of the Summer Seas.*

Davis, William Morris (1850–), American geographer and geologist, was born in Philadelphia. He was graduated from the Lawrence Scientific School of Harvard University (1869), and was assistant at the Argentine National Observatory at Cordoba (1870–3). From 1876 to 1885 he was instructor in geology and geography at Harvard, where he was subsequently assistant professor (1885–90) and professor (1890–99) of physical geography, and Sturgis-Hooper professor of geology (1899–1912). He became professor emeritus in 1912. In 1903 he was a member of a Carnegie Institution expedition to Turkestan; in 1908–9 visiting professor at Berlin University, in 1910–11 at Paris; and in 1911 president of the Geological Society of America. He was a foreign guest of the British Association in South Africa in 1908 and Australia in 1914. In the latter year he spent much time on the Pacific, studying the origin of coral reefs. Professor Davis was founder and president of the Association of American Geographers and the Harvard Travellers Club. In addition to numerous essays he published: *Elementary Meteorology* (1894); *Physical Geography* (1898); *Practical Exercises in Physical Geography* (1908); *Physiogeographie* (with G. Braun, 1911); *Erkl. Beschreibung der Landformen* (1912).

Davis, William Stearns (1877–), American educator, was born in Amherst, Mass., and was graduated from Harvard (1900; PH.D. 1905). He has been associate professor of mediæval and modern European history at Oberlin College (1907–9), and professor of history at the University of Minnesota (since 1909). He published: *A Friend of Cæsar* (1900); *God Wills It* (1901); *A Victor of Salamis* (1907); *An Outline History of the Roman Empire* (1909); *The Influence of Wealth in Imperial Rome* (1910); *The Friar of Wittenberg* (1912); *Readings in Ancient History* (1913); *A Day in Old Athens* (1914); *A Mediæval and Modern History* (1914); *The Roots of the War* (1918); *A History of France* (1919); *A Short History of the Near East* (1922); *Life on a Mediæval Barony* (1923); *The Beauty of the Purple* (1924).

Davis Strait, the body of water between Greenland and Baffin Land. It extends north from the Atlantic Ocean, widening slightly into Baffin Bay (q. v.), and is from 180 to 500 miles wide. Soundings of 5,500 feet have been made. It was named for its discoverer, John Davis (q. v.).

Da'vitt, Michael (1847–1906), Irish political agitator, was born near Straid, County Mayo. As a boy he worked in a cotton mill at Haslingden, Lancashire, and there lost his right arm (1857). Becoming an active member of the Fenian organization (1865), he took part in the attempted seizure of Chester Castle, and in May, 1870, was sent into penal servitude for fifteen years. Liberated on ticket-of-leave in December, 1877, he visited the United States, where he lectured and secured the means with which to continue his crusade in behalf of the Irish tenantry. He was the organizer (1879) and active promoter of the Irish Land League, and in 1880 went to the United States to superintend the organization of the American Land League. On his return to England (1881) he was rearrested and sent into penal servitude; and was again in prison for three months in 1883 for seditious speech. In 1892 he was sent to Parliament by Westmeath; unseated, but immediately returned for Northeast Cork. Having resigned in 1893 and been returned unopposed for South Mayo in 1895, he withdrew finally in 1899.

Davitt was a vigorous opponent of the land nationalization scheme of Charles Stewart Parnell (q. v.), and took an active part in that leader's deposition in 1890. His published works include: *Leaves from a Prison Diary* (1884); *Defence of the Land League* (1891); *Life and Progress in Australia* (1898); *The Boer Fight for Freedom* (1902); *Within the Pale* (1903); *The Crime of Kishineff* (1903); *Fall of Feudalism in Ireland* (1904); *Pageant of London* (1905).

Davos, dä'vōs, two villages (Platz and Dörfli) in the Swiss canton of the Grisons, at 5,115 feet and 5,164 feet respectively. Davos Dörfli is 9 miles east of Coire, and Davos Platz is about 13 miles from Filisur, on the Alvula Pass Railway. Platz is 18 miles by road over the Fluëla Pass (7,838 feet) from Süs, in the Engadine. Since 1865 Davos has been known as a health resort for consumptive patients, especially in the winter. Pop. of the two villages, 12,000.

Davout, då-vōō' (incorrectly Davoust), Louis Nicolas (1770–1823), French marshal, was born at Annoux in Burgundy. He was educated with Napoleon Bonaparte at the Brienne military school, and in 1788 became lieutenant in a cavalry regiment. During the revolutionary wars he rose to the rank of general. He accompanied Bonaparte to the East, where he contributed to the victory at Aboukir; and on his return to France was appointed marshal of the empire (1804). He took a prominent part in the triumphs of Austerlitz and Auerstadt, and was created Duke of Auerstadt (1808). For his services in the war with Austria in 1809, especially at Eckmühl and Wagram, he was made Prince of Eckmühl. As governor of Poland (1811) he ruled in a cruel and despotic manner. In the Russian campaign of 1812 he won fresh laurels on the fields of Mohive and Vitebsk. After the retreat from

Moscow, Davout became governor-general of the Hanse towns, where he so entrenched himself at Hamburg that he could not be dislodged by the Allies till after the first restoration.

When Bonaparte escaped from Elba, he appointed Davout minister of war. After the Battle of Waterloo the latter received the command of the remnant of the French army under the walls of Paris, but concluded a military convention with the Allies.

Da'vy, Sir Humphry (1778–1829), English chemist, was born in Penzance, Cornwall, and in 1795 was apprenticed to a surgeon and apothecary. In 1798 he made the acquaintance of Dr. Beddoes, who had just founded at Bristol a 'Pneumatic Institution' to investigate the medical power of factitious gases, and obtained the position of assistant in the laboratory. He became absorbed in his work there and in 1799 published a volume of essays, *Researches, Chemical and Philosophical*, in recognition of which he was offered the post of lecturer in chemistry to the Royal Institution. In 1802–12 he was professor of chemistry in that institution, and the following year began research work in agriculture which resulted in the publishing of his *Elements of Agricultural Chemistry* (1813).

The discoveries, however, on which Davy's fame as a chemist chiefly rest originated in the views which he developed in 1806 in his Bakerian lecture, *On Some Chemical Agencies of Electricity*, regarded as one of the most valuable contributions ever made to chemical science. He then discovered that the alkalies and earths are compound substances formed by oxygen united with metallic bases. In 1807 he succeeded in decomposing potash, forming the new metal potassium; he then decomposed soda and the alkaline earths, baryta, strontia, lime, and magnesia, and discovered the new metals, sodium, barium, strontium, calcium, and magnesium. He also investigated fire damp, producing in 1815 the miner's safety lamp which bears his name (see Davy Lamp). He was elected president of the Royal Society in 1820, and during the next few years devoted himself to electromagnetism.

Besides the works mentioned, and a great number of contributions to the *Philosophical Transactions*, he is the author of *Elements of Chemical Philosophy* (1812), *On the Safety Lamp in Coal Mines* (1818), *Salmonia, or Days of Fly Fishing* (1828), and *Consolations in Travel* (1830).

Davy Jones, a sailor's name for a malignant sea spirit or the devil generally. The common phrase 'Davy Jones' locker' is applied to the ocean as the grave of men drowned at sea.

Davy Lamp, a lamp consisting of oil enclosed in wire gauze so that, though the necessary air for combustion can get access to the flame, the lamp may be taken into an atmosphere liable to contain combustible gases without risk of causing an explosion. See Safety Lamps.

Dawal'la (*Hypophthalmus dawalla*), a fish found in the rivers of Guiana, and highly esteemed for the delicacy of its flesh. It is sometimes 2½ feet long, and is brightly colored.

Dawbarn, Hugh Mackay (1849–1915), American surgeon, was born in Westchester County, N. Y. He studied medicine in London and Paris, and was graduated from the College of Physicians and Surgeons (1881). In 1885 he was appointed instructor in minor surgery at the College of Physicians and Surgeons, and in 1887 professor of surgery at the New York Polyclinic School. He later served as professor of surgery at the Fordham University Medical School, and senior surgeon of the New York Hospital. He performed many remarkable operations, including an extensive grafting operation from his own skin that saved his son's life (1908). In 1902 he was awarded the Gross Prize of the Philadelphia Academy of Medicine.

Dawes, Charles Gates (1865–), American public official, was born in Marietta, Ohio. He was educated at Marietta College and practised law in Lincoln, Neb., from 1887 to 1894, when he removed to Evanston, Ill. He managed the McKinley campaign in Illinois in 1896 and served as Comptroller of the Currency from 1898 to 1901. In 1902 he organized the Central Trust Company of Illinois, became its president and chairman of the board, and was soon recognized as a dominant figure in the American financial world. On the entrance of America into the Great War, Dawes was commissioned major of engineers, was later purchasing agent for the American Expeditionary Force, and in 1918 became brigadier general. He was awarded the Distinguished Service Medal and received other honors. He organized and was first director (1921) of the U. S. Bureau of the Budget, and in 1923 was invited by the Reparations Committee in Paris to become chairman of the committee to investigate and report on a budget for the German government (see Reparations). In 1924–28 he was vice-president of the United States and in 1929 was appointed U. S. ambassador to Great Britain. His published works include *The Banking System of the United States* (1894); *Essays and Speeches* (1915); *A Journal of the Great War* (1922); *The First Year of the Budget of the United States* (1923).

Dawes, Henry Laurens (1816–1903), American political leader, was born in Cummington, Mass. He was graduated from Yale (1839), and was admitted to the Massachusetts bar in 1842, where he successfully practised law, though he devoted his attention principally to politics. He was a member of the State legislature (1848–9 and 1852) and State senate (1850), and of the National Congress (1857–75) and the U. S. Senate (1875–93). In the House he was long chairman of the Committee on Ways and Means, and in the Senate was identified with legislation concerning the Indians. In 1893–1903 he was chairman of the Commission to the Five Civilized Tribes of the Indian Territory.

Dawkins, Sir William Boyd (1838–1929), Welsh geologist, was born in Buttington, Welshpool. He became geologist to the Geological Survey of Great Britain in 1861, was curator of the Manchester Museum, 1870, and was elected professor of geology at Owens College, Manchester, in 1872. He was a member of the Channel Tunnel Commission in 1882. His principal works are *Cave Hunting* (1874); *Early Man in Britain* (1880); *British Pleistocene Mammalia* (1866–87).

Daw'ley, town, England, in Shropshire; 4 miles southeast of Wellington. It has extensive coal and iron mines. Pop. 8,000.

Dawn, the morning twilight, is a diffused illumination caused by the reflection of the sun's rays from the higher atmospheric strata. It begins when the sun is 18° below the horizon, and terminates with its rising. The length of the interval depends upon the inclination to the horizon of the sun's diurnal path, and is accordingly least under the Equator, where, at the sea level, it does not exceed one hour, while in high latitudes it extends at midsummer from sunset to sunrise. See Twilight.

Daw'son, city, Georgia, county seat of Terrell County, on the Central of Georgia and the Seaboard Airline Railroads; 98 miles southwest of Macon. It has cotton-oil, lumber, and grist mills, a peanut shelling plant, and peanut-oil mills. Pop. (1910) 3,827; (1920) 3,504.

Dawson, capital of Yukon Territory, Canada, is situated amid impressive scenery at the junction of the Klondike and Yukon Rivers; 360 miles northwest of Skagway, and 1,500 miles above the mouth of the Yukon. It is connected with the stations on the Yukon by river steamers in the summer and by horse sleighs in winter. In the latter season the temperature sometimes falls to − 50° F. or lower, in summer it may reach above 90°. Dawson was founded in 1896, when gold was discovered in the Klondike district, and is now the shipping centre of the surrounding region. Industries include gold and coal mining, saw mills, brewing, and metal working. Pop. (1911) 3,015; (1921) 2,050.

Dawson, CONINGSBY (WILLIAM) (1883–), Anglo-American author, was born in High Wycombe, Buckinghamshire, England, and was graduated from Oxford (1905). He went to the United States in 1905, and in 1910–13 was literary adviser to the George H. Doran Publishing Co. He served throughout the Great War and afterwards lectured in many States on the results of the war. His published works include *The Worker and Other Poems* (1906); *The House of the Weeping Woman* (1908); *Murder Point* (1910); *The Road to Avalon* (1911); *The Garden Without Walls* (1913); *Florence on a Certain Night* (poem, 1914); *The Raft* (1914); *Slaves of Freedom* (1916); *Carry On* (1917); *The Glory of the Trenches* (1918); *Out to Win* (1918); *Living Bayonets* (1919); *The Test of Scarlet* (1919); *The Little House* (1920); *It Might Have Happened to You* (1921); *The Kingdom Round the Corner* (1921); *The Vanishing Point* (1922); *Christmas Outside Eden* (1922); *The Coast of Folly* (1924); *Old Youth* (1925); *When is Always?* (1927); *Pilgrims of the Impossible* (1928); *The Unknown Soldier* (1929); *When Father Christmas Was Late* (1929).

Dawson, GEORGE MERCER (1849–1901), Canadian geologist, son of Sir J. W. Dawson (q.v.), was born in Pictou, Nova Scotia, and was educated at M'Gill University and the Royal School of Mines in London. He was geologist and naturalist to the North American Boundary Commission (1873–5), and later was connected with the Geological Survey of Canada. He became director of the Survey in 1895, a post which he held till his death. He conducted many surveying expeditions, especially in British Columbia and the Northwest Territories, and rendered important services in the Bering Sea Dispute. He published *Descriptive Sketch of the Physical Geography and Geology of Canada* (1884); *The Physical and Geological Features of Part of the Rocky Mountains* (1885).

Dawson, SIR JOHN WILLIAM (1820–99), Canadian geologist and educator, was born in Pictou, Nova Scotia, and studied at the University of Edinburgh. He made geological researches in Nova Scotia and New Brunswick; was appointed superintendent of education in Nova Scotia (1850); and was professor of natural history and later vice-chancellor of M'Gill University, Montreal (1855–93). He was instrumental in founding the Royal Society of Canada, serving as its first president; and was president of the American Association for the Advancement of Science in 1882, and of the Geological Society of America in 1893. His *Devonian and Carboniferous Flora of Eastern North America* records the discovery of the Eozoön Canadense of the Laurentian limestone (see EOZOÖN). He also published *Story of the Earth and Man* (1872); *The Dawn of Life* (1875); *The Origin of the World* (1877); *Fossil Men* (1878); *The Change of Life in Geological Time* (1880); *Egypt and Syria* (1885); *Modern Ideas of Evolution* (1890); *The Meeting Place of Geology and History* (1894).

Dawson, SAMUEL EDWARD (1833–1916), Canadian publisher and author, was born in Halifax, N. S. He was graduated from the Royal Military School at Montreal (1865) and conducted a publishing and bookselling business in Montreal for forty years. From 1891 to 1909 he was the King's printer at Ottawa. He was vice-president of the Canadian Copyright League in 1888, and president of the Royal Society of Canada in 1907. He published *A Study of Lord Tennyson's Poem, The Princess* (1884); *Voyages of the Cabots in 1497 and 1498* (1894–7); *Canada and Newfoundland* (1897); *The St. Lawrence Basin and Its Border Lands* (1905); *A Plea for Literature* (1908).

Dax, dåks (ancient *Aquæ Tarbellicæ*), town, France, in the department of Landes, on the Adour; 92 miles south of Bordeaux. It has a fourteenth century castle (now a barrack), and remains of Roman walls. Manufactures include liquor, faïence ware, chronometers, and leather. Asphalt, rock salt, and iron ore are mined, and there are hot sulphur springs (116°–140° F.). Pop. (1921) 11,047.

Day, the interval of time during which the earth makes a complete rotation, consisting of twenty-four hours.

The *sidereal day* is the interval between successive passages of a star across the meridian. Each sidereal day is regarded as of the same length, and being the true period of the earth's rotation, is used by astronomers. The *civil* or *solar day* is measured between two meridian passages of the sun, and is about four minutes longer than the sidereal day. The length of the solar day is constantly varying by reason of the obliquity of the ecliptic and the varying speed of the earth's orbital motion; so, in order to get a fixed measure of solar time, astronomers imagine a sun moving uniformly in the celestial equator, and completing its circuit in the same time as the real sun. The time marked by this imaginary sun is called *mean solar time*.

The mean solar day is divided into twenty-four hours, the hours into minutes and seconds. A sidereal day, we have seen, is shorter; its exact length is 23 hours, 56 minutes, 4 seconds of mean solar or common time. In the course of a civil year of 365 days, the earth turns on its axis 366 times, or there are 366 sidereal days. Astronomers reckon the day as beginning at noon, and count the hours from 1 to 24. The civil day begins at midnight, and the hours are counted in two divisions of twelve each. The loss or gain of twenty-four hours in circumnavigating the globe is compensated by suppressing a day, according as the direction of travel is from the east or west, on reaching the 180th meridian from Greenwich.

Day, as opposed to night (q.v.), varies with the latitude and the season of the year. As we go north from the equator it increases in summer, and decreases in winter. For the time of day in different countries, see TIME.

Day, as a legal term in the United States, denotes the period which elapses between one midnight and the next. But it may also mean only that part of the day during which business is transacted. Deeds, mortgages, etc., have precedence according to the order in which they were filed for record, and fractional days are of importance in the recording acts relating to real property.

Lawful day is a term sometimes applied to a day on which judicial business can competently be transacted. The opposite is generally known as *dies non juridicus*, or simply *dies non*, and includes Sundays and holidays.

Day, DAVID TALBOT (1859–1925), American geologist, was born in East Rockport, O., and was graduated from Johns Hopkins University (1881). He was chief of the Division of Mining and Mineral Resources, U. S. Geological Survey, from 1886 to 1907, and expert in charge of petroleum investigations (1907–14). In 1914 he became consulting chemist, U. S. Bureau of Mines. He was director of petroleum and other exhibits at various expositions, and U. S. commissioner to the International Commission for Petroleum Tests (1907–9). He is the compiler of *Mineral Resources of the United States* (1885–1904). Died April 16, 1925

Day, Frank Miles (1861–1918), American architect, was born in Philadelphia. He was graduated from the University of Pennsylvania (1883), and studied architecture there and in Europe. After 1887 he practised his profession in Philadelphia. He was a member of the National Institute of Arts and Letters.

Day, George Edward (1815–1905), American theologian and educator, was born in Pittsfield, Mass., and was graduated from Yale College (1833) and the Yale Divinity School (1838). In 1840–51 he was pastor of churches at Marlboro and Northampton, Mass.; from 1851 to 1866 professor of Biblical literature at Lane Theological Seminary; from 1866 to 1888 professor of Hebrew language and Biblical theology at Yale Divinity School; and from 1888 to 1895 dean of the Yale Divinity School. He was secretary of the American Bible Revision Committee, and editor of the *Theological Eclectic* from 1863 to 1871. Among his works are English editions of Oehler's *Biblical Theology of the Old Testament* (1883), and Van Oosterzee's *Biblical Theology of the New Testament* (1871).

Day, Henry Noble (1809–1890), American clergyman and educator, was born in Washington, Conn. He was graduated from Yale (1828) and the Yale Divinity School (1834), and from 1836 to 1840 was a Congregational pastor. From 1840 to 1858 he was professor of rhetoric at Western Reserve College, and from 1858 to 1864 president of the Ohio Female College. He published: *The Art of Elocution* (1844); *The Art of Rhetoric* (1850); *Elements of Logic* (1867); *The Art of Discourse* (1868); *The Science of Esthetics* (1872); *The Science of Thought* (1886); *Elements of Mental Science* (1889); *Science of Education* (1889).

Day, Holman Francis (1865–1935), American author and dramatist, was born in Vassalboro, Me., and was graduated from Colby College (1887). He entered journalism, and was connected with the Dexter (Me.) *Gazette*, Lewiston *Journal*, and Boston *Herald*, and as managing editor, with the Lewiston *Daily Sun*. His published works include: *Up in Maine* (verse, 1900); *Pine Tree Ballads* (1902); *Kin O'Ktaadn* (1904); *Squire Phin* (1905; dramatized as *The Circus Man*, 1909); *Rainy Day Railroad War* (1906); *Old King Spruce* (1908); *The Ramrodders* (1910); *The Skipper and the Skipped* (1911); *The Red Lane* (1912)); *Along Came Ruth* (drama, 1914); *The Landloper* (1915); *Blow the Man Down* (1916); *Where Your Treasure Is* (1917); *Kavanagh's Clare* (1917); *The Rider of the King Log* (1919).

Died Mar. 13, 1923

Day, James Roscoe (1845–), American clerygman and educator, was born in Whitneyville, Me. He was graduated from Bowdoin College in 1874, entered the Methodist Episcopal ministry, and held pastorates at Portland, Boston, and New York. In 1894 he became chancellor of Syracuse University. He was elected bishop in 1904, but declined in order that he might continue his work at the University. He is the author of *The Raid on Prosperity* (1907) and *My Neighbor The Working Man* (1920).

Day, Jeremiah (1773–1867), American educator, was born in New Preston, Conn. He was graduated from Yale in 1795, and after holding other teaching positions became professor of mathematics there in 1801, and president in 1817, resigning in 1846. He published text books in algebra, navigation, and philosophy.

Day, John (fl. *c.* 1600–40), English dramatist, studied at Caius College, Cambridge. Henslowe in his *Diary* mentions him as collaborating with Chettle, Dekker, and Haughton (1598–1600). His *Isle of Gulls* was published in 1606, *Law Trickes* and *Humour out of Breath* in 1608, and *Parliament of Bees* in 1641.

Day, Stephen. See Daye.

Day, Thomas (1748–89), English author, was born in London. Educated at Oxford, he was called to the bar (1775), but never practised. He carried out extensive farming operations on philanthropic principles in Essex and Surrey, till he was killed by a fall from a colt he was breaking in. He was opposed to American negro slavery, and stated his views in *Reflections on the Present State of England and the Independence of America* (1762) and his poem, *The Dying Negro* (1773). He sympathized with the American patriots during the Revolutionary War, and wrote *The Devoted Legions* (1776) and *The Desolation of America* (1777). In 1783 appeared the first volume of his famous *History of Sandford and Merton*, the second and third following in 1786–9, the work being an apt adaptation of the *Emile* of Rousseau to English life.

Day, William A., American lawyer and insurance official, was born in Wilmington, Del., and was educated at the Harvard Law School. After serving as mayor of Champaign, Ill., and in the Illinois legislature and senate, he became auditor of the U. S. Treasury Department (1885–9), special assistant to the U. S. Attorney-General (1901–3). and Assistant Attorney-General (1903–5). He was sent to Alaska in 1902 to investigate the judical scandals there, and to Paris to investigate the title to the Panama Canal property. He also took an important part in the prosecution of Government cases under the anti-trust laws. Entering the service of the Equitable Life Assurance Society as auditor in 1905, in the following year he was elected vice-president, and in 1911 president. died April 8, 1928

Day, William Rufus (1849–), 1923 American jurist and statesman, was born in Ravenna, O. He was graduated from the University of Michigan (1870), was admitted to the bar (1872), and practised successfully at Canton O. In 1886–90 he was judge of the court of common pleas in Ohio; in 1897 was appointed Assistant Secretary of State by President McKinley; and from April to September, 1898, served as Secretary of State, during the Spanish-American War. He resigned to become one of the U. S. peace commissioners at Paris; was subsequently a U. S. circuit judge (1899–1903); and in 1903 became an Associate Justice of the U. S. Supreme Court.

Dayaks. See Dyaks.

Day and Night Breezes, the name applied to the diurnal variations in the direction and velocity of the wind. Over the oceans and other large expanses of water, the diurnal period is but feebly marked, if at all. On land, however, the winds are distinctly stronger about noon than at night—a phenomenon due to the convectional interchange in the daytime between the air on the earth's surface and the more rapid upper currents. As the ground cools toward sunset the tendency for air to ascend ceases, and the surface wind weakens and falls calm in the evening. The diurnal variation in the mean direction of the wind is very small, but there is a slight tendency for it to veer a little to the right as the day advances, and to turn back again after sunset. See Winds.

Daye, Stephen (1611–68), was born in London, England, and came over to Cambridge, Mass., to take charge of the printing press sent to the colonists by the Rev. Jesse Glover (1638). He was thus the first printer in the English colonies. He printed, first, *The Freeman's Oath*, then *An Almanack, Calculated for New England by Mr. Pierce, Mariner*, and his first book was *The Psalms in Metre*. What remains of his printing does little credit to him, and he was superseded by Samuel Green,

died Feb 19, 1935

who afterward employed him as a journeyman.

Day-fly. See EPHEMERA.

Daylight Saving, a name given to a movement for altering the clock at certain seasons of the year, so as to bring it more nearly into accord with solar time, and thus to obtain a greater utilization of natural light. Several plans have been suggested, the most widely advocated being to advance all timepieces one hour in the spring and to set them back one hour in the autumn.

The scheme was introduced in Great Britain in 1907 by William Willet, whose persistent advocacy of the system created widespread interest, and led to the introduction of a daylight saving bill in the House of Commons in 1908, and again in 1909, when it passed second reading, and was referred to a select committee, which rejected the chairman's draft report in its favor. The plan was revived after the outbreak of the European War as a means of national economy, and in the summer of 1916 was adopted by most of the countries of Europe, as well as by Nova Scotia. On April 16 the German Federal Council passed a measure ordering all clocks set forward one hour at 11 P.M., April 30, and put back one hour at 1 A.M., Oct. 1; on May 8 the British House of Commons agreed to a provisional acceptance of the daylight saving plan for the duration of the war and this was continued after the close of hostilities. Italy set her clocks ahead on June 4, and France on June 14. Other nations which have adopted the plan are Austria, Turkey, Switzerland, Spain, Portugal, Holland, Norway, Sweden, Denmark, Russia, and Australia.

Adherents of the daylight saving idea claim that it makes for an important saving in gas, electricity, and fuel, for the promotion of health, and for increased industrial efficiency. The chief grounds of opposition are that it is unnecessary, since a large part of the population adapts its hours of work to the hours of daylight without such a change; and that it creates a double standard of time reckoning—one in tide tables and calendars, and another in daily use.

In the United States a campaign for a nation-wide movement for setting the clock ahead one hour during the summer months was initiated in New York City in May, 1916. A national convention was held in January, 1917, and a National Daylight Saving Association was formed at that time. In March, 1918, Congress passed a Daylight Saving Act in accordance with which the standard time of the United States was advanced one hour the last Sunday in March and retarded one hour the last Sunday in October. During 1919 an active movement for the repeal of the act was set on foot, sponsored in large measure by the farmers, who claimed that the change in time was of distinct disadvantage to them and really worked to increase the length of their working day. Such a repeal act was passed on Aug. 20, 1919, over the President's veto, but local ordinances providing for daylight saving continued the practice in many parts of the country.

In Canada daylight saving, after failing to secure the approval of the Dominion Parliament in 1917, came into operation throughout the country in the summer of 1918, when it was enacted that during the prescribed period in each year, the time for general purposes in Canada should in each province be one hour in advance of the accepted standard time, and that the Board of Railway Commissioners should advance by one hour the standard time for railway companies. The measure, though unpopular in the rural districts, was accepted as a necessity of war, but in 1919, with the end of the war and of the consequent necessity for the conservation of electric power, the House of Commons voted 105 to 50 against re-enacting the measure, thus bringing nation-wide daylight saving to an end. The large cities, however, have adopted local summer daylight-saving schemes of their own, and Parliament has regulated its own times of sitting according to the local daylight saving time of Ottawa, the capital city.

Day Lily (*Hemerocallis*), a perennial herbaceous genus of Liliaceæ, so named from the ephemeral duration of its individual flowers, which, however, succeed each other freely upon the peculiar inflorescence (a helicoid cyme). Several species are cultivated in flower gardens, especially the fragrant Yellow Day Lily (*H. flava*), a native of Europe, and *H. fulva*, from the Levant.

A Japanese species of lily, *Funkia subcordata*, with panicles of white flowers, is also known as the day lily (see FUNKIA).

Day of Barricades. See BARRICADES.

Days of Grace are the extra days, usually three in number, allowed to a person liable under a bill of exchange or promissory note in which to make payment. They are so called because originally they were given as *of grace*, but this custom of merchants early developed into a legal rule. Bills payable *at sight* or *on demand* are not generally entitled to days of grace, though some State statutes have provided otherwise. Bank checks never have this privilege. As a rule, if the last day of grace falls on a Sunday or public holiday, payment must be made on the day previous.

On the continent of Europe days of grace are now practically extinct, except in Russia, where ten are allowed by law. But even in that country the law is seldom taken advantage of by banks.

Day'ton, city, Campbell county, Kentucky, on the Ohio River, and on the Chesapeake and Ohio Railroad; opposite Cincinnati, of which it is a residential suburb. The Speers Memorial Hospital is situated here. Manufactures include pianos, watch cases, and tobacco. Pop. (1910) 6,979; (1920) 7,646.

Dayton, city, Ohio, county seat of Montgomery county, is situated on the Great Miami and Stillwater Rivers at the confluence of the Mad River, and on the Baltimore and Ohio, the Cleveland, Cincinnati, Chicago, and St. Louis, the Cincinnati, Lebanon, and Northern, the Dayton and Union, the Erie, the Pennsylvania, and the Dayton, Toledo, and Chicago Railroads, and on eight interurban electric lines; 50 miles northeast of Cincinnati. The city, finely situated in the fertile Miami Valley, covers an area of 17 square miles. The streets are broad and regularly laid out, and there is a park system including 9 parks, having an area of 1,125 acres. The city has access to natural gas from the West Virginia fields and this is largely used for domestic lighting and heating.

Notable edifices are the old County Court House, designed after the Parthenon, the new County Court House, Federal Building, Memorial Hall, the Steele and Stivers High Schools, Y. M. C. A. Building, the Public Library, Engineers Club, and Conservancy Building. The public school system comprises 45 schools, and there are 15 parochial schools. Hospitals include the Miami Valley, St. Elizabeth, and the State Insane Asylum. Just beyond the outskirts of the city is the National Military Home for Disabled Volunteers.

Industries.—Dayton is the third city in the State in the importance of its manufactures. According to the U. S. Census of Manufactures for 1914, industrial establishments numbered 524, with a capital of $71,150,000, and products valued at $71,088,000. The leading industries are foundries and machine shops, slaughtering and meat packing, manufacture of coffee and spice, tobacco manufactures, printing and publishing, bakeries, and manufactures of lumber and timber products and soap. The National Cash Register Works, the Dayton-Wright and other airplane factories, and the Government Aviation Experimental Station are located in Dayton. There is also an extensive jobbing trade.

Government. — Dayton has been governed since 1913 by a commission of five members elected at large on a non-partisan ticket, and a city manager, chosen by the commission and charged with the administration of the government. The total assessed valuation of property in 1920 was $227,338,350.

History.—The first settlement at Dayton was made in 1796, and in 1805 the town was incorporated and named in honor of Gen. Jonathan Dayton. On March 25, 1913, the Miami overflowed its banks and flooded the city, 84 lives were lost, and property valued at $128,000,000 was destroyed. A system of dry reservoirs for flood prevention has been constructed. Pop. (1900) 85,333; (1910) 116,577; (1920) 152,559.

Dayton, city, Washington, county seat of Columbia county, on the Touchet River, and the Northern Pacific Railroad and the Oregon-Washington Navigation Co. line; 30 miles northeast of Walla Walla. It is a shipping point for grain, and has manufactures of lumber, furniture, flour, and wool. Pop. (1910) 2,389; (1920) 2,695.

Dayto'na, city, Volusia county, Florida, on the Atlantic Coast, the Halifax River, the Florida East Coast Railway, and the Florida Coastal Island Navigation Co. line; 110 miles by rail south of Jacksonville. It is a well-known pleasure resort, with a good beach and many fine hotels. Fruit is raised, especially oranges and strawberries. Pop. (1910) 3,082; (1920) 5,445.

D'Azeglio. See AZEGLIO.

D.C. (*da capo*), a musical term signifying 'from the head or beginning.'

D.C.L., doctor of civil law.

D.D., doctor of divinity.

Deacon, an official in the Christian church. The institution of the office, called the diaconate, is usually traced to Acts vi. 1–7, but the name deacon does not occur in this connection, and at least some of the seven there referred to, notably Stephen and Philip, are immediately found sharing in the more strictly apostolic work of preaching. In Phil. i:1 deacons are mentioned along with the bishops, and in the pastoral epistles they occupy a position which, if subordinate to that of the latter, is certainly something more than a mere almonership. The main duty of the deacons seems to have been the care of the poor. Their number was limited to seven in many churches until the eleventh century. In modern churches there is great variety in the functions of the diaconate. In the Roman and Anglican communions it is one of the three major orders of the clergy, but is in effect usually but a stage of probation for the priesthood. In Presbyterian churches the deacon is a layman, elected for the management of business, or of both spiritual and financial affairs, and his position and duties are similar in other Protestant churches.

Deaconess. In Rom. xvi. 1, Paul commends Phoebe to the church at Rome as a 'servant (*diakonon*) of the church that is at Cenchreæ,' and in the *Apostolic Constitutions* (3d century) the deaconesses are a recognized order of female ministers. What their relation was to the widows referred to in 1 Tim. v. 3–16 cannot be accurately determined. They co-operated with the deacons, showed the women their place in the church assemblies, assisted at the baptism of persons of their own sex, and arranged the *agapæ* or love-feasts. In early times they were consecrated to their office by ordination; later they were inducted into office by prayer without the imposition of hands. By the seventh century the Western Church discontinued the office, but in recent times it has been revived among the Reformed churches; thus, deaconess institutions have been founded at Kaiserwerth, near Düsseldorf, in 1836; in London, for the Church of England, in 1861; in Edinburgh, for the Church of Scotland, in 1887. In America the order was sanctioned by the General Conference of the Methodist Episcopal Church in 1888; by the General Convention of the Protestant Episcopal Church in 1889; and by the Presbyterian General Assembly in 1891. There are Episcopal training schools for deaconesses in New York and Philadelphia. The Methodists have many deaconesses' homes, and such homes are also connected with some of the Lutheran churches. Consult Potter's *Sisterhoods and Deaconesses;* Robinson's *Ministry of Deaconesses;* Golder's *History of the Deaconess Movement.*

Dead, BOOK OF THE, the funeral ritual of the Egyptians, describing in mystical language the experiences of the soul after death, and the text it must quote in order to escape the torments and trials of the lower world. Copies of the work, or portions of it, were buried with the mummy in his tomb. Such copies, hieroglyphic or hieratic according to the age when they were executed, constitute fully one-half of the thousands of extant papyri. The best edition is that of Naville, *Das Aegyptische Todtenbuch* (1886). There are English versions by Le Page Renouf (1890) and E. A. W. Budge (Ani text, 2 vols., 1895, and Theban text, 3 vols., 1901.)

Dead Centres, the two positions in which a crank is parallel to the force acting on it, and consequently has no turning moment on the shaft. To avoid this difficulty, when two cranks are employed, they are set at right angles, an[illegible] when three, at 120° apart.

Dead Letter Office, a division of the U. S. Post Office for the reception of unclaimed or undeliverable mail matter.

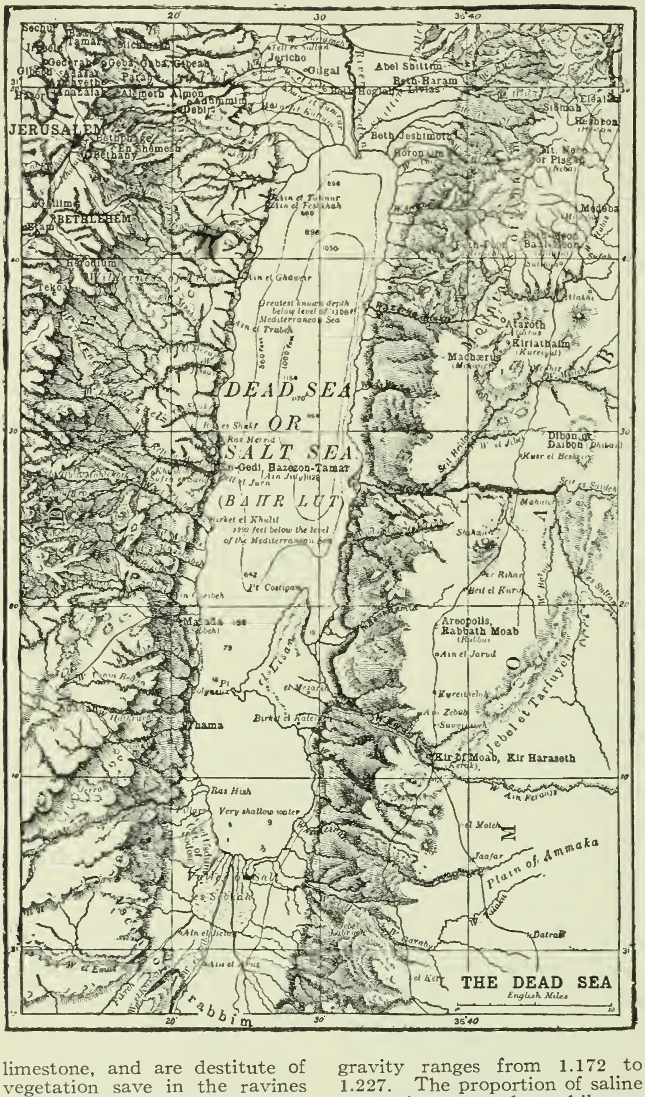
Deadly Nightshade. See BELLADONNA.

Dead-men's Fingers. See ALCYONIUM.

Dead Nettle, the popular name of a labiate genus of plants (*Lamium*) which European country folk declare occasionally cause death by irritating the hands with stinging hairs, especially when dried. The irritation is supposed to travel through the body, causing illness. The plants are inconspicuous, with purple or white flowers and nettle-like leaves. The common species have become naturalized in the United States.

Dead Sea, called by the Hebrews the Salt Sea and the Eastern Sea, by the classic writers the Sea of Asphalt, and by the Arabs the Bahr Lut, or Sea of Lot, is a large inland lake about 47 miles long and 9½ miles wide, with a total area of 340 square miles, in Southern Syria. It lies in a great tectonic fault caused by the general elevation of the region in the Eocene period, and is the lowest and the largest of the three lakes in the course of the Jordan. Its mean level is 1,292 feet below the level of the Mediterranean, while its greatest depth, at its northern extremity, is 1,310 feet. The southern extremity is extremely shallow (10 to 20 feet.) The level varies from 12 to 20 feet according to the season, the highest level being reached about April, when the Jordan is in flood. In shape the sea is an elongated oval, interrupted by a promontory which projects into it from the southeast. It is fed by the Jordan from the north, and by many other streams, but has no apparent outlet, its superfluous water being presumably carried off solely by evaporation. Over 6,000,000 tons of water are poured into it daily. Along its east and west borders there are lines of bold, and in some cases perpendicular, cliffs rising in general to an elevation of 1,500 feet on the west and 2,500 feet on the east. These cliffs are composed chiefly of limestone, and are destitute of vegetation save in the ravines traversed by fresh-water streamlets. The north shores of the lake form an extensive and desolate muddy flat, marked by the blackened trunks and branches of trees, strewn about and incrusted with salt. The south shore is low, level, and marshy, desolate and dreary. On this shore is the remarkable ridge of rocksalt, 7 miles long and 300 feet high, called *Khashm Usdom* ('Ridge of Sodom'). Lava beds, pumice-stone, warm springs, sulphur, and volcanic slag indicate the presence at some period of volcanic agencies.

The water of the Dead Sea is characterized by the presence of a large quantity of magnesium and soda salts. Its specific gravity ranges from 1.172 to 1.227. The proportion of saline matter is so great that, while sea-water contains only 3.5 per cent. of salts, the water of the Dead Sea contains upwards of 26 per cent., or nearly eight times as much as that of the ocean. The high specific gravity permits the human body to float easily on the surface of the water but the salinity is so great that no animal life is possible in the confines of the sea. See PALESTINE. Consult Lynch's *Narrative of the U. S. Expedition to the Dead Sea;* Smith's *Historical Geography of the Holy Land.*



Dead Sea Apple. See APPLE OF SODOM.

Dead's Part, in Scotch law, the portion of an estate remaining after the widow and children of the deceased had received the shares to which they were entitled by law. This remaining part was subject to the will of the testator.

Dead'wood, city, South Dakota, county seat of Lawrence county, on the Chicago and Northwestern and the Chicago, Burlington and Quincy Railroads; 175 miles west of Pierre. It is the trade and supply centre of the Black Hills gold-mining region, and has plants for the extraction of gold, machine shops, boiler works, and lumber mills. Pop. (1910) 3,653; (1920) 2,403.

Deaf Mutes, EDUCATION OF. A deaf mute, commonly spoken of as deaf-and-dumb, is a person who, by reason of congenital or acquired deafness, is incapable of spontaneous speech. Spontaneous speech development takes place only as the individual can hear speech sounds, and, therefore, fails to occur where the power of hearing is absent. Other forms of mutism occur, namely psychic mutism or the mutism of idiocy, and idiopathic mutism due to disability of the organs of speech themselves, but these are very rare and are not properly considered here.

Deaf-mutism may be either congenital or acquired. Congenital deaf mutes are born with no potentiality for hearing, while the acquired condition is due to disease of the organs of hearing in early childhood before the development of speech (see DEAFNESS). In general, the term is applied to total deafness combined with entire lack of articulation, those who have become entirely deaf later in life and have retained the power of speech being known as semi-mutes.

The first regular instructor of the deaf and dumb was Pedro Ponce de Leon (1520–84), a Spanish monk, who taught several deaf mutes to speak, read, write and cipher. The first extant work on the education of the deaf was written by another monk, Juan Pablo Bonet, and was published in 1620 (English translation, 1890).

Information regarding what had been accomplished in Spain was brought to England by Sir Kenelm Digby, who accompanied Charles I. on his visit to Madrid in 1623. A private school for deaf mutes was inaugurated in London by Henry Baker, a nephew of Defoe, and in 1760, the famous school described by Pennant and Dr. Johnson (1773) was started in Edinburgh by Thomas Braidwood. The first English public school for the indigent deaf was established in 1792, in the Old Kent Road, London, the teacher being Dr. Joseph Watson, a nephew of Braidwood.

Meantime, Van Helmont of Brussels, and Amman, a Swiss living at Amsterdam, author of *Surdus Loquens* (1692), had experimented with the subject. Their method was adopted by Samuel Heinicke (1727–90), the founder of the first school for the deaf in Germany, and the first recognized by any government. Hence the method followed by this school of teachers is often spoken of as the 'German method.'

To the Abbé de l'Epée of Paris (1712–89) must be given the credit of showing that the education of the deaf was a Christian duty. He took up the work from motives of benevolence, sacrificing his private fortune in helping forward this cause. His early attempts were on the lines of the Spanish teachers, but as the numbers of his pupils increased, he elaborated the natural gestures of the deaf into a system of artificial signs, by means of which he was able to impart information to a large number of pupils at once. He was succeeded in his work by Sicard, and the system used by these teachers came to be known as the 'French method.'

In the United States Dr. W. Thornton, of Philadelphia, published an essay on *Teaching the Deaf to Speak* in 1793, and in 1811 a grandson of Braidwood made an unsuccessful attempt to establish schools for the deaf in New York and Virginia. The first regular school for the deaf was established in Hartford, Conn., in 1817, by the Rev. T. H. Gallaudet (q. v.), who had studied in France and who was assisted in his undertaking by Laurent Clerc, a deaf mute teacher from Paris who had studied with the Abbé Sicard. This school was dependent at first mainly upon private contributions, but in 1819 a national grant of 23,000 acres of public land was made for its support; in 1819 Massachusetts enacted a law whereby the State undertook the payment of a stated sum of money to the school for each pupil from Massachusetts; New Hampshire took similar action in 1821; Vermont and Maine in 1825; Connecticut in 1828; Rhode Island in 1842; Georgia and South Carolina in 1834.

In the meantime schools were being formed in other States. New York instituted her work in 1817, an asylum being chartered at New York City, for which legislative aid was secured in 1822, and of which, in 1831, Harvey P. Peet was made principal. He was succeeded by his son, Isaac L., in 1867. Under these teachers this institution has achieved great success. Its industrial features comprise a shoeshop, tailor-shop, carpenter-shop, printing-office, garden, and sewing-rooms, the pupils being fitted for self-support by manual labor. Joseph Seixas organized the Pennsylvania institution at Philadelphia in 1820, and secured Laurent Clerc and Isaac Weld as instructors.

In 1823 Kentucky established her Asylum for Deaf Mutes at Danville, and from this time forward the education of the deaf was generally looked upon as a State undertaking. In 1829 the Columbus, Ohio, institution was opened. Virginia established a joint school for the blind and deaf in 1838; State schools were established in Indiana in 1841; in Tennessee and North Carolina in 1845; in Georgia and Illinois in 1846; and in South Carolina in 1849. At first the policy of the schools was to afford free instruction only to the indigent deaf, but in 1848 Indiana took a forward step in opening its school to all without cost. In the period from 1850 to 1875 nineteen other States created schools for the deaf, and to-day provision is made for their training in practically every State of the Union.

There are two main types of schools, in addition to private schools, for the deaf: day schools, conducted as part of city school systems, and institutional schools. In 1918 there were in the United States 162 schools of all types, of which 155 reported to the U. S. Bureau of Education. The statistics in the accompanying table are based on the schools reporting.

Schools for the Deaf in the United States (1918).

	Number of Schools.	Instructors.	Pupils.	Graduates.
State, or semi-state schools...	68	1,375	11,316	206
City day schools............	69	323	2,482	5
Private schools.............	18	123	644	3

The National Government maintains the only institution in the world of collegiate rank for the deaf, at Washington. This is Gallaudet College, which, with the Kendall School, forms the Columbia Institution for the Deaf. Its enrollment in 1917–18 was 113 (60 boys, 53 girls).

The principal private institutions in the United States interested in the education of the deaf are the Convention of American Instructors of the Deaf (1850), the Conference of Superintendents and Principals (1868), and the American Association to Promote the Teaching of Speech to the Deaf, which was incorporated in 1890 and which now includes the Volta Bureau in Washington, D. C., founded and endowed by Alexander Graham Bell in 1887 for the increase and diffusion of knowledge relating to the deaf. Canada has 8 schools for the deaf, with almost 1,000 pupils.

Methods of Instruction.—There are three principal methods of instruction for the deaf—the manual, the oral, and the combined.

In the *manual method*, signs, the manual alphabet, and writing are the chief means of instruction employed, the aim in this method being the mental development of the child and facility in the use and comprehension of written language.

The sign language in use in the United States and Canada is French in origin; but has naturally been largely modified in American usage. It is essentially an ideographic and pantomimic language, practically all the signs being distinctly suggestive of the object or action which they denote. This sign language is supplemented by the manual alphabet, in which the letters are represented on the hand. Two forms of this alphabet are employed: the one-hand alphabet, used almost exclusively in America and in most European countries, and the two-hand alphabet, used mainly in Great Britain.

The manual method has been very largely supplanted by the other methods of instruction. A modification of the system, known as the 'manual alphabet method,' and using only the manual alphabet and written language, is sometimes employed.

The *oral method* of instruction depends upon speech and speech reading, and aims at facility in speaking and in reading the speech of others as well as at general development and use of the written language.

All signs except purely natural signs are discarded. The pupils are taught to pronounce the elemental sounds of the language, singly and in combination, and to recognize their forms on the lips; to write, and to associate with these sounds and lip-movements the characters which represent them. As soon as he can pronounce a word correctly, the child is taught the meaning of it. When he can say *ball*, a ball is shown to him, the connection being thus established in his mind.

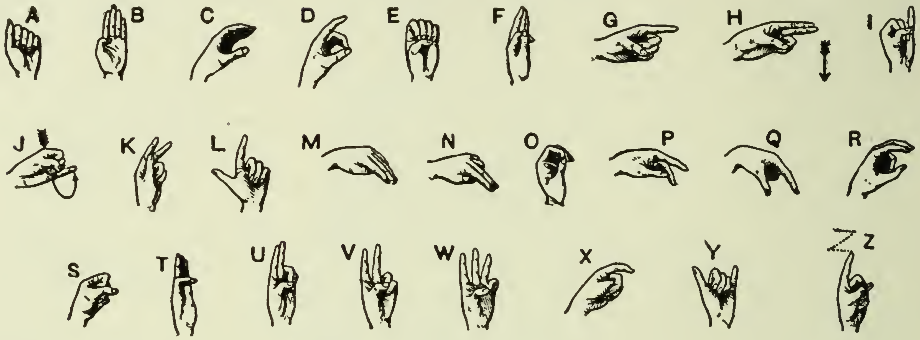
The oral method seems to have originated in Germany and was studied there by Horace Mann and Samuel G. Howe, who endeavored in 1842 to introduce it into America.The Clarke School, established in 1866 at Chelmesford, Mass., was the first oral school in the United States, other pioneers being the New York Institution for the Improved Instruction of Deaf Mutes, and the Horace Mann school of Boston. The oral method is now used in a number of institutional schools and is the prevailing method in day schools. A modification of this method known as the auricular method is used with semi-deaf pupils, whose hearing is utilized as far as may be, either with or without the use of artificial appliances.

In the earlier method of oral instruction the pupil learned to speak by watching the teacher's lips and tongue and even by grasping the teacher's throat and then imitating the muscle action. A new method of teaching speech was introduced in 1848 by A. Melville Bell and introduced into America by his son Alexander Graham Bell. This system comprises 'a series of phonetic characters based on the position of the vocal organs when in action. The characters suggest to the eye the mechanism of speech in the formation of every possible sound that can be uttered.' (See VISIBLE SPEECH.)

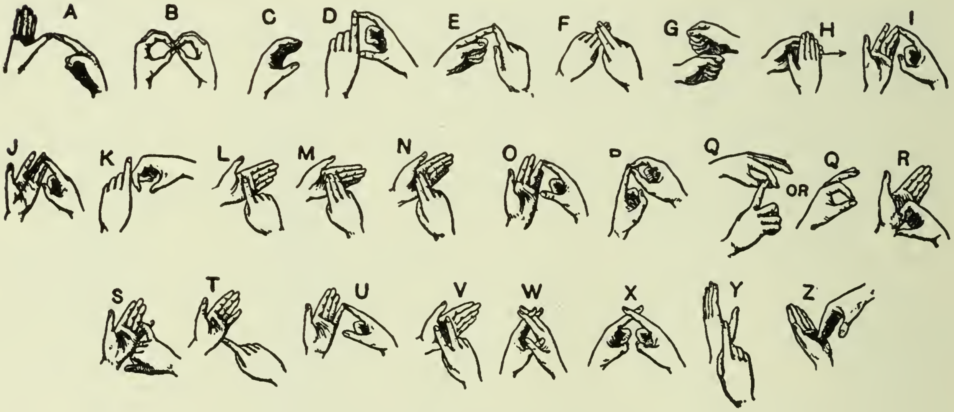
The *combined method*, as the name implies, is a combination of the manual and oral methods. In it mental development and the acquisition of language are made the primary aim, and speech and speech reading the secondary. This method is the predominant one in institutions in the United States, but is not used to any extent in day schools.

The curriculum in schools for the deaf varies widely, being determined largely by the demands of various schools. In a report of a Special Committee submitted to the Eleventh Triennial Conference of Superintendents and Principals of American Schools for the Deaf, in December, 1919, it was recommended that the work in schools for the deaf should cover the work of the eight grades of the ordinary public school and two years of high school work—the course of instruction to cover twelve years. Industrial training forms an important feature of the work and covers a wide field, the most common subjects being carpentry, sewing, printing, farming, shoe-making, and painting.

After leaving school, the deaf mostly find employment in the ordinary handicrafts. They sel-



One-hand Alphabet for Deaf Mutes.
This is the alphabet used almost entirely in the United States.



Two-hand Alphabet for Deaf Mutes.
This is the form of alphabet in general use in Great Britain.

dom find their way into business or professional life, though a few deaf mutes have succeeded as clergymen, lawyers, editors and teachers. Of the 43,812 deaf mutes in the United States reported by the Census of 1910, 37.5 per cent. were engaged in agricultural pursuits, and 36.1 per cent. in manufacturing and mechanical occupations.

The Blind Deaf.—The blind deaf constitute a special class for educational purposes, as they can be taught through the sense of feeling only. The common method is by the use of the manual alphabet, the name of an object being spelled into the hand of the pupil, who is at the same time given the object to feel. This method is later extended to acts and eventually to more abstract ideas. Laura Bridgman and Helen Keller (qq. v.) are two famous examples of the blind deaf who have thus acquired a liberal education.

Bibliography.—Consult Bell's *Deaf-Mute Instruction in Relation to the Work of the Public Schools;* Peet's *The Family Instruction of the Deaf in Early Childhood;* Gordon's *Notes and Observations on the Education of the Deaf;* Farrar's *Arnold on the Education of the Deaf;* Boultbee's *Practical Lip-reading for the Use of the Deaf;* Long's *The Sign Language* (1910); Best's *The Deaf: Their Position in Society and the Provision for their Education in the United States* (1914); R. O. Johnson's *Special Report* submitted to the Eleventh Triennial Conference of Superintendents and Principals of American Schools for the Deaf (1919); *Bulletin, 1919, No. 79,* U. S. Bureau of Education, on *Schools for the Deaf, 1917–18* (1920).

Deafness, or the loss of hearing, may be either congenital or acquired. Congenital deafness is due generally to lack of development or to destruction of the inner ear. Its primary cause is unknown, though heredity seems to play a rôle. Acquired deafness usually follows one of the acute infectious diseases. It occurs chiefly after scarlet fever and meningitis, but may follow typhoid fever, measles, diphtheria, whooping cough, and other diseases. It may be due, also, to primary disease of the auditory organs or to injuries of that portion of the brain lying between the auditory centre and the ear. Temporary deafness may result from overdoses of certain drugs, from the accumulation of wax in the ear, or from sudden fright.

Deafness is of varying degrees from simple impairment of the accuracy of hearing to complete incapacity for hearing any sound. Complete deafness occurring before the acquisition of the power of speech results in the inability to speak also (see Deaf Mutes).

Congenital deafness is incurable. Acquired deafness may be treated, but always by a physician. The practice of inserting hairpins or other wire instruments in the ear is a most pernicious one. Syringing except on the advice of a physician is also dangerous.

The best preventive measures against acquired deafness are due attention to primary ear troubles, treatment of adenoids and other diseases of the respiratory tract, and all measures directed to checking the spread of the acute infections.

Deák, Ferencz (1803–76), Hungarian statesman, was born in the county of Zala. He studied law and in 1832 was elected to the national Diet, where his eloquence, parliamentary skill, and warm patriotism secured for him the leadership of the Liberal opposition. In 1848 he became minister of justice in the Batthyanyi cabinet and mapped out a thorough judicial reform, which, however, was interrupted by the Revolution. When the ministry resigned, on the outbreak of hostilities against Austria, Deák retired to private life. In 1860 he once more rose to prominence, after Francis Joseph had been forced to promise to the Hungarians the restoration of their ancient rights. He was elected to the Diet of 1861, and became the leader of that body, as well as the foremost champion of national liberties. His firmness, eloquence, and wisdom brought about the compromise of 1867 which governed the relations between Austria and Hungary up to the time of the Great War (1914). Consult *Ferencz Deák, a Memoir,* with preface by Sir M. E. Grant-Duff, and Steinbach's *Franz Deák.*

Dea'kin, Alfred (1856–1919), Australian statesman, was born in Melbourne. He was educated at Melbourne University, was elected to the Victorian Parliament (1879), and was minister of public works and water-supply (1883–6), solicitor-general (1885), chief secretary (1886–90), and attorney-general of the commonwealth (1901). He was three times a member of the National Australian Federal Convention (1890, 1891, 1897–8), and twice of the Federal Council of Australia (1889–95, 1897–9). As the representative of Victoria he visited England during the passage of the Commonwealth Act, and became attorney-general of the first Commonwealth ministry. In 1903 he succeeded Sir Edmund Barton as premier, and held office until 1904. He was again premier in 1905–08 and 1909–10. In 1915 he was president of the Australian Commonwealth Commission to the San Francisco Exposition. He published *Irrigation in Western America* (1885), *Irrigation in Egypt and Italy* (1887), *Irrigation in India* (1892), *Irrigation in Australia* (1893), and *Temple and Tomb* (1894).

Deal, seaport and municipal borough, on the east coast of Kent, England; 18 miles southeast of Canterbury. Deal has mainly arisen to supply the wants of the numerous vessels which are often detained by the winds in the Downs, and the chief branches of industry are connected with maritime pursuits, boat-building, sail-making, piloting or hoveling, victualing and naval stores. The prosperity of the place now depends largely on sea-bathing, on the military depôt at Walmer (2 miles south of Deal), and on the shipping in the Downs.

Deal has been one of the Cinque Ports since the 13th century. Of the three castles built by Henry VIII. in 1539, Deal Castle is the residence of its 'captain'; Walmer Castle is the residence of the Warden of the Cinque Ports. Pop. (1911) 11,297.

Deal, a term applied to the wood of the yellow or Scotch fir (*Pinus sylvestris*) and of the white or spruce fir (*Abies excelsa*). It is also used to denote all pine wood which is cut ready for the joiner, in distinction from the carpenter's 'timber.' Deals, in a particular sense, are pieces of pine wood of 9 in. by 3 in. section.

Dealfish (*Trachypterus arcticus*), one of the ribbon-fish (q. v.) which occur in the North Atlantic. It differs from the members of the other genera in the fact that the ventral fins are composed of several branched rays.

De Amicis, Edmondo. See Amicis.

Dean. A title variously applied, chiefly to ecclesiastical dignitaries. (1.) The head (*decanus*) of ten monks in a monastery. The senior dean is accorded preëminence, and in the absence of abbot and prior assumes the government. (2.) The chief of the Sacred College of Cardinals at Rome (cardinal dean) presides, in the absence of the Pope, in the consistory. (3.) The head of the chapter of canons of a cathedral or collegiate church. (4) The dean of the province of Canterbury is the bishop of London. (5) Head (rural dean) of a division of an archdeaconry, exercising jurisdiction under the bishop or archdeacon. The office was obsolete in England from the 16th century, having been restored since 1835. (6) In the American episcopacy the president of a convocation. (7) Dean of peculiars, having charge of a particular church exempt from the jurisdiction of the bishop, as of Battle in Sussex, the chapels royal in England, and six deans of the chapel royal in Scotland. (8) Dean of the Arches, the judge of the ecclesiastical court of the diocese of Canterbury. (9) Fellow of a college of Oxford, of Cambridge, or of Dublin, who superintends the chapel discipline and services. (10) In German and American universities the professor who presides over each faculty. (11) The president of a faculty in a Scottish or ancient Continental university, or in a college affiliated to London University. (12) The president of the Faculty of Advocates in Scotland.

Dean, FOREST OF, ancient royal forest in the west of Gloucestershire, England, between the Severn and the Wye. It is a hilly tract of land about 20 miles in length north and south, and 10 miles east and west, noted for its deposits of coal and iron. It also has stone quarries.

Dean, WEST, township in the Forest of Dean (q. v.). Pop. (1911) 11,676.

Deane, SILAS (1737–89), American diplomat, was born in Groton, Conn. He was graduated from Yale (1758), was admitted to the bar in 1761, and was active in the preliminaries of the American Revolution. From 1774 to 1776 he was one of the Connecticut delegates to the Continental Congress, and in the latter year went to France as a secret diplomatic and financial agent. With Benjamin Franklin and Arthur Lee he arranged political and commercial treaties with France, the documents being finally signed at Paris on Feb. 6, 1778. He also arranged for financial assiatance from that country, and entered into expensive agreements with Lafayette, De Kalb and others for their personal services. He was recalled by Congress on charges of extravagance in these matters, and returned to America early in 1778 to meet the charges. The controversy necessitated another visit to France for the purpose of obtaining papers covering his financial transactions, but on his arrival in that country he learned that he had become *persona non grata* to the French government through the publication of some of his despatches. Deane retired to Holland, and afterward to England, where he died in poverty and much embittered by his unjust treatment by Congress, instigated, it is thought, by Arthur Lee, with whom he had quarrelled in Paris. Congress in 1842 voted that a considerable sum of money was due him, and ordered it paid to his heirs. In connection with these matters Deane published three brochures: *Paris Papers*, or *Mr. Silas Deane's late Intercepted Letters to his Brother and other Friends* (1781), *Letters to Hon. Robert Morris* (1784), and *An Address to the Free and Independent Citizens of the United States of North America* (1784). See *The Deane Papers* (5 vols., 1886–90).

Dean of Guild, formerly, in Scotland, the head of the merchant guild. His functions are now confined to the regulation of buildings within borough limits.

Dearborn, dēr'burn, HENRY (1751–1829), American soldier, was born in Northampton, N. H. He studied medicine and became a practising physician, but on the outbreak of the Revolutionary War, left his practice to raise a militia company, of which he was made captain. He served in the battle of Bunker Hill, accompanied the Arnold expediton against Canada, and in December 1775 was taken prisoner at Quebec. Exchanged in March, 1777, he was in the same year made a lieutenant-colonel of New Hampshire militia, and took part in the battle of Monomuth, in Sullivan's expedition against the Indians in Western New York, and in the final Yorktown campaign. He was secretary of war in the cabinet of President Jefferson (1801–9); became a major-general in January, 1812, and until his honorable discharge in June, 1815, was the senior officer of the U. S. Army. At the outbreak of the War of 1812 he was placed in command of the northern department. He effected a partial conquest of Upper Canada, whose capital, York (now Toronto) he captured (1813); but he proved unequal to his position and in 1813 he was superseded at the front by the more incapable Gen. James Wilkinson. In 1822–4 he was U. S. minister resident in Portugal.

Dearborn, FORT, a fort established by the U. S. Government on the site of Chicago, Ill., in 1804 and named in honor of Henry Dearborn, then secretary of war. It was evacuated by the small U. S. garrison (about 70) on Aug. 15, 1812, and was destroyed on the following day, the garrison being attacked soon after leaving the fort by Indians and about two-thirds of their number being killed. The survivors, after being taken to Mackinaw, were released. The fort was reëstablished by the U. S. Government in 1816, but was subsequently again abandoned. Consult Kirkland's *The Chicago Massacre of 1812*; Wentworth's *Early Chicago, Fort Dearborn.*

Death. It is one of the fundamental doctrines of physiology that every part of the organism has its own definite term of vitality, and that there is a continuous succession of the destruction of old cells and the formation of new ones in all tissues. Every blow we strike, every thought we think, is accompanied by the death and disintegration of a certain amount of muscular or nervous tissue as its necessary condition; and thus every action of our corporeal life takes place at the expense of the vitality of a certain amount of organized structure. This is termed *molecular death*, and, within its proper limits, is obviously essential to the life and well-being of the organism.

The cessation of the circulation and respiration may be regarded as constituting *somatic death*, or the death of the entire organism, which must obviously be shortly followed by the molecular death of every portion of the body.

The first person to attempt a classification of the modes of human death was the great French physician Bichat. He based his classification on a metaphor, that since life rests on a tripod of heart, lungs, and brain, death may follow the failure of any one of these supports and may consequently follow syncope, asphyxia, or coma. A better classification is as follows:

(1) Syncope. As brain and heart act together, there is in syncope a loss of consciousness and an impairment of the circulation. Conversely, this form of death may follow disease of the circulatory or of the nervous system. A large hæmorrhage, or fatty degeneration of the heart, may give rise to syncope; and a mental shock or a physical blow on the head or on the epigastrium may produce the same result.

(2) Asthenia. This means literally death from want of strength. It is a common termination of old age and of fevers. All the functions of the body are impaired; the patient tends to slip down in bed, the pulse is thready, and a low muttering delirium often results from the enfeeblement of the brain. Mistress Quickly's description of Sir John Falstaff's death (*Henry V.*, II. 3) is a wonderfully accurate clinical picture of asthenia.

(3) Asphyxia or apnœa. The interference with breathing may be rapid, as in laryngeal disease, or slow and gradual, as in bronchial or pulmonary troubles. Before death, as a rule, the sensibility is dulled, the mental func-

tions impaired, and the suffering abated.

(4) Coma. This may result from direct injury to the brain, as in apoplexy, or from poisoning of the nervous centres, as in uræmic or opium poisoning. There is profound unconsciousness, the pupils being insensitive. The pulse is at first slow, but just before death it becomes rapid and irregular, while the temperature generally rises. The breathing is stertorous, and death is due to suffocation.

While these four distinct modes of death are recognizable, the types are frequently combined.

The ordinary signs of death are cessation of respiration and circulation, cooling of the body, cadaveric rigidity, and putrefaction. In cases of trance or suspended animation, however, the cardiac and respiratory action may be so feeble as to be imperceptible even to trained observers. To distinguish between such conditions and death, numerous devices have been suggested. One of the commonest—though not entirely dependable—is to hold a mirror before the patient's mouth and nostrils for five minutes; if it is undimmed at the end of that time respiration has finally ceased. In all cases, the preliminary steps of decay are conclusive. The lustre of the eye is quickly lost, its tension falls, and the cornea becomes flaccid and dimmed. The elasticity of the skin disappears, and hypostasis or gravitation of the blood to the most dependent parts of the body begins to show about eight hours after death. Rigor mortis (q.v.) usually sets in about the same time, and lasts fully twenty-four hours. Although in some cases the temperature may rise a few degrees after death, cooling quickly sets in, and at ordinary temperatures the body is quite cold in twelve to twenty hours.

The ultimate cause of death is the failure of the heart to function, causing a cessation of the circulation of the blood and consequent loss of nourishment to the tissues. This failure of the heart is brought about by so large a number of causes that it is impractical to attempt here to name them. In general, the following may be said to be preeminent: disease, particularly cancer, tuberculosis, kidney diseases, typhoid fever, pneumonia, and diphtheria; injuries; burns or scalds; poisoning; freezing; starvation; asphyxia; drowning; shock; electricity; old age.

Registration of death is a legal requirement in many countries. Following a death physicians are obliged to file a certificate giving its cause before permission to bury the body can be obtained. For disposal of the dead see Burial, Burial Customs, Cremation, Cemetery. See also Vital Statistics.

Death, in its biological aspect, has been described as the penalty for having a body. In the Protozoa there is no distinction between the germ plasm (see Heredity) and soma or body; a protozoön reaches its limit of growth, and then divides to form two new individuals. It therefore follows that 'death as a natural recurrent phenomenon has no place among these organisms.' With the Metazoa it is otherwise: here the individual may be said in a large sense to exist only in order to hand on the deathless germ plasm to the new generation.

In law a distinction is made between *natural* or physical death and *civil* death. Civil death is the extinction of civil rights following conviction of treason or of felony or banishment. In England civil death has been abolished and in its strictest sense it is not recognized in the United States. The law also considers as dead any person who has disappeared from his usual haunts for a period of seven years and about whom nothing can be discovered within that time. Hence a woman, after hearing nothing from or about her husband for such a period is legally free to remarry.

Death Adder. See Adder.

Deathbed Declaration. See Declaration of Deceased Persons.

Death Cup. See Mushrooms.

Death, Dance of. See Dance of Death.

Death Duties. See Inheritance Tax.

Death Mask. See Mask.

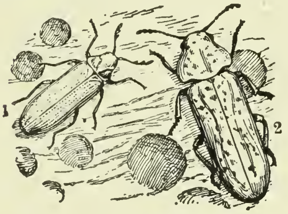
Death Rate. See Vital Statistics.

Death's Head Moth (*Acherontia atropos*), a large moth belonging to the sphinx family, Sphingidæ, which owes its name to the fact that the body bears a peculiar mark somewhat resembling a skull and crossbones. The caterpillar measures about four inches, is brightly colored, and has a horn-like appendage near the tail. It is chiefly nocturnal in its habits and feeds upon the potato, deadly nightshade, and other plants. When full-fed it burrows in the earth, and there pupates. The adult moth has a dark plum-colored body striped with black, and soft and downy wings, the fore pair brown with yellow spots and markings, the hind pair yellow banded with black. A remarkable characteristic of this moth is its ability to produce a squeaking noise.

Death's Head Moth

Death Valley or Amargosa Desert, an arid valley, formerly the bed of a salt lake, in the southeast corner of Inyo county, California, about 100 miles long (from north to south) and from 10 to 20 miles wide. It includes the lowest point in the American continent, 276 feet below sea level. Two river beds, usually dry, traverse it, Furnace Creek and the Armagosa, and it is walled in on three sides by high mountains. The rainfall is slight, there is no vegetation in the valley bottom, and many travellers have perished there of thirst.

Death Watch, a name given to beetles of the Ptinidæ order, belonging to the genus *Anobium,* living chiefly in old furniture and woodwork, to which they are often extremely destructive. They produce a curious ticking sound by hammering with the head against wood; this is presumably a sexual call, but is interpreted by the superstitious as a herald of death. The name death-watch is erroneously given by some entomologists to dust-lice or book-lice (q.v.).



Death-Watch

1. Anobium domesticum. 2. A. tessellatum.

De Bary, dā bä'rē, Heinrich Anton (1831–88), German botanist and biologist, was born in Frankfort-on-Main. He was professor of botany at Freiburg (1855–66) and at Halle (1867–72), and in 1872 became first rector of the University of Strassburg. He is chiefly known by his researches in connection with fungi, of the science of which (mycology) he may be styled the founder. He also made important contributions to bacteriology. His chief works are *Vergleichende Anatomie der Vegetationsorgane bei den Phanerogamen und Farnen* (1877); *Morphologie und Physiologie der Pilze, Flechten, und Myxomyceten* (1866); *Vorlesungen über Bakterien* (1885; Eng. trans. 1888).

Debates and Debating. A debate may be defined specifically as a setting forth of the pros and cons of a definite subject by two individuals or groups of individuals under certain fixed rules. In school and college debating it is customary to have three speakers on each side, with a given time limit for speaking. Each debater is generally assigned one main line of argument, and speakers are usually allowed six to eight minutes each. Rebuttal speeches must introduce no new matter, although new evidence may be brought out to sustain a controverted point. The debate is opened by the first speaker for the affirmative, whose speech should be largely introductory and expository. He should cover the essential points as stated, and should develop at least one line of argument. The first negative speaker should, as a rule, make a direct reply to the first affirmative speaker, following it with his brief of the case for the negative. The second speaker on each side should elaborate and carry on the proofs, and the last speaker should elaborate the final points and conclude, closing up any gaps left by his colleagues or made by his opponents and summarizing the proof for his side. A short speech in rejoinder is usually allowed the affirmative leader, and sometimes a representative from each side is allowed a speech in rebuttal. Judges chosen by mutual consent usually decide the question on the merits of the arguments and the excellence of presentation.

Literature contains many examples of debates famous for oratory, lucidity, and eloquence. Among notable examples are the Douglas-Lincoln debates, the Webster-Hayne debate, and, in recent times, the Bryan-Darrow debate.

De Bay. See Bajus.

De Beauchamp, Richard. See Warwick.

De Beaumont, Elie. See Beaumont.

De Beaumont, Eon. See Eon de Beaumont.

De Belloy. See Belloy.

Deben′ture, a word of somewhat elastic meaning, but popularly understood to denote a form of security given by companies for money advanced to them on loan. Debentures are, however, sometimes issued by clubs, and even by individuals. A debenture is usually, but not always, under seal; it acknowledges indebtedness on the part of the debtor, and contains a promise to repay the principal either at a specified date, or only on the happening of certain contingencies, with interest in the meantime. Debentures are generally secured by a trust deed vesting certain property in trustees, who are given a power of sale on the company making default; generally, too, the debentures themselves contain either a floating charge on the company's property as a whole, or a specific charge on some particular part of the undertaking. See Company.

De Bethune, Maximilien de. See Sully M. de B., Duc de.

Debi Patan, dā′bi pä′t*a*n, village, India, in Gonda district, Oudh. It is said to be the original centre of the Siva form of worship in North India. A religious fair attended by many thousands is held here every year.

Debir, dē′b*e*r, a city of Judah (Josh. xv. 49), called also Kirjath-sepher and Kirjath-sännah. It was in the hills north of Beersheba, and was the farthest city to the south attacked by Joshua (Josh. x. 38). The site is that of the present village of Ed-Dhâherîyeh, southwest of Hebron.

Debit and Credit. See Bookkeeping.

Deb′orah, an Israelitish heroine of the period of the Judges. She joined Barak in a campaign to deliver Israel from the yoke of the Canaanites, and utterly routed the native confederation under Sisera, near Megiddo, on the Kishon. The narrative is given in two forms: (1) the Song of Deborah (Judg. v.), which, if not by the heroine herself, is certainly of contemporary origin and therefore of great historical value; (2) a prose version (Judg. iv.) by a later writer, according to which Deborah was both a prophetess and a judge, the wife of Lapidoth, resident in Benjamin.

De Bow, dē-bō′, James Dunwoody Brownson (1820-67), American journalist, was born in Charleston, S. C. After some years of mercantile occupation, he was graduated from Charleston College in 1843 and for a time practised law. He became a contributor and later editor of the *Southern Quarterly Review*, for which he wrote an article on the Oregon question which was widely discussed. In 1845 he removed to New Orleans and established *De Bow's Review*. He became professor of political economy in the University of Louisiana in 1848, and was chief of the bureau of statistics of Louisiana and superintendent of the Seventh U. S. Census, in 1853–5. He was an ardent advocate of secession and was chief agent for the purchase and sale of cotton for the Confederacy. He published *Industrial Resources of the Southern and Western States* (1853), and compiled from the census statistics *A Statistical View of the United States* (1854).

Debreczin, deb′ret-sen (Hun. *Debreczen*), town and episcopal see, Hungary, in Hajdu county; 138 miles east of Budapest. It is the centre of the Hungarian Protestants, and has a theological (Calvinist) college and an agricultural academy. Manufactures include flour, cigars, brushes, and machinery, and there are famous cattle markets. The synod which adopted Calvinism as the national religion of Hungary was held here in 1567. In 1849 Debreczin was for some weeks the seat of the revolutionary government; and here, on March 15, 1849, Kossuth proclaimed the independence of Hungary. Pop. (1920) 103,186.

Debruised, dē-bro͞ozd′, in heraldry. When an animal or other charge has one of the ordinaries laid over it, it is said to be *debruised* of that ordinary.

De Bry, Théodor. See Bry.

Debs, Eugene Victor (1855–), American labor organizer, was born in Terre Haute, Indiana. He was a locomotive fireman, engaged in commercial life, and became city clerk of Terre Haute in 1879 and a member of the Indiana legislature in 1885. He was grand secretary and treasurer of the Brotherhood of Locomotive Firemen in 1880–93, and president of the American Railway Union, 1893–7. He conducted a successful strike on the Great Northern Railway, and was acquitted on a conspiracy charge, but was sent to jail for six months for contempt of court while conducting the great strike of the Western roads in 1894. He was the Social Democratic candidate for the presidency in 1900, and the Socialist candidate in 1904, 1908, and 1912, but declined nomination in 1916. Following a pacifist speech made at Canton, Ohio, in September 1918, he was charged with a violation of the Espionage Act, was sentenced to ten years' imprisonment, and entered Leavenworth prison on April 13, 1919. While still in prison he was again nominated as presidential candidate by the Socialist Party. His sentence having been commuted by President Harding, he was released on Dec. 25, 1921.

Debt, in the most general sense any obligation, whether present or future, which may be discharged by a money payment. In the strict common-law sense of the term, however, it is restricted to an obligation calling for the payment of a definite sum presently or at a definite time in the future or on demand. In this sense, debts are classified as simple-contract debts, specialty debts and debts of record, sometimes but improperly called contracts of record. The simple-contract debt is created by an agreement by parole or in writing not under seal to pay a liquidated sum of money at a given time; a specialty debt arises from a similar promise or agreement contained in an instrument under seal, such as a bond; while a *debt of record* is a judgment for a definite sum of money, whether for breach of contract, tort, or other cause of action, duly entered in a court of record.

The common law remedy against a defaulting debtor is an action of debt. In certain cases, especially where the debt is one of record, modern statutes generally provide a process of a summary nature. Ultimately the creditor's claim is satisfied by execution against the debtor's estate. In the administration of the estates of bankrupts or decedents, debts due the state—taxes, excise duties, etc.—and debts of record are given preference over those due to private persons. The preference formerly accorded to specialty over simple-contract debts has been generally done away with by statute. In the absence of statute, an insolvent debtor may prefer one creditor over another, and may pay his debts in the order he chooses. Modern bankruptcy statutes usually forbid such preferences in the interests of the state and of the general creditors.

The treatment of debt as a pecuniary obligation to be satisfied out of the estate of the debtor, and not as a breach of faith involving turpitude and punishment, is a result of the reorganization of society on a commercial basis. Primitive law makes little or no distinction between the position of one who fails to meet his legal obligations, and one guilty of crime. Both are liable to have their person seized by the injured party. This is exemplified both in the ancient Jewish law and the laws of Greece and Rome. In the Roman law the insolvent debtor became the slave of his creditor. By the common law of England for several hundred years debtors were subject to imprisonment at the pleasure of their creditors, or until their debts should be discharged. The system of imprisonment for debt prevailed also in many of the United States. It was abolished in the latter country about 1831, but survived in England until 1868. The liability to arrest in civil actions for debt which still remains is based not on the debt, but on the fraud or other misconduct by which a debtor may seek to deprive a creditor of his legal remedy for the satisfaction of the debt.

See ABSCONDING; ATTACHMENT; BANKRUPTCY; DEBT, PUBLIC; GARNISHMENT; INSOLVENCY.

Debt, Public. Public indebtedness arose with the development of constitutional forms of government, which are responsible for their borrowings. Public expenditures of a volume exceeding annual revenues are the cause of a government's public debt. Emergencies and the need for capital outlays to cover a long period of years force administrations from the pay-as-you-go principle, and the ultimate payment from taxes or other revenue is held in abeyance in the form of long-term indebtedness. Such expenditures are usually extraordinary.

Public borrowing is also resorted to for short period financing because of a maladjustment of tax collection dates and ordinary governmental expenditures. It has developed so that taxes are payable at some time advanced within a year, while public payrolls and other expenditures run continually throughout the year; consequently the gap between outgo and income must be financed by loans. This is particularly true in the State and local governments of the United States.

The usual form of long-term public debt is found in bonds carrying a promise or option of redemption, although some governments carry such debts in perpetuity. However, in the United States it is a general policy to eventually redeem all loans. Governmental loans have also been achieved through issues of paper currency, and many European governments floated huge internal loans in this manner following the World War. This policy, if unrestrained, has many untoward effects. Short-term borrowing is usually evidenced by ordinary bank loans, short-term treasury certificates, notes or by tax anticipation warrants.

Except for great national emergencies, public loans usually represent a strictly business proposition, and this is particularly true for state and local borrowing. When the United States' Federal Government borrows money under ordinary conditions, it does so in the regular financial market. Many authorities commend the practice of a government's selling its bonds directly to the ultimate owner.

In war years when market conditions are not conducive to large bond issues at a reasonable interest rate, the patriotism of the people is drawn upon. The Liberty and Victory Loan issues during and following the World War stand as examples of such marketing of bond issues. From 1917 through 1919 the Federal Government borrowed $25,000,000,000 without impairing the nation's financial structure.

Debt redemption follows two general methods, although the Federal debt redemption policy cannot be strictly classed as either. The older sinking-fund method calls for the setting aside annually, or at other intervals, an amount which will equal the amount of the loan with accumulated interest at the date of maturity. Sinking funds are susceptible to 'freezing' and 'borrowings' for other purposes. Authorities generally agree that this method represents an uneconomical procedure. The modern serial bonds are much more desirable, for thereby interest and a specified portion of the principal are paid annually and a specific tax may be levied therefor. The redemption of Federal loans is largely a matter of administrative policy, redemption being made as surpluses from revenues and foreign debt payments occur, or when the reverse is true, maturing bond issues are renewed and more debt is incurred. Federal bond issues are for the most part credit bonds, which may be treated in this manner.

The major cause of the national debt of the United States (and other nations as well) has been war, but in the past there have been instances wherein the borrowings have been for extra-war activities. The Louisiana purchase was financed by borrowing, bonds have been floated for gold purchases to stock the Treasury reserve, and the construction of the Panama Canal was partially financed by a bond issue. There is a tendency for governments, like private corporations, to utilize the advantages of credit in times of peace.

The Revolutionary War gave the United States its first national debt of $75,463,000 in 1791. The Civil War carried it to a high of $2,756,000,000 in 1866. In 1915 it stood at $1,190,000,000, and the World War raised it to a peak of $26,594,000,000 in 1919. During the 1920's the aggregate debt was gradually reduced to about $16,000,000,000. Then the emergency of the depression which was well under way in 1930 called for expenditures which created the all time high of $27,000,000,000 at the middle of 1934. It was anticipated that the total would pass $30,000,000,000 by 1935.

The total public debt of the nation, Federal, State and local, approximated $45,000,000,000 in 1934—equal to about 30 per cent of the value of privately owned real property. As indicated above, the Federal debt represents 60 per cent of the total, while the State governments account for about 6 per cent and local governments about 34 per cent of the total. The bulk, well over half, of the State debt has been incurred for highway development. About one-third of the local debt is for public service enterprises, which are usually considered self-liquidating. The next largest item is for education and represents nearly 20 per cent of the total. About 15 per cent of the local indebtedness exists because of local highway and street developments.

The national debt of most of the countries of the world for dates ranging from December 31, 1932 to December 31, 1933, and converted to dollar volume on the basis of estimates by the Director of the Mint of the values of foreign monetary units for the last quarter of 1933, together with the per capita figure based upon reliable population estimates, was as follows:

Nation	Debt (000,000 omitted)	Per Capita Debt
Argentine	$ 1,612	$ 136
Australia	7,067	1,063
Austria	419	62
Belgium	7,326	892
Bolivia	115	38
Brazil	24	1
Bulgaria	192	31
Canada	2,596	247
Chile	671	153
China*	1,459	3
Columbia	144	18
Costa Rica	57	105
Cuba	168	42
Czechoslovakia	1,124	75
Denmark	326	89
Dominican Republic	19	16
Ecuador	13	5
Egypt	433	30
Esthonia	25	23
Finland	88	24
France	11,000	262
Germany	2,939	45
Great Britain	32,000	696
Greece	557	85
Guatemala	20	9
Haiti	15	6
Honduras	13	14
Hungary	353	40
India	5,335	15
Indo-China*	61	3
Italy	5,100	124
Japan	3,944	59
Latvia	19	10
Liberia	2	2
Lithuania	14	6
Mexico	896	53
Netherlands	1,095	134
Nicaragua	6	7
Norway	401	138
Panama	18	36
Paraguay	7	8
Persia	15	2
Peru	149	21
Poland	567	18
Portugal	308	44
Roumania	1,092	57
Russia†	5,992	36
Salvador	24	16
Siam	42	4
Spain	3,865	161
Sweden	590	95
Switzerland	948	231
Turkey	384	27
United States	22,539	179
Uruguay	306	161
Venezuela	4	1
Yugoslavia	683	49

* 1931

† As recognized by the Soviet.

The growth of the national debt of the United States since 1800 is as follows:

June 30	Gross Debt	Gross Debt Per Capita
1800	$ 82,976,000	$ 15.63
1810	53,173,000	7.34
1820	91,016,000	9.44
1830	48,565,000	3.77
1840	3,573,000	.21
1850	63,453,000	2.74
1860	64,843,830	2.06
1870	2,436,453,269	63.19
1880	2,090,908,872	41.69
1890	1,122,396,584	17.92
1900	1,263,416,913	16.56
1910	1,146,939,969	12.69
1920	24,297,918,412	228.32
1930	16,185,308,299	131.38
1931	16,801,485,143	135.42
1932	19,487,009,766	156.12
1933	22,538,672,164	179.32
1934	27,000,000,000	214.00

While the national debt of the United States was gradually reduced during the 1920's, a prodigious growth in indebtedness took place during that period in state and local finance. The first three years of the 1930's experienced a reversal of this trend. The national debt increased sharply and the increment of new State and local issues gradually declined. This may be attributed to the constitutional and statutory restrictions upon such borrowing. However, the aggregate indebtedness that was built up during the era of expansion still remains to complicate the problem of state and local taxation.

See War Debts.

Consult U. S. Treasury Reports; U. S. Census Reports on *Financial Statistics of States*, and *Financial Statistics of Cities;* H. L. Lutz, *Public Finance* (2nd ed. 1929); W. J. Shultz, *American Public Finance and Taxation* (1931); Evans Clark, *The Internal Debts of the United States* (1933); F. A. Shannon, *Economic History of the People of the United States* (1934).

Debussy, d*e*-bo͞o-sē′, Claude Achille (1862–1918), French composer, was born in St.-Germain-en-Laye, and was educated at the Paris Conservatory. In 1884 he went to Rome, where he gained the Grand Prix de Rome with the cantata *L'Enfant prodigue;* although his symphonic suite *Printemps,* submitted to the Academy the following year, was declared too advanced, and to be lacking in form. During his stay in Rome he also wrote *La Damoiselle élue,* for female voices and orchestra, the setting of a French version of Rossetti's *Blessed Damozel.*

Debussy then spent a period in Russia, and on his return to Paris devoted his time to composition. In 1902 his greatest work, *Pelléas et Mélisande,* was produced at the Opéra Comique, and its author was acclaimed the leader of the new French School. This opera is a setting of Maeterlinck's drama in which all the horror, grief, and mysticism of the text are reproduced by means of novel harmonies, weird combinations of instrumental timbres, unusual progressions, and ever-shifting tonalities. In 1904 appeared his symphonic poem *L'Après-midi d'un faune,* and in 1905 *La mer,* a series of symphonic sketches. Other important works are: *Trois nocturnes; Ariettes oubliées; Petites suites;* the ballets *Jeux* and *Crimen Amoris;* incidental music to *King Lear;* besides innumerable songs and piano pieces. Consult F. Liebich's *Claude Achille Debussy.*

Dec′a (Greek, ten), a prefix of frequent occurrence: as in *decapolis,* a group of ten cities; *decalogue,* the Ten Commandments; *decameter,* a measure of ten meters, etc. From *deca* is formed *decade,* a group of ten. In the calendar of the French Republic *decade* was used to designate the week of ten days.

Dec′achord, an ancient Greek instrument of ten strings (hence the name), triangular in shape; also a kind of large guitar with ten strings.

Décadents, dā-kȧ-däṅ′, a name given a section of young writers and artists, including Stéphane Mallarmé, Verlaine, Baudelaire, Maurice Barrès, Maeterlinck, and others in France during the late nineteenth century. The term has been practically supplanted by *Symbolists,* although Décadent is still used in a general way to designate those writers whose art deals with the crude, natural, and often repulsive. Consult Symons' *The Symbolist Movement in Literature.*

Dec′agon, a term used in geometry to describe a plane figure having ten angles and ten sides. A *regular decagon* is one which has all the sides and angles equal.

Dec′alogue (Greek *dekalogos.,* 'tenfold pronouncement'), the code of religious and moral precepts generally called the *Ten Commandments.* According to Exod. xx. 19, they were proclaimed by God to the Israelites at Mount Sinai, being afterward inscribed on two tables of stone (Exod. xxxi. 18; *cf.* xxxii. 19; xxxiv. 1). Two versions are given (Exod. xx. 2–17, and Deut. v. 6–21), but the divergencies are not of essential importance. Critics are divided as to which is earlier in date of composition. Some who doubt the Mosaic origin of either believe that the oldest decalogue is to be found in the much more ceremonial series of commandments given in Exod. xxxiv. 14–26, while others accept the Mosaic authorship of the recognized ten, though in a briefer form.

As a code the Decalogue is mainly negative, and is largely confined to external actions, and thus demands the more profound and more inward interpretation given by Jesus—*e.g.,* in Matt. v., where He deals with a few of the precepts; and in Matt. xxii. 35–40, where He condenses them into what are called 'the two great commandments of the law.' It should, however, be noticed that His pair of master precepts are already found in the Pentateuch: love to God in Deut. vi. 5, and love of one's neighbor in Lev. xix. 18.

The churches are not at one in the enumeration of the ten divisions of the Decalogue, there being no fewer than three divergent systems: (1) The Jewish, as in the Talmud; (2) the Roman Catholic and Lutheran; and (3) the Greek and Reformed. The prohibitions of other gods and of image worship being closely connected, and supported in common by the reason annexed in Exod. xx. 5, 6, were even in ancient times taken together as one of the Ten Words; the number ten being made out of the rest in various ways. The Jews commonly considered the prefatory words in Exod. xx. 2 (Deut. v. 6), 'I am the Lord,' etc., as forming the first Word. The Lutheran Church, following another ancient Jewish division, divides the prohibition of evil concupiscence into two—the Ninth and Tenth Commandments, making 'Thou shalt not covet thy neighbor's house' (which in Exod. xx. 17 is mentioned first) the Ninth. The Roman Catholic Church, following Augustine, finds the Ninth Commandment in the first clause of Deut. v. 21, 'Thou shalt not covet thy neighbor's wife.' In the other Protestant Churches, and in the Greek Church, as also in Josephus, Philo, and the earliest Church Fathers, the prohibitions of other gods and of image worship are counted as the First and Second Commandments, and that of evil desire as one—*viz.,* the Tenth. Consult Dale's *Ten Commandments;* Bade's *The Decalogue: A Problem in Ethical Development* (1914).

Decameron. See Boccaccio.

De Camp', Joseph Rodefer (1858–1923), American painter, was born in Cincinnati, Ohio. He studied art under T. S. Noble at the Cincinnati school, and also at the Royal Academy, Munich, and with Duveneck in Italy. He received the first prize in the City Hall decorative competition, Philadelphia; the Temple gold medal, Philadelphia Academy of Fine Arts (1889); honorable mention at the Paris Exposition (1900); a gold medal at the St. Louis Exposition (1904); and the Beck portrait medal, Philadelphia (1911). He was a member of the National Institute of Arts and Letters and of the Ten American Painters. Some of his paintings are: *Woman Drying Her Hair* (Cincinnati Museum); *Lady Playing a Guitar* (Boston Museum); *The New Gown* (Wilstach Gallery, Philadelphia); *Little Hotel* (Pennsylvania Academy, Philadelphia); *Sally* (Worcester Museum).

Decamps, d*e*-käṅ', Alexandre - Gabriel (1803–60), French painter, was born in Paris. He studied for a short time under Abel de Pujol, and in 1827 exhibited his first pictures at the Salon—*Lapwing Hunting* and *A Soldier of the Vizier's Guard,* which attracted much favorable comment. Toward the end of 1827 he went to the Levant and soon afterward showed the first of the Oriental paintings for which he later became famous. His *Defeat of the Cimbri* (1834) attained great success, as did also *A Turkish Village, The Corps de Garde, A Café in Asia Minor,* and a series of drawings depicting the history of Samson. Decamps' forte lay in painting wild life and Oriental scenes, where his masterly treatment of light and shade had scope. His finest work is at Chantilly, and in the Wallace Collection, London. His *Night Watch at Smyrna* is in the Metropolitan Museum, New York.

De Candolle, d*e* käṅ-dōl'. Alphonse Louis Pierre Pyrame (1806–93), Swiss botanist, son of Augustin De Candolle (q. v.), was born in Paris, and succeeded (1841) to his father's chair in the University at Geneva. With others he continued his father's *Prodromus* (17th and last vol., 1873); beside writing, among other books, *Géographie Botanique Raisonnée* (2 vols., 1855): *Lois de la Nomenclature Botanique* (1867); *Origine des Plantes Cultivées* (1883).

De Candolle, Augustin Pyrame (1778–1841), Swiss botanist, was born in Geneva. He studied chemistry, physics, and botany in Paris, and there wrote his *Astragalogia* (1802), and his *Essais sur les Propriétés Médicales des Plantes* (1804). In 1802 he was elected to an honorary professorship in the Academy of Geneva, but remained in Paris, and delivered his first botanical lectures in the Collège de France in 1804. His *Flore Française* appeared in 1805. He visited all parts of France and Italy (1806–12), investigating their botany and agriculture, and embodied the results of his journeys in a supplement to the *Flore* (2 vols.) issued in 1815. In 1807 he was appointed to a chair at Montpellier, retiring in 1816 to Geneva, where a professorship of botany was founded for him. De Candolle rendered great services in the domain of descriptive botany, especially in the natural classification of plants. The greatest of his works is *Regni Vegetabilis Systema Naturale* (vols. i. and ii, 1818–21), continued in the *Prodromus Systematis Naturalis Regni Vegetabilis* (1824–73). He bequeathed a herbarium of more than 70,000 species of plants to his son, Alphonse De Candolle (q. v.).

Decap'oda ('ten-legged'), the order of Crustacea to which belong crabs, lobsters, shrimps, and their allies, and which therefore includes the highest crustaceans (see Crustacea; Crab; Lobster). The word is also applied to the sub-order of dibranchiate cuttles, to which the common squid belongs. See Squid.

Decap'olis, a region of 'ten (allied) cities' in Bashan, Gilead, and Syria, and including Bethshean (Scythopolis), in the Jordan valley (Matt. iv. 25; Mark v. 20, vii. 31). The various lists of Roman authors differ, but the ten cities included Damascus, Gerasa (Jerâsh in Gilead), Gadara, Hippos (Sûsieh, east of the Sea of Galilee), Pella (Fahil in the Jordan valley, east of the river), Philadelphia (Amman in Central Gilead), Scythopolis, Canatha (Kenath or Kanawât in East Bashan) with Capitolias (probably Beit er-Râs in North Gilead), Dion (Adun), and Raphana in Bashan.

De Cassagnac, Adolph B. G. de. See Cassagnac.

Decath'lon, an athletic contest consisting of ten events, each contestant participating in all of the events. See Olympic Games.

Deca'tur, city, Alabama, county seat of Morgan county, on the Tennessee River, 86 miles northwest of Birmingham, and about 40 miles S.E. of the Muscle Shoals dam. It has railway repair shops, car and engine works, cotton and saw mills, and manufactures of lumber, furniture, fertilizers, flour, silk and hosiery mills. Albany and Fairview were consolidated with Decatur in 1927. Pop. (1930) 15,593.

Decatur, city, Georgia, county seat of De Kalb county, on the Georgia Railroad; 6 miles N.E. of Atlanta. The Agnes Scott College (Presbyterian) for women, and Donald Frazer High School (Presbyterian) are situated here. The town is a popular summer resort. Near here on July 20, 1864, was fought the Battle of Peach Tree Creek (q. v.). Inc. 1922. Pop. (1930) 23,154.

Decatur, city, Illinois, county seat of Macon county, on the Sangamon River, and on the Illinois Central, the Wabash, the Cincinnati, Indianapolis and Western, and the Pennsylvania Railroads, and the Illinois Traction system; 170 miles southwest of Chicago. It is the seat of James Milliken University, the Wabash Division Hospital, St. Mary's Hospital, the Decatur and Macon County Hospital, the Pythian Home for the aged and orphans. Lake Decatur, 14 miles long and ½ to ¾ m. wide, formed by the construction of a dam in the Sangamon River at a cost of $2,000,000 provides a water supply adequate for a city of 150,000 inhabitants. Decatur is an important shipping point, and an active railroad and industrial centre. The manufactures include iron foundry products, plumbing and electric light fixtures, soda fountains, wire-mat goods, corn products, glucose, starch and flour.

Decatur was founded in 1830. During the period prior to the Civil War Abraham Lincoln practised law in a log cabin court house now standing in one of the city parks. Here, on April 6, 1866, Dunham Post No. 1 of the G.A.R. was organized. In 1909 the city suffered a fire loss of $1,000,000. Commission government was adopted in 1911. Pop. (1920) 43,818; (1930) 57,510.

Decatur, city, Indiana, county seat of Adams county, on St. Mary's River, and on the Erie, the Toledo, St. Louis and Western, and the Pennsylvania Railroads; 22 miles southwest of Fort Wayne. It has manufactures of lumber, tiles and staves, machinery, motors and leather, as well as meat packing plants, and stone quarries. Pop. (1920) 4,762; (1930) 5,156.

Decatur, Stephen (1779–1820), American naval officer, was born in Sinnepuxent, Md., the son of a naval officer who commanded a privateer during the American Revolution. He entered the U. S. Navy as a midshipman in 1798, and was commissioned lieutenant in the following year. During the Tripolitan War he served in the squadrons of Commodores Dale (1801–2), Morris (1802–3), Preble (1803–4), Barron (1804–5), and Rodgers (1805), and commanded at different periods the *Argus, Enterprise, Intrepid, Constitution,* and *Congress.* On Feb. 16, 1804, at the head of a small party, he entered the harbor of Tripoli, boarded and burned the captured *Philadelphia,* and effected his escape under heavy fire. For this daring exploit Decatur was promoted to the rank of captain, then the highest regular rank in the Navy. On Aug. 3, 1804, he led a division of gunboats in the attack on a Tripolitan flotilla; and he took part also in the second, fourth, and fifth attacks on Tripoli.

In the War of 1812, as commander of the frigate *United States,* Decatur captured the British frigate *Macedonian* (Oct. 25, 1812); and as commander of the *President* he was forced to surrender, after an unequal fight, to the British frigate *Endymion* and three other vessels (Jan. 15, 1815). With the courtesy rank of commodore he commanded a squadron of ten vessels in the Algerian War (1815), captured two of the enemy's vessels, and negotiated on board his flagship, the *Guerrière,* a treaty of peace whereby the Dey of Algiers agreed that no tribute should ever be required by Algiers from the United States. He then obtained indemnities from Tunis and Tripoli for violating treaties. From 1816 to 1820 he was a member of the U. S. Naval Commission. He was killed in a duel near Bladensburg, Md., by Commodore James Barron (q. v.). See *Life* by A. S. Mackenzie (1846).

Decazes, de-kȧz', Elie, Duc (1780–1860), French statesman, became a member of the Court of Appeals in Paris (1811). Accepting the Bourbon restoration (1815), he was nominated prefect of police, then successively Minister of the Interior (1818), and President of the Council (1819). Suspected unjustly of complicity in the assassination of Duc de Berri (q. v.) in 1820, he was sent to London as ambassador until public feeling against him cooled. After the Revolution of 1848 he took no further part in public life.

Deceased Wife's Sister. See Affinity.

Decebalus. See Dacia.

Deceit, in law, means fraudulently leading another to believe what is not true, and thereby causing him legal injury or damage. There must have been false representation and reasonable reliance on them. See Fraud.

DeCelles, de-sel', Alfred Duclos (1844–1925), Canadian public official, was born in St. Laurent, Quebec. He was graduated from Laval University (1867), was admitted to the bar in 1873, and later turned to journalism, editing successively *Le Journal de Québec, La Minerve* (Montreal), and *L'Opinion Publique* (Montreal). In 1880 he became assistant librarian and in 1885 librarian of the Dominion Parliament. He was a chevalier of the Legion of Honor of France. He published *La Crise du Régime Parlementaire; A la Conquête de la Liberté en France et au Canada; Les Etats Unis; Cartier; Papineau,* and other historical works.

December, the last month of the year. In the old Roman calendar, before the time of Julius Cæsar, the year began with March, and that which is now the twelfth was then the tenth month; hence the name (*decem,* 'ten'). The early Saxons called it *Mid-winter month* and *Yule month.* See Year.

Decem'viri, or Decemvirs, various commissions at Rome, of which the most important were the following:

(1) *Decemviri legibus scribendis* ('the decemvirs for writing the laws'). Their appointment (451 B.C.) was a success for the plebeians in their struggles against the patricians; for one of the plebeians' grievances was that the patricians alone were the custodians and administrators of the law. The plebeians secured the eligibility of their order to the office of decemvir, though no plebeian was actually elected then. At the end of their year of office the decemvirs published a code, which, after approval by the senate and assembly, was engraved on ten tables of metal, and set up in the forum. Decemvirs were again elected for each of the next two years, and they published two new tables of laws. But after that they began to govern tyrannically, and refused to lay down their office, until finally the insurrection caused by Claudius' treatment of Virginia forced them to resign. Their laws, known as the *Laws of the Twelve Tables* (see Twelve Tables), formed the basis of all later Roman law (q. v.).

(2) *Decemviri stlitibus* (*i.e., litibus*) *iudicandis* ('decemvirs for judging law suits'), a commission which had jurisdiction

in civil cases during the republic. Under the empire it had jurisdiction in capital cases. (3.) *Decemviri sacris faciundis* ('decemvirs for the performance of sacred rites') was a college whose members were elected for life; their chief charge was the care of the Sibylline books, and the management of the games of Apollo and the secular games. Under the kings their number was but two; about 367 B.C. this number was raised to ten—five patricians and five plebeians. Sulla, in 81 B.C., increased the figure to fifteen.

Deciduous Trees are those whose leaves fall in the autumn, in contradistinction to evergreen trees, which retain their leaves throughout the winter. Before the fall of the leaves, the sugar and other plant foods which they contain are returned to the tree, and cease to flow from tree to leaf. Among the chief deciduous trees are the oak, ash, beech, birch, and elm.

Decimal Association (offices: Oxford Court, Cannon Street, London), a British organization which advocates the compulsory adoption of the metric system of weights and measures throughout the British empire. It has published many interesting reports and bulletins.

Decimal Fractions. Ordinary fractions, such as $\frac{1}{4}$, $\frac{10}{25}$ $\frac{121}{144}$, being difficult to add and subtract, etc., it was found advisable to change them, thus, $\frac{1}{4} = \frac{2}{10} + \frac{5}{100}$. Hence the number $967\frac{1}{4}$ can be read as $900 + 60 + 7 + {}^{2} + \frac{5}{100}$. Each digit (in the fractional part as well as in the integral) has *ten* times the value of the like digit which immediately follows it. Writing that number thus, 967.25, the dot or 'decimal point' shows where the fraction begins. 23.438 lbs. stands for 23 lbs. and a fraction of a pound—*viz.* 4 tenths + 3 hundredths + 8 thousandths of one pound the unit, or $\frac{438}{1000}$. Similarly, $5.1673 = 5\frac{1673}{10000}$, and generally the denominator of a decimal fraction must be 10 or 100, 1000, etc.—*i.e.* some power of 10. The majority of ordinary fractions, such as $\frac{2}{3}$, $\frac{4}{7}$, and $\frac{5}{11}$, cannot be changed into exact decimals—thus, $\frac{4}{7} = .57142$ followed by an infinite number of digits; but practically we may say that $\frac{4}{7}$ is $= \frac{57}{100}$, or $-\frac{571}{1000}$, or $\frac{5714}{10000}$, and so on, according to the amount of accuracy that is required. Since 10 has only the factors 2 and 5, it follows that any 'vulgar fraction' (in its lowest terms) whose denominator contains any other prime factor than 2 or 5 cannot be expressed exactly as a decimal. Some, as $\frac{5}{6}$ (= .833, etc.), repeat one figure for ever, and are called 'recurring;' others, as $\frac{5}{11}$ (= .4545, etc.), $\frac{4}{7}$ (= .57142857, etc.), repeat two or more for ever, and are called 'circulating.'

Decimal System, the general title inclusive of all systems of weights, measures, and coinage, in which subdivisions and multiples proceed by powers of ten. It is the natural scientific outcome of the decimal system of number-naming, which prevails among all civilized races—a system which no doubt finds its origin in the ten fingers of the two hands. The one objection to all decimal systems is that the number 10 is not divisible into thirds and quarters without the introduction of fractions.

Decimation, or the execution of every tenth man, a punishment devised by Roman military discipline when an offence had been committed by a large body of men which rendered them all liable to death, the selection being made by lot.

Decius, whose full name was GAIUS MESSIUS QUINTUS TRAJANUS DECIUS, emperor of Rome from 249 to 251 A.D. He was born in Pannonia, of an Illyrian family. In 249 B.C. he was ordered by the Emperor Philippus to restore to subordinates the disaffected troops in Mœsia. The troops made him emperor against his will, and Philippus, meeting him at Verona, was defeated and killed. Two years later Decius himself perished in a battle against the Goths, in Thrace. During his reign the Christians were persecuted severely, among the sufferers being Origen.

Decius Mus, PUBLIUS. **(1.)** Consul at Rome in 340 B.C. On the eve of the decisive battle of Mount Vesuvius in the Latin war each of the consuls had a vision, in which it was declared that the general of one side and the army of the other would be destroyed. Decius, by sacrificing himself, enabled the Romans to win the battle, and the war was ended by the subjection of the Latins. **(2.)** Son of the above, was four times consul, and in his last consulship, in 295 B.C., followed his father's example in devoting himself to death in the great victory of Sentinum over the Samnites and Gauls.

Decken, KARL KLAUS VON DER (1833-65), German African traveller, was born at Kotzen, Brandenburg. His explorations ranged over E. Africa from Lake Nyasa to Somaliland. Decken was contemporary with Livingstone. He partly climbed (1862) Mount Kilima-Njaro, but was murdered by the Somali during his next expedition up the river Juba. See Kersten's *Von der Decken's Reisen in O. Afrika* (6 vols., 1869-79).

Declaration. Under the common law practice, the pleading containing, in proper form, a statement of the facts constituting the plaintiff's cause of action. It should set forth the venue, that is the jurisdiction in which the action is commenced, the title of the court, names of the parties, an indication of the form of action, a proper statement of the facts upon which the action is based, and an allegation of the damages claimed. In its form and nature it must correspond with the original process in the action. This pleading corresponds to the complaint under modern codes of procedure. See COMPLAINT; COMMON FORMS; PLEADING.

Declaration (Scotch criminal law). Within forty-eight hours after arrest every prisoner (who cannot be dealt with summarily) is brought before a magistrate for examination. The questions are put by the procurator-fiscal, but the prisoner may decline to answer. If he answers, his declaration, written by the sheriff-clerk, is signed by him and by the magistrate, and may be used against him at the trial. The same practice prevails in the United States, being usually called an 'examination,' to enable the magistrate to determine whether there is sufficient cause to hold the prisoner for the grand jury. The accused may 'waive examination' if he desires.

Declaration in lieu of Oath. An unsworn statement before any person or body having judicial powers, by a witness, to the effect that he will tell the whole truth and nothing but the truth in the testimony which he may be asked to give before them. At early common law only persons who believed in God could testify, as an oath was considered necessary to bind a witness, but by modern statutes an unbeliever, or one who has scruples against taking an oath, may solemnly declare or affirm that he will tell the truth instead. The legal effect is the same as an oath, and if the witness does not tell the truth he is guilty of perjury. See OATH; PERJURY.

Declaration of Deceased Persons. Under certain circumstances the declarations or statements of deceased persons may be introduced in evidence at a trial. The admission of such testimony is an exception to the general rules of evidence that hearsay must be excluded, therefore such declarations must fall within well-established classes or they cannot be admitted. The reasons for relaxing the hearsay rule in certain cases are the difficulty of proving the question upon which the statements throw light, and the supposed unusual reliability of the statements because of the circumstances surrounding them. Among the most important of these declarations may be named so-called dying declarations. These declarations are admissible in cases of homicide only and must have been made by the victim shortly before and in expectation of death, which must occur soon after the commission of the crime and must be an accusation of the person under trial. Another important class of declarations are statements as to pedigree. The question which the statements are offered to prove must be strictly one of pedigree, that is, relationship, and must have been made before the trial was begun by some one related by blood to the family. The statements must have been of facts generally accepted in the family. In certain cases family trees have been admitted as statements made by the family, or entries in the family Bible. Other examples are those where a lost will is proved by statements made by the testator with regard to it and statements against one's pecuniary or proprietary interests. These may be made by the person himself, or by some one identified in interest with him: for instance, the statements of a former owner of real property may be used against the present owner if they were made before the action was begun. But the statements of a former holder of a negotiable instrument are not admissible against the present holder. Testimony given under oath for the purpose of use at a trial hardly comes under the rule against hearsay, for here the testimony is hedged in by formalities, whereas declarations properly speaking are spontaneous and made without any thought of furnishing testimony for a trial. See EVIDENCE.

Declaration of Independence, the document by which on July 4, 1776, the thirteen American colonies declared their independence of Great Britain. At the outbreak of the Revolutionary War there seems to have been little popular sentiment in favor of independence, but gradually such a sentiment developed, and on June 7, 1776, Richard Henry Lee introduced in the Continental Congress the famous resolutions 'That these United Colonies are, and of right ought to be, free and independent states, that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved.' These resolutions, seconded by John Adams, were put aside for a time, and on June 10 a committee was appointed 'to prepare a declaration to the effect of the said first resolution.' Of this committee Thomas Jefferson was chairman; the other members were John Adams, Benjamin Franklin, R. R. Livingston, and Roger Sherman. The declaration, draughted by Jefferson, and slightly amended by Adams and Franklin, was presented to Congress on June 28. On July 2 Lee's resolutions, as given above, were passed, and on July 4, the declaration, substantially as draughted by Jefferson, was adopted, the two most significant and important changes being the excision of Jefferson's arraignments of the British people, and of King George III. for his encouraging and fostering the slave trade, which Jefferson called an 'execrable commerce.' The declaration received the votes of all the colonies except N. Y., whose delegates were at that time not authorized to commit themselves on the question. On August 2 it was signed by the delegates then present, absentees affixing their signatures later—McKean as late as 1781. Only one signer, Thornton, had taken 'no part in the discussion and vote on independence' (Friedenwald). Of the 56 signers, 7 were not members of Congress on July 4, and of those who were present on that day 7 never affixed their signatures. The declaration was written by Jefferson with consummate skill and a singular felicity of expression, and 'no document,' says Friedenwald, 'has ever been put to such severe, intimate, popular use and service.' The original document itself was long on exhibition in Washington, but in 1894, the parchment having greatly deteriorated, was stored away from air and light. In 1823, however, a facsimile was made, and this is still on exhibition. The text of the declaration is as follows:

The unanimous declaration of the thirteen United States of America. When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitles them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed. That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object, evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security. Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

He has refused his Assent to Laws, the most wholesome and necessary for the public good.

He has forbidden his Governors to pass Laws of immediate and pressing importance, unless suspended in their operation till his Assent should be obtained; and when so suspended, he has utterly neglected to attend to them.

He has refused to pass other Laws for the accommodation of large districts of people, unless those people would relinquish the right of Representation in the Legislature, a right inestimable to them and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public Records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved Representative Houses repeatedly, for opposing with manly firmness his invasions on the rights of the people.

He has refused for a long time, after such dissolutions, to cause others to be elected, whereby the Legislative powers, incapable of Annihilation, have returned to the People at large for their exercise; the State remaining in the meantime exposed to all the dangers of invasion from without, and convulsions within.

He has endeavored to prevent the population of these States; for that purpose obstructing the Laws for Naturalization of Foreigners; refusing to pass others to encourage their migrations hither, and raising the conditions of new Appropriations of Lands.

He has obstructed the Administration of Justice, by refusing his Assent to Laws for establishing Judiciary Powers.

He has made Judges dependent on his Will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of New Offices, and sent hither swarms of Officers to harass our people, and eat out their substance.

He has kept among us, in times of peace, Standing Armies without the Consent of our legislature.

He has affected to render the Military independent of and superior to the Civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his Assent to their Acts of pretended Legislation:

For quartering large bodies of armed troops among us:

For protecting them, by a mock Trial, from punishment for any Murders which they should commit on the Inhabitants of these States:

For cutting off our Trade with all parts of the world:

For imposing Taxes on us without our Consent:

For depriving us in many cases, of the benefits of Trial by jury:

For transporting us beyond Seas to be tried for pretended offences:

For abolishing the free System of English Laws in a neighboring Province, establishing therein an Arbitrary government, and enlarging its Boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies:

For taking away our Charters, abolishing our most valuable Laws, and altering fundamentally the Forms of our Governments:

For suspending our own Legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated Government here, by declaring us out of his Protection and waging War against us.

He has plundered our seas, ravaged our Coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large Armies of foreign Mercenaries to compleat the works of death, desolation and tyranny, already begun with circumstances of Cruelty & perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the Head of a civilized nation.

He has constrained our fellow-Citizens taken captive on the high Seas to bear Arms against their Country, to become the executioners of their friends and Brethren, or to fall themselves by their Hands.

He has excited domestic insurrections amongst us, and has endeavored to bring on the inhabitants of our frontiers, the merciless Indian Savages, whose known rule of warfare, is an undistinguished destruction of all ages, sexes and conditions.

In every stage of these Oppressions We have Petitioned for Redress in the most humble terms: Our repeated Petitions have been answered only by repeated injury. A Prince, whose character is thus marked by every act which may define a Tyrant, is unfit to be the ruler of a free people.

Nor have We been wanting in attentions to our British brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which, would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity, which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends.

WE, THEREFORE, the Representatives of the United States of America, in General Congress, Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the Name, and by authority of the good People of these Colonies, solemnly publish and declare, That these United Colonies are, and of Right ought to be free and independent States; that they are Absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Great Britain, is and ought to be totally dissolved; and that as free and independent States, they have full Power to levy War, conclude Peace, contract Alliances, establish Commerce, and to do all other Acts and Things which independent States may of right do. And for the support of this Declaration, with a firm reliance on the protection of Divine Providence, We mutually pledge to each other our Lives, our Fortunes, and our sacred Honor.

The foregoing declaration was, by order of Congress, engrossed, and signed by the following members:

John Hancock.

Following is an alphabetical list of the Signers and the States which they represent:

John Adams, Mass.
Samuel Adams, Mass.
Josiah Bartlett, N. H.
Carter Braxton, Va.
Charles Carroll, Md.
Samuel Chase, Md.
Abraham Clark, N. J.
George Clymer, Pa.
William Ellery, R. I.
William Floyd, N. Y.
Benjamin Franklin, Pa.
Elbridge Gerry, Mass.
Button Gwinnett, Ga.
Lyman Hall, Ga.
John Hancock, Mass.
Benjamin Harrison, Va.
John Hart, N. J.
Joseph Hewes, N. C.
Thomas Heyward, Jr., S. C.
William Hooper, N. C.
Stephen Hopkins, R. I.
Francis Hopkinson, N. J.
Samuel Huntington, Conn.
Thomas Jefferson, Va.
Richard Henry Lee, Va.
Francis Lightfoot Lee, Va.
Francis Lewis, N. Y.
Philip Livingston, N. Y.
Thomas Lynch, Jr., S. C.
Thomas McKean, Del.
Arthur Middleton, S. C.
Lewis Morris, N. Y.
Robert Morris, Pa.
John Morton, Pa.
Thomas Nelson, Jr., Va.
William Paca, Md.
Robert Treat Paine, Mass.
John Penn, N. C.
George Read, Del.
Caesar Rodney, Del.
George Ross, Pa.
Benjamin Rush, Pa.
Edward Rutledge, S. C.
Roger Sherman, Conn.
James Smith, Pa.
Richard Stockton, N. J.
Thomas Stone, Md.
George Taylor, Pa.
Matthew Thornton, N. H
George Walton, Ga.
William Whipple, N. H.
William Williams, Conn.
James Wilson, Pa.
John Witherspoon, N. J.
Oliver Wolcott, Conn.
George Wythe, Va.

‘THE SIGNING OF THE DECLARATION OF INDEPENDENCE.’
(Photographed from the Painting by John Trumbull in the Rotunda of the Capitol at Washington.)

Bibliography. Consult Friedenwald, *The Declaration of Independence: an Interpretation and an Analysis* (1904); Hazelton, *The Declaration of Independence* (1906); Chamberlain, 'The Authentication of the Declaration' in *John Adams and Other Essays and Addresses* (1898); and Tyler, *Literary History of the American Revolution* (2 vols., 1897). The best collection of biographies of the signers is still Sanderson's *Biography of the Signers of the Declaration of Independence* (9 vols., (1823–7).

Declaration of Paris. With the object of introducing uniformity into the usages of maritime warfare, the plenipotentiaries of the various powers who were parties to the Treaty of Paris of 1856, after the Crimean War, agreed on the following articles, known as the Declaration of Paris:—(1) Privateering is, and remains, abolished; (2) the neutral flag covers enemy's goods, with the exception of contraband of war; (3) neutral goods, with the exception of contraband of war, are not liable to capture under the enemy's flag; (4) blockades, in order to be binding, must be effective—*i.e.* maintained by a force sufficient really to prevent access to the coast of the enemy. The declaration was not acceded to by the United States or Venezuela, nor as to the first clause by Spain or Mexico; but in 1898, on the outbreak of war between Spain and the United States, both belligerents bound themselves by the full terms of the declaration. For violations of the declaration, see CONTRABAND OF WAR.

Declaration of Rights. See BILL OF RIGHTS.

Declarator. In the law of Scotland, an action in which the plaintiff asks the court to declare the existence of some right of his about which there is a doubt, without asking that anything shall be paid or done by the defendant; for example, a declarator of marriage is a decree of the Court of Session setting forth that A. B. and C. D. are husband and wife. If the right declared is one which gives the plaintiff a legal claim against the defendant, he must enforce it by a separate action. This form of action has never existed in the United States.

Declaratory Act, an act passed by Parliament and on Mar. 18, 1766, signed by George III, accompanying the repeal of the Stamp Act (q. v.) and declaring that the American colonies 'have been, are, and of right ought to be, subordinate unto, and dependent upon the imperial crown and parliament of Great Britain,' that the British government 'had, hath, and of right ought to have, full power and authority to make laws and statutes of sufficient force and validity to bind the colonies and people of America, subjects of the crown of Great Britain, in all cases whatsoever.' As Lord Shelburne afterwards wrote to Pitt, the effect of the act was to keep alive 'an unfortunate jealousy and distrust of the English government throughout the colonies.'

Decle, LIONEL (1859–1907), Anglo-French journalist and explorer, was born at Rocourt, St. Quentin, France. From 1881–5 he traveled in the Far East, and spent three years (1891–4) on a journey from Cape Town to Uganda and Zanzibar. He again traveled in Africa in 1896–7, and in 1899–1901 conducted the *Daily Telegraph* expedition from the Cape to Cairo. He published *Three Years in Savage Africa* (1898); and *Trooper* 3809 (1899), a realistic picture of a French conscript's life.

Declension, the term employed by grammarians to denote the changes in the structure of certain classes of words (generally the noun, adjective, pronoun, and article) to express different relationships with other words. In modern English the only declinable parts of speech are the noun and the pronoun, which are inflected to express two numbers—singular and plural—and four cases—nominative, genitive, dative, and accusative. Declension is effected by the addition of suffixes (as in the *s* in 'windows' or *en* in 'oxen'), which were originally separate words. In some cases these suffixes induced a change of the root vowel of the word, and the altered root alone remains, the suffix having dropped off—as in *man,* plural *men* (originally *menni*). See GRAMMAR.

Declination, in astronomy, is the angular distance of a heavenly body north or south of the celestial equator. In the first case it is reckoned positive, in the latter negative, and it is complementary to polar distance. Parallels of declination are the small circles parallel to the equator traversed by stars in their diurnal motion round the pole.

Declination Needle, or DECLINOMETER, an instrument for registering the amount and variations of magnetic declination. Gauss gave it a new form in 1833, by substituting telescopic for microscopic readings of a fixed scale reflected from a mirror moving with the magnet-bar, an arrangement suggested by Poggendorff in 1826. Through the adoption of Charles Brooke's photographic method, it was made self-recording in 1848, when a drum covered with sensitized paper, and caused to revolve once in twenty-four hours, was placed so as to receive a spot of light reflected from a small mirror attached to the needle. A zigzagged curve denotes the occurrence of vibrations, measurable in time and extent, and significant of changes in magnetic declination.

Decorah, city, Iowa, county seat of Winneshiek county, on the Upper Iowa River, and on the Chicago, Rhode Island and Pacific, and the Chicago, Milwaukee and St. Paul railroads; 75 miles N.W. of Dubuque. It is the seat of the Norwegian Lutheran College. The manufactures include stock and poultry feeds, cement blocks, and sash and door, and there are dairy, farm and stock and horse-raising interests. Pop. (1930) 4,581; (1940) 5,303.

Decoration Day, or MEMORIAL DAY, a day set apart (as a legal holiday) in all of the states of the American Union (except Idaho and Texas) for the purpose of commemorating the soldiers who fell in the Civil War and decorating their graves. The day thus set apart is May 30 in all the northern and western states and in Va., where, as in all the Southern states, the name adopted is 'Confederate Memorial Day.' Ala., Ga., Miss., and Fla. observe April 26; N. C. and S. C., May 10; Tenn., the second Friday in May; and La., June 3—Jefferson Davis's birthday, which is also observed, as such, in six other Southern states.

Decorations. See ORDERS OF KNIGHTHOOD, MEDAL.

Decort, FRANS (1834–78), Flemish lyric poet, born at Antwerp; became (1861) secretary to the military court, Brussels. He published the popular Flemish almanac, *Jan en Alleman.* His poetry, though virile and sometimes impassioned, deals chiefly with subjects of domestic life. He also translated (1862) some of Burns's songs. His *Liederen* appeared in 3 vols. (1857 and 1868); also *Zingzang* (1866).

Decoy. Means of attracting game within range of a hunter's weapons have been used, no doubt, ever since hunting began, and in the greatest practicable variety. Decoys fall into two classes—living and inanimate. Living decoys may be trained to the work, or simply exhibited, and expected to do nothing of their own will to aid the sportsman. Such are the stool-pigeons which formerly, with their eyes stitched up, were placed on sticks over a trap-net spread on the ground, and then made to flutter by the fowler who shook the perch by means of a cord from his place of concealment. Song-birds are caught now in Europe and elsewhere by similar means; and in this country sportsmen often tie ducks or geese by the leg to anchors and let them swim about near their 'blinds,' expecting that wild fowl will settle down beside these apparently safe and peaceful companions. Sometimes the decoy animals are taught to do their duty intelligently. Dogs have been so trained in some parts of the world; and along the N. American coast many men who make a business of shooting wild fowl have ducks which know how to go out toward a passing flock of free birds and toll them in where the man is waiting to shoot, the decoy birds dropping out of harm's way at the last moment. In this class would fall the ducks which show the way to the mouth of the trap described below; and in general the work done by such birds is often very surprising to the uninitiated.

While trained decoys are largely used in the United States as elsewhere, sportsmen more generally content themselves with images of the birds they are after. In some cases, stuffed specimens are used, but ordinarily they are images carved from wood or made of hollow metal, and painted to represent various species of water fowl or shore birds. Their use involves knowledge of the habits of the birds sought, since the decoys must be floated or set up on shore in the place and attitude and flock formation which the living birds of that species take, otherwise the attempt at deception will fail. The perfection of the decoy itself is therefore not so important as its right use, which accounts for the success some very poorly provided gunners have when compared with others possessing the finest apparatus, but scant knowledge or experience.

In Great Britain decoys are employed in connection with elaborate traps for catching wild ducks alive and in large quantities. A sheet of water is selected in a locality where absolute quietude can be secured. From the main body, known as the 'pool,' several ditches or channels ('pipes') are cut for a length of from sixty to seventy yards. Hoops are stretched over the pipe and covered with netting, so as to make it a serpentine and semitubular cage. The mouth and portion nearest the open water are screened by brush fences which enable the decoy-man to approach and examine the trap without being seen. The tail end of each pipe is a long, taut, net cylinder, into which the birds are driven. The water in this cage is very shallow. In order to attract the wild duck, tame ones are turned down in the lake, and fed until they make themselves at home, and learn to swim up the pipes for their food. These attract the wild ones, who settle, and then swim with them into the pipes after the grain scattered there. The decoy-man, sheltered behind his screens, watches the movements of the birds, and at the proper moment closes the exit and drives them into the cylindrical net. There are records of over five thousand wild duck having been taken in a single decoy during one season (October to March). Somewhat similar methods are made use of in some other parts of the world to entrap wild fowl, notably in Japan, where elaborate ponds with narrow false exits, entrapping the game, are maintained by several noblemen favorably situated for the sport.

Decree, the decision or determination of the rights of the parties to an action or proceeding in courts of equity, admiralty, and probate. This includes an award of proper relief. The decree of a court of equity corresponds to a judgment in a court of law, but differs in the matter of the relief awarded. A judgment must be for a sum of money, or dismissing a pleading, and in favor of one party as against the other, without any other provisions. However, a decree may afford relief according to the 'equities of the case.' For example, if a court of equity decrees the cancellation of a written instrument for fraud, it usually requires the plaintiff to return what he has received from the defendant, and the decree in such a case would provide that the instrument should be cancelled upon payment of the consideration theretofore received. A decree of a court of equity may be either interlocutory or final. It is said to be interlocutory when it merely disposes of a part of the matters at issue, or leaves something more than the mere ministerial execution of the court's orders to be done. For example, an interlocutory decree may be entered in a divorce action, granting the divorce, and leaving open the question of custody of children, or alimony, which matters would be disposed of in a final decree. It is final when it includes a complete determination of the matter in controversy upon all the facts. Under some codes the word judgment is applied to the decisions of courts in the exercise of equitable jurisdiction, as well as those of the courts of law, but the distinction remains. See COMMON LAW; EQUITY; JUDGMENT.

Decrescent, DECREMENT, DECOURS, in heraldry, terms applied to the figure of the *waning* moon —*i.e.* with its horns turned to the sinister.

Dedham, town, Massachusetts, county seat of Norfolk county, on the Charles River, and on the New York, New Haven and Hartford Railroad; 10 miles S.W. of Boston. The manufactures include carpets, woolen goods, and machinery. It was settled in 1635, and had the first free school in the country. Pop. (1930) 15,136; (1940) 15,508.

De Donis, STATUTE, 13 ED. I. c. 1. In England prior to the date of this statute (1285) the courts had held that if an estate was granted to a man and the heirs of his body, he obtained a conditional fee, so that as soon as he had issue he could sell the land, and thereby disinherit his heirs of entail. These estates on the happening of the condition —birth of heirs—differed from ordinary estates in fee simple only in the restrictions named in the grant as to what class of heirs should take. The statute De Donis converted conditional estates into estates tail, which descended to the heirs: its object was to prevent alienation. But anything tending to prevent alienation of land has always been repugnant to the general sense of the community in England, and this last statute was soon evaded by what were called warranties: a man's heirs were held bound to warrant a grant made by their ancestor.

Deduction, in logic and reasoning, is commonly described as the process of inference in which we pass from general principles to particular conclusions or consequences, and is thus contrasted with induction, in which we pass from particular data to the general principle that underlies them. In proportion as any science, originally inductive, attains to highly general or fundamental principles which can then be made the bases of deductive inferences, the science is said to pass from the inductive to the deductive stage. But logicians are tending to regard deduction and induction as essentially the same logical process, operated, as it were, from different ends.

Dee. (**1.**) River of England and Wales, 80 m. long, rises in Merionethshire, and flows, generally N., into the Irish Sea, its sandy estuary being 14 m. long by from 2 to 6 m. wide.; 5,000 ac. of land on the shores of the estuary have been reclaimed. (**2.**) River, Aberdeenshire and Kincardineshire, Scotland, rises in the Cairngorm Mts., Aberdeenshire, and after a N.E. course of 87 m. falls into the North Sea at Aberdeen. It is one of the finest salmon rivers in Britain.

Dee, JOHN (1527–1608), English alchemist and astrologer, born in London; became known as a sorcerer after a representation of Aristophanes's *Peace*, wherein he used a mechanical beetle. Imprisoned (1555) under Queen Mary, he became (1586) head of a small confraternity for seeking the philosopher's stone and invoking the angels, and in 1595 he was made warden of Manchester College. Dee claimed to have found an elixir which transmuted a piece of a warming-pan into gold. He used to practise divination by magic mirrors. See his own *Private Diary*, ed. Halliwell-Phillipps (1842); and Mackay's *Memoirs of Extraordinary Popular Delusions* (new ed. 1892).

Deed. In law, an instrument in writing under seal, binding by its terms one or more parties to some obligation, or transferring property, and made complete and effective by delivery by the party bound thereby. In its broadest sense it includes formal contracts, bonds, and other obligations under seal, but to-day the term is almost exclusively applied to conveyances of interests in real estate. Deeds are divided into two classifications: indentures and deeds poll. Strictly speaking, an indenture is a deed between two or more persons having different interests, each being bound to some obligation by its provisions. The name was derived from the practice of writing out such an instrument in duplicate on the same piece of parchment, and then cutting it in half by an 'indented' or notched line, thus separating the two parts, and rendering them capable of identification later by fitting the indented edges together. This practice has fallen into disuse, but the name has been retained and is often inaccurately applied to conveyances of property which are properly deeds poll. A deed poll is a single instrument under seal binding only one party or several parties having the same interests. Under the old forms of conveyancing there were deeds 'of bargain and sale;' deeds containing 'covenants to stand seized;' deeds of 'lease and release,' because of certain technical rules as to the transfer of property, but at present ordinary deeds of bargain and sale or grant without any technical expressions are sufficient. A deed may contain certain covenants relating to the property and a warranty of title for the benefit of the grantee, in which case it is commonly known as a 'full covenant warranty deed.' If it merely purports to release whatever interest the party executing it may have, and contains no covenants or warranty, it is called a 'quit claim deed.' Both forms are in constant use.

While a deed is not required by law to be expressed in any particular language, it should contain certain formal parts clearly set forth. These essentials are: the names of the parties; a mention of consideration, although the exact amount or nature need not be named; a *habendum* clause, usually commencing 'to have and to hold,' and containing a description of the property and a statement of the exact interest therein conveyed; and a mention of a proper execution on a certain date and delivery. It may contain restrictions, covenants, and a warranty of title. The restrictions may be almost anything that the parties agree upon, as that no liquor be sold upon the premises. The following covenants are usually inserted in deeds of real property: against encumbrances, that is, that there are no liens or encumbrances against the property except such as are mentioned therein; that the grantor has a good right to convey; covenant of 'further assurance,' that is, that the grantor will execute any further instrument to perfect the title which the grantee may reasonably require of him in the future; quiet enjoyment, that is, that the grantee will not be molested in his possession by the grantor or any one claiming under him; and covenant of seizure or ownership. If any of these be broken either at the inception of the deed, as a covenant against encumbrances when liens against the property exist, or later, the grantee has an action against the grantor for damages. A warranty may be against any one claiming under or through the grantor or against all persons, and the latter is the more common.

A person executing a quit-claim deed undertakes no responsibility as to title or of any other nature; the grantee assumes all risks.

In most of the United States, deeds must be under seal, and witnessed or acknowledged before a proper officer, as a notary public or commissioner of deeds. The seal may be a wafer, indentation, or mere scroll executed with the pen. A delivery to the grantee or some one representing him is essential to make a deed operative. Recording is not essential to the validity of a deed, but is necessary for the protection of the grantee against subsequent innocent purchasers for value. See CONVEYANCING; ESCROW; LEASE; USES.

Deep-Sea Deposits. See DEPOSITION.

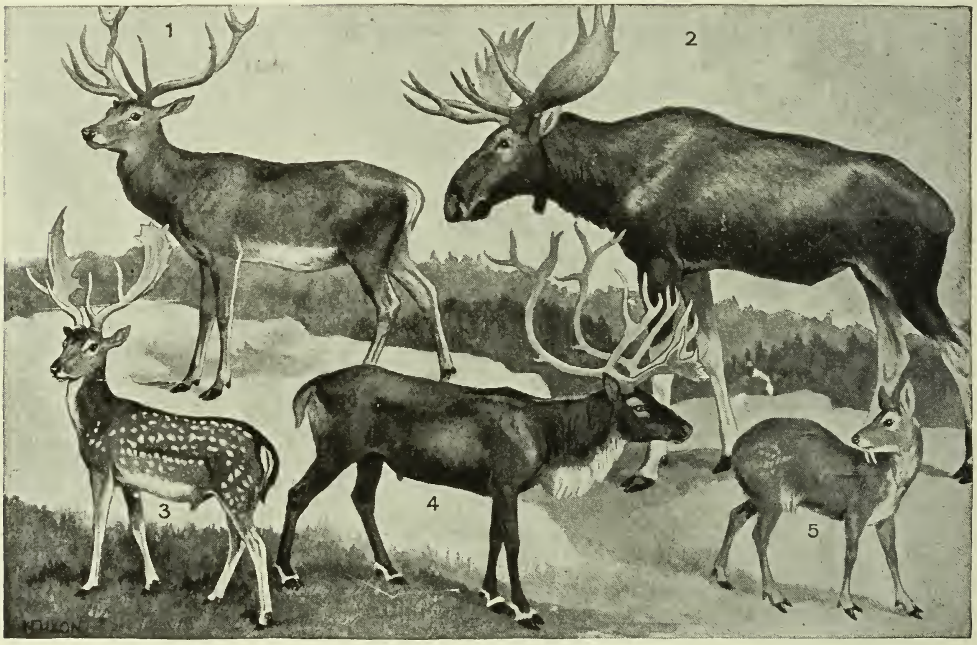
Deep-Sea Exploration. See OCEAN, ABYSSAL ANIMALS, DISTRIBUTION OF ANIMALS, MARINE BIOLOGICAL RESEARCH, DEPOSITION, OOZE, and CHALLENGER.

Deer, generally all the members of the family Cervidæ. As thus defined deer are artiodactyle ungulates ('even-toed hoofed animals'), distinguished by the fact that, with very few exceptions, the head—in the male sex alone, except reindeer — bears branched deciduous antlers, which are shed and renewed each year. Further points of distinction from the members of the family Bovidæ (cattle) lie in the teeth. In addition to the two central toes (digits three and four), on which the weight of the body is supported, deer almost always possess lateral toes, whose bony axis is more complete than in sheep and cattle. Deer are widely distributed over the globe, but are absent from Africa S. of the Sahara, as well as from the Australian area. Their fossil history is tolerably well known. Early deer had very simple antlers, like those borne by a stag of the first year. But the development of antlers reached its maximum before the present period, for in cave deposits of England and the European continent antlers ascribed to near allies of the existing red deer have been found exceeding in size those of living forms. The various prominent forms are described elsewhere under their special names, as mule-deer, moose, etc. See E. Ingersoll's *Life of Mammals* (1906), and J. D. Caton's *Antelope and Deer of America* (1897).

Deerhound, THE, is considered by some authorities to have sprung from the rough Scottish greyhound, while others claim its descent from the ancient Irish wolfhound. It is used for slipping at wounded stags or deer, to bring them to bay, until they can

Deerhound.

be despatched by the hunter. Like the greyhound, the deerhound hunts by sight and not by scent; it also resembles that breed in general appearance, though it is thicker, stronger, and coarser in build, and has a head somewhat longer and wider across the skull. The hair on the side of the lip forms a mustache, which the greyhound does not possess. The deerhound should be at least 28 in. high, with a girth of 32 in., and a weight of 70 to 90 lbs. Its color may be any shade, from dark blue or black brindle to light gray brindle, yellow, fawn, dun, and drab. This dog is rarely seen in the United States.



Common Species of Deer.

1. Elk, or Wapiti. 2. Moose. 3. Fallow deer. 4. Reindeer. 5. Musk deer (enlarged).

Deer-Mouse, the popular name for several species of mice which are reddish above and white below, as the American white-foot (*Peromyscus*). See Mouse.

Deer-Stalking. The method of the chase of the red deer as practised in Scotland, where the sport has been popular for centuries, and the deer are now carefully protected except for a brief season. The mountains, corries, burns, heather, and rough grass of the Highlands of Scotland provide an ideal home for the red deer. Of late years there has been considerable agitation in Scotland regarding the claims of the crofters, whose lands have been converted into deer forests. Yet the greater part of the land so converted was unfit for agriculture, much of it inadequate even for sheep-raising; sheep and wool also had decreased in value, while deer forests were in demand, large rentals being readily paid for them. The owners, as a rule, spend money freely on their forests, and employ many men, especially during the stalking season, which may be called the Highlander's harvest. Owing to the large rentals accruing from the deer forests, the proprietors are also enabled to improve their property, thus giving employment to the poorer classes. See the article Crofter.

The word 'forest,' as applied to these deer preserves, has misled many, for there is little wood, the forests consisting of mountain, moor, and valley. On some deer forests sheep farms are let separately, but deer thrive better and multiply faster where there are no sheep. Deer shot on or near sheep farms are, as a rule, of poor quality. The lower grounds of the forests are admirably adapted for the wintering of deer. There they find pasture and shelter from the severity of a Highland winter. The burning of the heather annually over a part of the area keeps the whole in good condition for pasturage, as the heather requires ten years to grow to maturity.

The deer forests of Scotland occupy over 2,000,000 ac., varying in size from about 80,000 to 10,000 ac. The principal are:—In Aberdeenshire, Inverness-shire, Ross-shire, Sutherlandshire and Banffshire. Deer-stalking is a very expensive sport. As much as £15,000 has been paid for the lease of a noted preserve, or £300 a day for the fifty working days between the middle of August and the middle of October. It is useless to attempt the sport without the assistance of a stalker or guide, for an intimate knowledge of the ground is essential. Two or more gillies and two ponies follow.

When the terms 'deer-stalking' or 'deer-stalker' are mentioned without explanation to a sportsman, he thinks at once of the sport of hunting the stag by stealthy approach as practised in the Highlands of Scotland, as described below. This is the perfection of the art of stalking game—that is, stealing up near enough to it to get a shot. The practice is a necessity in a treeless region such as northern Scotland, and for the same reason it is necessary to adopt similar methods in open regions elsewhere; but deer, as a rule, are denizens of wooded country; and in America the only opportunity afforded for practising the arts of stalking them are given by the mule-deer in the plains of the Upper Missouri region. There, although most of the venison is obtained in some other way, the sportsman whose time need not be economized may find the game and the ground highly adapted to testing his skill as a stalker. It is not the deer but the goats and sheep of the high mountains which afford the stalker his best training and highest rewards. Thus only, as a rule, is it possible to secure the longed-for trophies of the American bighorn and white goat, or of the many nobly horned rams which pasture upon the high slopes and ridges of the Himalaya and other shelterless Asiatic ranges. One of these can be obtained only by the most skilful approach, careful that this is made up-wind, so that the hunter's scent shall not betray him; careful that no rattling stone or snapping twig reach the alert animal's ear; careful to steal nearer and nearer by slow, painful advances from one bit of cover to another so that he shall never be seen by the watchful eyes. Not only consummate skill, but great patience and endurance are necessary if the stalker is to succeed. Nowhere are all these qualities more required and exercised than in the chase of the stag of the red deer in the Scottish Highlands.

The wind is the governing factor in deer-stalking. A stag can scent a man a thousand yards, or, in a high wind, a mile and a half away. Deer move up-wind when feeding, and far more days have been spoiled by the quarry getting wind than by its sighting the hunter. Except by a fluke it is impossible to obtain a shot working down-wind. When the wind blows downhill the deer generally locate themselves where they have the advantage of side currents blowing down glens or openings to scent the stalker.

Should the deer be within sight and raise their heads, the stalker must remain steady, permitting the deer to look twice at him, as is their habit. Then, if they appear unalarmed, he must take cover gradually, so that a quick movement may not awaken their suspicion afresh. Rough ground must be crossed stooping or crawling. Hurry is fatal to the sport, as a winded man cannot shoot straight. When stalking downhill it is advisable to slide down upon the back, feet foremost, resting on the elbows, and using the heels to draw the body down. In this method the humping of a face-foremost crawl is obviated. In stalking uphill greater caution is required, as deer always look downhill.

The best parts of the day for stalking are early morning and evening, when the deer are feeding. Regarding weather, a cloudy day is most favorable. In days of fluctuating wind the deer are restless and on the alert toward all quarters. One should never speak, or speak only in a whisper, for on hill-tops sound travels to a great distance. A good shot looks not over but from the side of the shelter by which he is concealed. The best place to aim at, if the deer be standing, is immediately behind the shoulder; if he be lying, the head may be attempted. If the stag is below him the hunter must aim low—in extreme cases even lower than the body. If it be necessary to rest the rifle, it should be rested on something soft, for if it be steadied on a hard substance, such as a rock, the shock of the explosion throws the bullet too high. For a running shot a rest should never be used, as the arms must be free to follow the movements of the animal. The aim is about 6 in. behind the fore arm. Deer often stop after the first stampede, and a second shot is possible. When a deer, being shot, falls immediately, haste should be made to secure him; he may have been merely stunned, and, suddenly rising, again take flight. If he runs a few yards after being shot, and then falls, his death is undoubted.

See A. Macrae's *A Handbook of Deer-Stalking* (1880); J. Colquhoun's *Moor and the Loch* (new ed. 1888); W. B. Davenport's *Sport: Deer-Stalking* (1885); Cameron of Lochiel's *Deer-Stalking* (Fur and Feather Series, 1896); A. Grimble's *Deer-Stalking* (1886); W. Scrope's *The Art of Deer-Stalking* (1897); H. H. Crealock's *Deer-Stalking in the Highlands* (1862).

De Facto. That which exists in fact as distinguished from that which exists in law—*de jure*. A government may exist by force when it has no legal recognition or constitutional right to exist; it is then a *de facto* government. An officer may claim an election and take office under color of title while some one else was legally elected to the place; he would then occupy the place *de facto*. A corporation is said to be *de facto* when it holds itself out as such, if steps were taken to incorporate and a law exists under which it could have incorporated even though it really has not been incorporated.

Defamation is the essence of the action of slander or libel; without defamation neither of these actions can be maintained. Defamation must be published either by spoken word, when it is called slander, or in writing, print, picture, stationery, or the like, when it is called libel. If there is no publication there is no liability. Defamation consists in false imputations against one's character or calling. It is sometimes actionable *per se*—that is, without any proof of damage, sometimes only actionable when damage can be shown. Defamation is actionable *per se* when it is of such a character that it tends to exclude one from society or to injure one in his trade or profession. As for instance a statement that a physician was 'no good, not fit to treat a kitten,' or to impute a contagious disease to one or to accuse one of a crime. The rule is stricter with regard to spoken defamation, and often words which if written would be actionable, without damage shown, are not actionable without damage if merely spoken. Truth is always a justification in a charge of defamation and in some specified cases defamation, whether true or not, is excused or privileged. This is for reasons of general public policy. Illustrations of privileged defamation are words spoken on the witness stand in a court of law, confidential communications between employers, with reference to employees or servants, and statements made with regard to one's financial standing by mercantile agencies, or, to a certain extent, newspaper statements about public men.

Defamatory words must be construed according to their ordinary meaning, not in their extreme or possible sense. See Libel; Slander.

Default, generally, the failure to perform some legal or quasi-legal duty. Thus a defaulting trustee is one who misapplies or fails to account for trust funds. In legal procedure the failure to comply with certain rules of court—*e.g.* the failure to appear or plead within the specified time—places a party in default, and judgment by default may be given against him in his absence.

Defeasance, a deed whereby, on the fulfilment of the conditions mentioned therein, the effect of another deed is nullified or defeated. The same effect may be brought about by a condition in the same deed, but when the instruments are separate it is called a defeasance. Defeasances must be recorded in order to bind innocent purchasers. In equity a defeasance may be proved by parole evidence, but not as against an innocent purchaser for value.

Defendant. The term is now generally applied to any one

‘THE DEER-STALKERS’ RETURN.’ FROM THE PAINTING BY SIR E. LANDSEER, R.A.

against whom an action is begun, but formerly it was used to denote the defendant in a personal action, only. In order to obtain a personal judgment the defendant must always be brought within the jurisdiction of the court by the personal service of a summons upon him. However, in many states a person may be served by publication of the summons in newspapers designated by the court, if he has property within the jurisdiction, which can be attached. A judgment obtained after such service is not recognized in other states. If an infant is sued there must be a guardian *ad litem* appointed by the court. It is always necessary to serve the right person and to name him, but if the real name is unknown a fictitious name may generally be used, provided this is clearly stated. In some actions several defendants must be sued together, as, for instance, in the foreclosure of a mortgage any one interested in the property must be named, but an improper joinder of defendants is cause for demurrer. The defendant has a specified time—usually twenty days—in which to answer the complaint, and if judgment is taken against him by default, he has every reasonable chance to open the default upon affidavits showing why he did not appear.

Defender of the Faith was a title conferred on Henry VIII by Pope Leo X in 1521, to mark the church's appreciation of one of Henry's youthful excursions into the field of theology. It has since formed part of the official title of the sovereigns of England.

Deffand, MARIE DE VICHY-CHAMROND, MARQUISE DU (1697–1780), French letter-writer and *dame de salon*. She early became distinguished for her wit and beauty, and, forming her own establishment, from 1740 onwards she gave celebrated receptions to her admirers. Among her friends and correspondents were Montesquieu, D'Alembert, Marmontel, and Voltaire. In 1753 she took as a companion an orphan girl, Mlle. de Lespinasse. Her *Correspondance* with Walpole and her *Lettres* to Voltaire were published together in four volumes in 1810 (new ed. 1864), and her *Correspondance Inédite* in 1877 (new ed.). See also her *Correspondance* with D'Alembert, Montesquieu, Hénault, etc. (1809; new ed. 1865); Berry, *Life of Madame du Deffand* (1834), and Tanentyre, *Women of the French Salons* (1901).

Defiance, city, Ohio, co. seat of Defiance co., 52 m. s.w. of Toledo, in the fork of the Maumee and the Auglaize rivers, and on the Miami and Erie Canal and the B. and O. and the Wabash railroads. It is situated in a grain and dairy district and has manufactures of radio parts, plants for auto parts, screw machine products, and refrigeration equipment. It is the seat of Defiance College. Pop. (1930) 8,818; (1940) 9,744.

Defilade. In fortifications, the arrangement of a work so that men standing on the terreplein behind the parapet shall be screened from the enemy's view and protected from his fire, is called defilading the work. This may be accomplished in three ways: by raising the parapet, lowering the terreplein, or by using traverses. See FORTIFICATION.

Definition. By a definition, in the widest sense, is meant such a description of the thing defined as will mark it out clearly from all other things with which it might be confused. Such a description may range from a mere enumeration of superficial characteristics patent to any observer to that determination of the inner nature of the thing which is possible only to the expert or man of science. The particular method or definition traditionally recognized in logic is that which defines in terms of genus and differentia (see GENUS and DIFFERENTIA)—*e.g.,* man is defined as a rational animal, animal being the genus of which man is a species, and rationality the differentia of the human species. Definition is sometimes treated as being merely the statement of the meaning in which the speaker or writer chooses to use the word he is defining. See W. L. Davidson, *Logic of Definition* (1885).

Deflagration, in chemistry, is a rapid and local combustion which is specially marked in cases where salts capable of evolving oxygen, such as potassium nitrate, are thrown on to red-hot charcoal.

Defoe, DANIEL (1659–1731), English novelist and pamphleteer, author of *Robinson Crusoe,* the son of a London butcher, born probably in 1659. It was the Jacobite plot against William III that gave occasion to his first known pamphlet, *A New Discovery of an Old Intrigue* (1691). After that he devoted himself mainly to politics. Defoe was a born pamphleteer, and wrote naturally and forcefully from the first. One of his notable pamphlets, written in 1698, was an *Essay on Projects,* which advocated the joint-stock system, banks, the higher education of women, and income tax. *The Danger of the Protestant Religion from the Present Prospect of a Religious War in Europe* (1701) had the same motive as *The True-born Englishman* (1701), in verse—a satire on the hybrid Anglo-Saxon's despite of the Dutch king. After the accession of Queen Anne, Defoe for a time upheld the Whig cause. The publication of his most famous pamphlet, *The Shortest Way with the Dissenters* (1702), brought down upon him the wrath of Anne's Tory government, and he was convicted of seditious libel, fined, stood three times in the pillory, and was imprisoned during her majesty's pleasure. While lying in Newgate he had begun (1704) to issue a weekly *Review,* in which he constantly urged the anti-French and Protestant cause, attacked the Tories, and counseled peace. In 1706 he was sent to promote the parliamentary union of England and Scotland. In later years he acted in the capacity of a government spy or secret agent. The *Review* stopped in 1713, and thereafter Defoe was associated with the *Mercator,* whose aim was to promote the commercial treaty with France. While a traitor in the house of the Jacobites he turned novelist, and produced *Robinson Crusoe* (1719), *The Life and Piracies of Captain Singleton* (1720), *The Fortunes and Misfortunes of Moll Flanders* (1721), *The History of Colonel Jack* (1723), *A Journal of the Plague Year* (1722), *A Tour Thro' . . . Great Britain* (1724), *A New Voyage round the World* (1725), *A History of the Devil* (1727). In *Robinson Crusoe* he showed himself a master of fiction. See editions of 1840 (*Life* by W. Hazlitt), 1840–1, and 1882 (7 vols.); Wilson, *Life* (1830); W. Lee, *Life*

Daniel Defoe

(1869); Minto, *Life* (English Men of Letters Series, 1879); and H. Morley, *Defoe's Earlier Life and Earlier Works* (1889); J. Sutherland, *Defoe* (1938).

Defregger, Franz (1835–1921), Austrian painter, born in the Pusterthal in Tyrol; was a pupil of Piloty in Munich (1867). In 1868 his *Speckbacher,* a picture of the Hofer rising of 1809, made him famous. *Before the Dance* (1872), *The Prize Horse* (1873), together with numerous genre pictures of Tyrolese peasant life, and several characteristic scenes from the Hofer rising followed, and in 1876 he painted a famous *Victors' Return.* Appointed professor at Munich (1878) he painted his masterpiece—*Hofer Going to His Death* (1878). See monographs, in German, by Rosenberg and Meissner (1900).

De Funiak Springs, tn., Florida, co. seat of Walton co., situated in the pine region, 80 m. E.N.E. of Pensacola, on the Louis. and Nash. R. R. It is the seat of the Florida Chautauqua and a state normal school. It has agricultural interests and manufactures of ladders and wooden ware. Pop. (1930) 2,636; (1940) 2,570.

Degas, Hilaire Germain Edgard (1834–1917), French painter, born in Paris. Usually classed with the impressionists, he was in fact the pupil of Ingres, though he departed from the classical tradition of composition, and introduced subject matter hitherto deemed alien to art. In fact his work is permeated by the spirit of modernity. For subject matter he chose chiefly the race horse and the female figure, especially the ballet girl at rest, at rehearsal, and on the boards. A consummate draughtsman rather than a colorist, he owed much of his original method of arrangement of line, balance of composition, and unusual perspective to a careful study of Japanese art. Degas worked in oils, pastel, water colors, and lithography. Portrait painting holds a secondary place in his art. Among his famous pictures are the much-discussed *Absinthe Drinkers,* the *Danseuse Assise,* and the *Danseuse* in the Luxembourg Gallery at Paris; *The Ballet in Robert le Diable,* at the National Gallery, London; and *La Première Danseuse,* a pastel. See 'Degas, the Painter of Modern Life,' by George Moore, in the *Magazine of Art* (xiii. 416), and Brownell, *French Art* (1901).

De Gaulle, Charles André Joseph Marie (1890–), French general and statesman, was born at Lille Nov. 22, 1890, and was educated at the Collège Stanislas, Paris and at the École Militaire de Saint-Cyr. He entered the First World War as a lieutenant and rose to the rank of captain. He held various military posts in the interval between the two world wars, and entered the Second World War as colonel, being advanced to general of brigade in May, 1940. In June of the same year he became Under Secretary of State for War and National Defense in the Reynaud Cabinet. After the fall of Paris he was active in opposing a separate peace with Germany and urged the union between France and England for a continuance of the struggle. Failing, he flew to London and there founded the Free French movement. In June 1943 he became president of the French Committee of National Liberation. In June 1944 he became head of the Provisional Government of the French Republic. In July he conferred with President Roosevelt in Washington and obtained *de facto* recognition for his government which was accepted by the Allies as the dominant political authority in France until an election could be held. His government was transferred to Paris in August after the liberation of that capital. The régime was fully and formally recognized by the Allies as the Provisional Government of France in October. Under De Gaulle's leadership France set about the task of domestic reconstruction and gradually assumed her place in the councils of the Allied powers.

Degeneration, in Biology. In certain cases the young animal possesses organs which not only display greater elaboration of structure than those of the adult, but which are apparently nearer the typical organs of the class. In these cases the adult is said to exhibit degeneration as compared with the young animal. An animal is also described as degenerate if its organs, or certain of these, display a lower grade of organization than that usual in the class to which it belongs, even if these organs are no better developed in the young animal than in the adult. Thus the tapeworm is degenerate as regards its nervous system, its excretory system, and in the absence of an alimentary canal; for nervous system, excretory system, and alimentary canal are well developed in certain flatworms which are undoubtedly nearer the ancestral stock than the tapeworms. A tapeworm illustrates admirably one characteristic which animals must possess before they can legitimately be described as degenerate: they must possess simultaneously organs of considerable elaboration and organs displaying secondary simplification—for instance, the absence of the alimentary canal in the tapeworm, together with a very elaborate reproductive system, and a complex fixing apparatus of hooks and suckers.

In regard to even the proximate cause of degeneration we are much in the dark; but it is at least clear that there is a close connection between it and a limitation of the environment. Such a limitation most commonly occurs as the result of parasitism, but it is also brought about by a sedentary life, by a subterranean habitat—as, for example, in burrowing or in cave animals—even, in many cases, by the change from salt to fresh water, not a few fresh-water animals being degenerate as compared with their marine allies.

It is obvious that the test of comparative morphology can only be applied where the animals' affinities are well known: it is practically impossible to decide whether an animal is or is not degenerate when it occupies an isolated position. This is the case with Amphioxus, which may be either degenerate or primitive, the materials for a decision being meantime non-existent. See *Degeneration,* by E. Ray Lankester (1880); T. H. Morgan, *Evolution and Adaptation* (1903).

Degeneration, Physical. See Physical Degeneration.

Degerando, Joseph Marie, Baron (1772–1842), French statesman and philosopher; born at Lyons; employed by Lucien Bonaparte in the ministry of the interior, also by Napoleon in the government of Italy, and commissioned to prepare a survey of the state of the empire. He was the author of *Education des Sourds-Muets de Naissance* (2 vols., 1827), *Histoire Comparée des Systèmes de Philosophie relativement aux Principes des Connaissances Humaines* (3 vols., 1804; new ed. 1847), and *Du Perfectionnement Moral et de l'Education de Soi-Même* (1825).

Degraded, or Degreed, in heraldry, placed upon *steps,* as a cross calvary.

De Grasse. See Grasse, François Joseph Paul de.

Degree, the unit in terms of which an angle is generally measured. It is the 90th part of a right angle; or 360 degrees are moved over by a radius, the outer end of which describes the whole circumference of a circle. The degree of an equation is the number which expresses the highest power of the variable.

Degree. A degree was originally a teaching license granted by a university; now it is an academic distinction or rank conferred by the authorities of a university (1) on its matriculated students who have complied with certain and duly specified attendance or residential regulations and have passed the necessary examinations, or have prepared and presented the required theses, and (2), *honoris causa,* on persons who have specially distinguished themselves in letters, art, music, science, public service, etc.

The master's degree originated in the twelfth century in the Italian and French universities, but soon gave place, except in the faculty of arts, to the degree of doctor. The bachelor's degree came into use in the following century, representing the completion of work preparatory to the higher degrees. In modern times it has retained its importance chiefly in English and American colleges and in France. It is not conferred by the Scottish universities. The master's degree also is no longer conferred on the Continent, where the only recognized scholastic title is that of doctor. The latter has generally been retained in England and America as the only honorary degree, the bachelor's and master's degrees being conferred only for work done. The doctor's degree, however, is regularly given on the completion of the medical course, and the master's and doctor's occasionally by law schools. The abuse by smaller American colleges of the degree-conferring power has led to more stringent regulations, and to the custom of adding to the letters representing the degree the name of the institution by which it is conferred. The differentiation of courses and the addition of new branches has led to a great increase in the forms of the various degrees. Bachelor of arts, science, divinity, law are still the standard degrees representing a completed preliminary course; master of arts and science, a graduate course of at least one year; doctor of philosophy, a graduate course of three years. In addition to these, degrees are now conferred in a large number of special departments representing specialized work. The more usual degrees are:

A.B. or B.A., Bachelor of Arts.
B.C.L., Bachelor of Civil Law.
B.D., Bachelor of Divinity.
Lett.B., Bachelor of Letters.
LL.B., Bachelor of Law.
Ph.B., Bachelor of Philosophy.
B.Sc., Bachelor of Science.
M.B., Bachelor of Medicine.
Mus.B., Bachelor of Music.
A.M. or M.A., Master of Arts.
C.M., Master in Surgery (*Chirurgiæ Magister*).
LL.M. or M.L., Master of Laws.
C.E., Civil Engineer.
M.E., Mining Engineer.
E.E., Electrical Engineer.
Ph.G., Graduate in Pharmacy.
Ph.D., Doctor of Philosophy.
D.C.L., Doctor of Civil Law.
D.D., Doctor of Divinity.
Litt.D., Doctor of Literature.
L.H.D., Doctor of Humane Letters.
D.M.D., Doctor of Medical Dentistry.
D.V.M., Doctor of Veterinary Medicine.
D.Sc., Doctor of Science.
J.D., Doctor of Law (*Juris Doctor*).
J.U.D., Doctor of Civil and Canon Law (*Doctor Utriusque Juris*).
LL.D., Doctor of Laws.
M.D., Doctor of Medicine.
Mus.D., Doctor of Music.
V.S., Veterinary Surgeon.

The peculiar scholastic dress associated with academic degrees is a development of the monastic habit. It consists of gown, hood, and cap, varying in form and color for the different faculties and grades. The cap is a modern development of the hood which originally was attached to the gown. American usage recognizes but one form of cap, the Oxford or so-called 'mortar-board,' consisting of a head-covering surmounted by a square from the center of which a tassel depends. In England a flat velvet bonnet is also used. English gowns are of different colors for the higher degrees and the various universities, while American custom prescribes the black gown of silk or worsted. The distinctive feature of the costume is the hood, the shape, colors, and lining of which represent the university, the faculty, and the degree. The Cambridge and Oxford bachelor's hoods are black, lined with white rabbit or fur; the Cambridge master's, black, lined with white silk, the Oxford, black, lined with red. D.D. is represented at Cambridge by a hood of scarlet cloth, lined with pink and violet shot silk; at Oxford by a hood of scarlet cloth, lined with black silk. Scarlet cloth lined with cherry silk at Cambridge represents LL.D. In the United States some uniformity in usage has been achieved through the efforts of a commission which met at Columbia University in 1894, and formulated a plan which has met with general acceptance. All the hoods are black. The bachelor's hood differs from the master's only in length, while the doctor's hood is formed with a panel. The department or faculty is shown by a trimming of color from two to five inches wide, as follows: Arts and letters, white; theology, scarlet; law, purple; philosophy, blue; science, gold yellow; fine arts, brown; music, pink; medicine, green. The institution is shown by the colors of the lining. The doctor's cap alone may have a gold tassel. See Leonard, *Cap and Gown in America,* Albany, 1896.

De Gubernatis, ANGELO (1840–1913), Italian author, born in Turin; became (1863) professor of Sanskrit at the Institute in Florence. He was delegate of the Italian government at the International Congress of Orientalists (1876), and on the invitation of the Taylorian Institution he delivered three lectures on Manzoni at Oxford (1878). He was appointed professor of Sanskrit in Rome in 1891. He lectured at Johns Hopkins University in 1903–4. His works include numerous books on Indian subjects, monograps on *Manzoni* (1878) and other Italians, *Mitologia Vedica* (1874), *Dizionario Biografico degli Scrittori Contemporanei* (1879–80), *Manuale di Mitologia Comparata* (1880; new ed. 1887), *Storia Universale della Letteratura* (18 vols., 1882–85), and *Mythologie des Plantes* (1878–80).

Dehra, India, chief tn. in Dehra Dun dist., United Provinces. Pop. (1931) 40,409.

Deianira, wife of Hercules. After Hercules had captured Oechalia, Deianira, fearing that he would fall in love with a captured princess, sent him a garment steeped in the blood of the centaur Nessus, thinking by its reputed virtue to keep him faithful to her; but it clung to his flesh and burned him to death. When she knew the effect of her gift, Deianira killed herself. This story is the theme of Sophocles' play, *Trachiniae.*

Dei Gratia ('by the Grace of God'), an expression denoting absolute dependence on the Almighty will. Since the 15th century it has come to be relegated to the use of sovereigns, as implying their acknowledgment that their authority comes alone from God. The words occur in full or abbreviated on the British coinage.

Deioces, or DAJAUKKU, according to Herodotus, was the first king of Media, reigning from 709 to 656 B.C., or correcting the historian's faulty arithmetic, from 700 to 647 (Nöldeke).

Deiotarus (d. 40 B.C.), king of Galatia, who helped the Romans in their wars with Mithridates. In the civil war he aided Pompey, but in 47 made his submission to Cæsar, being deprived of his kingdom, though not of his title, and fined. After Cæsar's death he recovered his kingdom. In 45 Cicero defended him on a charge of conspiring to murder Cæsar.

Deïphobus, a son of Priam and Hecuba. After the death of Paris he married Helen; and when Troy was taken he was slain by Menelaus.

Deira, the s. part of the ancient kingdom of Northumbria, Britain. It included the district between the rivers Humber and Tyne, with a part to the west.

Deism signifies generally belief in God, but is frequently used in contradistinction to theism, and in particular is applied to a rationalistic movement in England during the 17th and 18th centuries. Its distinguishing feature was its antagonism to the current conception of revealed religion. Applying a rationalizing criticism to Scripture, the deists repudiated all the specifically Christian doctrines. The chief representatives of the movement were Lord Herbert of Cherbury, 'the father of deism,' Blount, Toland, Collins, Woolston, Tindal, Morgan, Chubb, and Bolingbroke; Hobbes and Lord Shaftesbury are sometimes numbered among them. See Leslie Stephen, *History of Rationalism in 18th Cent.* (1876); Lechler, *Geschichte des Englischen Deismus* (1841).

Déjazet, Pauline Virginie (1797–1875), French actress, born at Paris; made a specialty of male impersonations. After acting at the Vaudeville, Variétés (1844–49), Gymnase and (1834) Théâtre du Palais-Royal, in 1859 she became manager of the Folies-Dramatique, under the new name of Théâtre Déjazet. She retired in 1868. See *Life* by Henry-Lecomte (1892).

De Kalb, city, Illinois, 58 miles west of Chicago, on the Chicago and Northwestern and the Chicago and Greatwestern railroads. It manufactures pianos, accordions, screen cloth, insulated copper wire and cable, refrigerating units, stoves, truck bodies, tank treads, canned vegetables and electric screens. It is the seat of the Northern Illinois State College. Pop. (1930) 8,545; (1940) 9,146.

De Kalb, Johann, Baron (1720–80), German-American soldier in the Revolutionary War, was born in Hüttendorf, Bavaria. He served in the French army in 1743–61, and rose to the rank of brigadier general. France sent him on a secret mission to the American Colonies in 1768, and he returned to this country with Lafayette in 1777. He was commissioned major general, and served in New Jersey and Maryland until 1780, when he was made second in command to General Bates in the Southern army, and was mortally wounded at the Battle of Camden (Aug. 16). See Kapp, *Life* (1862).

De Kay, Charles (1848–1935), American author, son of Com. George C. De Kay, was born at Washington, D. C., and graduated (1868) at Yale. He became a member of the staff of *The New York Times* in 1877, and was subsequently that paper's literary and art critic until 1892. He was U. S. consul-general at Berlin from 1894 to 1897. He published *The Bohemian* (1878), *Hesperus, and Other Poems* (1880), *The Vision of Nimrod* (1881), *The Vision of Esther* (1882), *The Love Poems of Louis Barnaval* (1883), *Barye: Life and Works* (1889), and *Bird Gods* (1898).

Dekker, Eduard Douwes (1820–87), Dutch author, born at Amsterdam; became (1851) assistant-resident of Amboyna and (1856) Lebak, in W. Java. But, being moved by the merciless rapacity of the Dutch colonial system, and its unworthy treatment of the natives, he resigned, and wrote in language that burns with indignation, under the pseudonym of 'Multatuli,' *Max Havelaar* (1860), a work arraigning the conduct of the Dutch government in Java. The work caused a sensation, and the author was obliged to quit the Netherlands and take up his residence in Germany. During his later years he wrote much—*e.g.* in *Ideën* (7 vols., 1862–77). His *Collected Works* were issued in 10 vols. in 1892. See *Lives,* in Dutch, by Busken-Huet (1885) and Meerkerk (1900).

Dekker, Thomas (?1570–1641?), English dramatist and pamphleteer, born in London. He was several times imprisoned for debt from 1598 to 1616, and after 1638 he disappears altogether from view. His pamphlets are mainly occupied with contemporary London life, especially the habits and haunts of thieves and vagabonds, a subject he also introduced into his plays. His prose pamphlets include *The Wonderful Year* (1603), a picture of London in a plague year, and *The Gull's Hornbook* (1609), a description of Elizabethan life about town. Of his plays, the best are *The Shoemaker's Holiday* (1600), a comedy; *Old Fortunatus* (1600), a romantic extravaganza; *The Honest Whore* (in two parts, 1604 and 1630), Dekker's masterpiece in 'the comedy that transcends and plays with, rather than grasps and exposes, the vices and follies of men'; *The Virgin Martyr* (1622), a tragedy written with Massinger; and *The Witch of Edmonton* (1658), a tragedy written with Ford and Rowley. Dekker also wrote *Satiromastix* (1602), a reply to Jonson's *Poetaster,* in which he believed himself satirized under the figure of Crispinus. Of collaborated work, he wrote, among others, *Sir Thomas Wyatt,* in 1607, with Webster; *The Roaring Girl* (1611), with Middleton; and *The Sun's Darling,* a masque (1656), with Ford. Dekker produced little that is uniformly good, and much that is deplorably bad; but in his occasional outbursts of pure poetry, and in the power of depicting female character and scenes of tender emotion, he is second only to Shakespeare. See Pearson's edition of the plays (4 vols., 1873); Grosart's edition of the prose works (in the Huth Library, 1885–6); also a selection of four plays in *Dekker* in the Mermaid Series (1837).

De Koven, Henry Louis Reginald (1859–1920), American composer, born at Middletown, N. H., graduated (1879) at Oxford. He studied singing and composition at Stuttgart, Florence, and other Continental cities, with Vanuccini, Genée, Delibes and other masters. He occasionally acted as music critic for various New York papers, but devoted himself principally to the composition of light opera and songs. His first opera, *The Begum,* was produced in 1887, with Harry Bache Smith as librettist, and this successful partnership was continued in *Robin Hood* (1890) and *Rob Roy* (1894). Other operas of De Koven are *Don Quixote* (1889), *The Fencing Master* (1892), *The Highwayman* (1897), *The Mandarin* (1896), and *Maid Marian* (1901). His compositions are distinguished for their fluency and melody. Some of his songs, as 'Oh, Promise Me' and 'The Armorer's Song,' achieved great popularity.

De la Beche, Sir Henry Thomas (1796–1855), English geologist, born near London. He induced the government to take the important step of creating the Geological Survey as a distinct department; founded the Museum of Practical Geology (1851) and the School of Mines (1851); was secretary and, later, president (1847) of the Geological Society. His chief works are *Geological Observer* (1853), a masterly production; and *Manual of Geology* (1831).

Delaborde, Henri, Count (1811–90), French painter and art critic, born at Rennes; entered the National Library at Paris as conservator of the department of engravings (1855), from which he resigned in 1885.

He was also from 1875 permanent secretary of the Academy of Fine Arts. He published a life of *Ingres* (1870), *Etudes sur les Beaux-Arts* (1864), *L'Académie des Beaux-Arts* (1891), *La Gravure* (1882), and *Les Maîtres Florentins du XVe Siècle* (1889).

Delaborde, Henri François (1764–1833), French general who rose from the ranks, was born at Dijon. He enlisted at the commencement of the wars of the revolution, was faithful to Napoleon, served under Moreau in the Peninsular War, and was appointed governor of Lisbon (1808). He accompanied Napoleon in his Russian campaign of 1812.

Delacroix, Ferdinand Victor Eugène (1799–1863), French historical painter, the representative leader of the romantic school, was born at Charenton. In Guérin's studio he and his fellow-student Géricault revolted against the conventional classicism of the dominant school of David. Géricault's *Raft of the Medusa* (1819), and Delacroix's *Barque of Dante* (1822), and *The Massacre of Chios* (1824), aroused bitter hostility, and it was not until 1830 that Delacroix and the romanticists received state patronage, though till his death Delacroix was depreciated by the majority of the critics. His subjects were largely drawn from the works of Scott, Byron, Shakespeare, and Goethe; and his fine sense of color—developed by a study of Rubens, Tintoretto, and the English school—introduced a new element into French art. A visit to Morocco in 1832 opened up to the artist the mystery and marvels of the East. Among his chief works are the *Blind Milton Dictating Paradise Lost* (about 1826) and *Cromwell at Windsor Castle.* A list of his etchings, lithographs, and engravings is given in Moreau's *E. Delacroix et son Œuvre* (1873). His *Letters* were published by Burty in 1878 and 1880; his *Journal* in 1885 by Chesneau. See Véron, *E. Delacroix* (1887), and Stranahan, *History of French Painting* (1899).

Delafield, Richard (1798–1873), American soldier and engineer, born in New York. He graduated from West Point in 1818, and served as assistant engineer in constructing Fort Monroe and Fort Calhoun, 1819–1824, in construction and surveying on the Mississippi, and in the improvement of the Delaware River harbors. In 1838 he was made superintendent of the United States Military Academy, which he reorganized and placed on a high plane. From 1845 to 1856 he was engaged in government engineering work in various sections. He was sent in 1855 to the Crimea, and his report on methods of warfare became a standard work for the period. From 1856 to 1861 he was again superintendent of the Military Academy, and in 1864 was appointed chief of United States Engineers, with the rank of brigadier general.

Delagoa Bay, the southernmost port of Portuguese E. Africa, is 15 m. across. The main channel N.W. of Cutfield Flat is alone accessible to vessels of deep draught. The British claimed certain islands in Delagoa Bay, but in 1875 Marshal MacMahon decided against Britain. In 1887 Colonel Macmurdo, an American, formed a company for constructing a narrow-gauge line from Delagoa Bay to the Transvaal frontier at Komati Poort. A dispute arose with the Portuguese, who ventured to seize it. In 1890 the matter was referred to arbitration, and after a delay of ten years the Portuguese were adjudged to pay 15,000,000 francs ($3,000,000) by way of indemnity. On its shores stands Lorenzo Marques. During the S. African War it was the only port available for the Boers.

De La Mare, Walter John (1873–), British poet and novelist, born at Charlton, Kent. He was educated in London at St. Paul's Cathedral Choir School. His delicate and highly individual work soon brought him public acclaim. *The Return* (1910) won the Polignac prize and was followed with *The Listeners and Other Poems* (1912), *Peacock Pie* (1913), *Motley and Other Poems* (1918). His novel, *Memoirs of a Midget* (1921) shows his ability to delve into the realm of fantasy. He has written several volumes of short stories, including *The Riddle* (1924), *Broomsticks* (1925), *The Connoisseur and Other Stories* (1926). See Megroz, *Walter De La Mare* (1924).

'Lady Macbeth.' From a Painting by Delacroix.

Delambre, Jean Baptiste Joseph (1749–1822), French astronomer, born at Amiens, studied under Lalande. He first attracted notice by his tables of the motions of Uranus (1781), Jupiter, and Saturn; and was engaged (1792–9) by the government to assist Méchain in measuring the arc of the meridian between Dunkirk and Barcelona. Becoming a member of the Academy (1792) and of the Bureau of Longitudes, he succeeded (1807) Lalande in the astronomical chair of the College of France. His works are *Base du Système Métrique Décimal* (1806–10); *Abrégé d'Astronomie* (1815); *Histoire de l'Astronomie* (1817–23, in 5 vols.).

Delancey, EDWARD FLOYD (1821–1905), American lawyer and writer on historical subjects, born at Mamaroneck, N. Y. He graduated from Hobart College in 1843, attended the Harvard Law School, and was admitted to the bar in 1846. He was connected with the American Historical Association and the New York Historical Society and published, with other works, *History of Mamaroneck, New York* (1886); *Origin and History of Manors in the Province of New York* (1886); *The Capture of Fort Washington the Result of Treason* (1877). He was editor of Jones' *History of New York during the American Revolution*, and of the New York Historical Society's Collections.

De Lancey, JAMES (1703–60), American jurist, born in New York and educated at Cambridge, England. Returning to New York in 1729, he was instrumental in drawing up the Montgomery charter of New York City, and was a justice of the Supreme Court from 1731 and its chief justice from 1733. He served twice as lieutenant governor, in 1747–55 and 1757–60. He assisted in founding King's College (Columbia).

De Lancey, OLIVER (1708–85), Loyalist soldier in the American Revolution, youngest son of Etienne de Lancey, was born in New York City. He entered political life, filled several minor offices, was active in raising troops, and took part in the disastrous attack on Fort Ticonderoga in July, 1758, as colonel of the New York City regiment, for which he received the thanks of the assembly. He was a member of the provincial council from 1760 to 1776, and in 1773 was placed in command of the southern military district of the province of New York. At the outbreak of the Revolutionary War he threw in his lot with the Loyalists and reported to Gen. Howe on Staten Island. He subsequently raised three regiments of Loyalists, was commissioned brigadier general, and given command of Long Island, remaining there until the close of the war. His home on the upper part of Manhattan Island was burned early in the contest, and his lands and property in New York and New Jersey were afterward formally confiscated. Gen. De Lancey after the cessation of hostilities made his home in England, where he died.

Delancey, OLIVER (1752–1822). A British soldier born in Edinburgh. He was colonel of the Seventeenth Light Dragoons, took part in the battles of Bunker Hill and Long Island, and succeeded Major André as adjutant general. Returning to England, he entered Parliament, and became a general in 1812.

Deland, city, Florida, county seat of Volusia, 100 miles south of Jacksonville on the Atlantic Coast Line Railroad and the St. Johns River. It is the seat of John B. Stetson University (coeducational). Principal industries are agriculture, citrus growing, and lumber products. Pop. (1930) 5,246; (1940) 7,041.

Deland, MARGARETTA WADE (Margaret Deland) (1857–1945), American author, was born (Campbell) at Allegheny, Pa., and studied at Pelham, New Rochelle, N. Y., and at the Cooper Union in New York City. She taught industrial design in the N. Y. Normal College in 1878–9, and was married in 1880 to Lorin F. Deland, of Boston, Mass., where she afterward lived. Her first book was *The Old Garden, and Other Verses* (1886). It was followed by *John Ward, Preacher* (1888), a popular novel dealing with theological questions, and by *Florida Days* (1889), *Sidney* (1890), *Mr. Tommy Dove, and Other Stories* (1893), *Philip and his Wife* (1895), *Old Chester Tales* (1898), *Dr. Lavendar's People* (1898), *The Common Way* (1904), *The Awakening of Helena Richie* (1906), *The Iron Woman* (1911), *The Rising Tide* (1916), *New Friends in Old Chester* (1924), *Old Chester Days* (1935), *Golden Yesterdays* (1941).

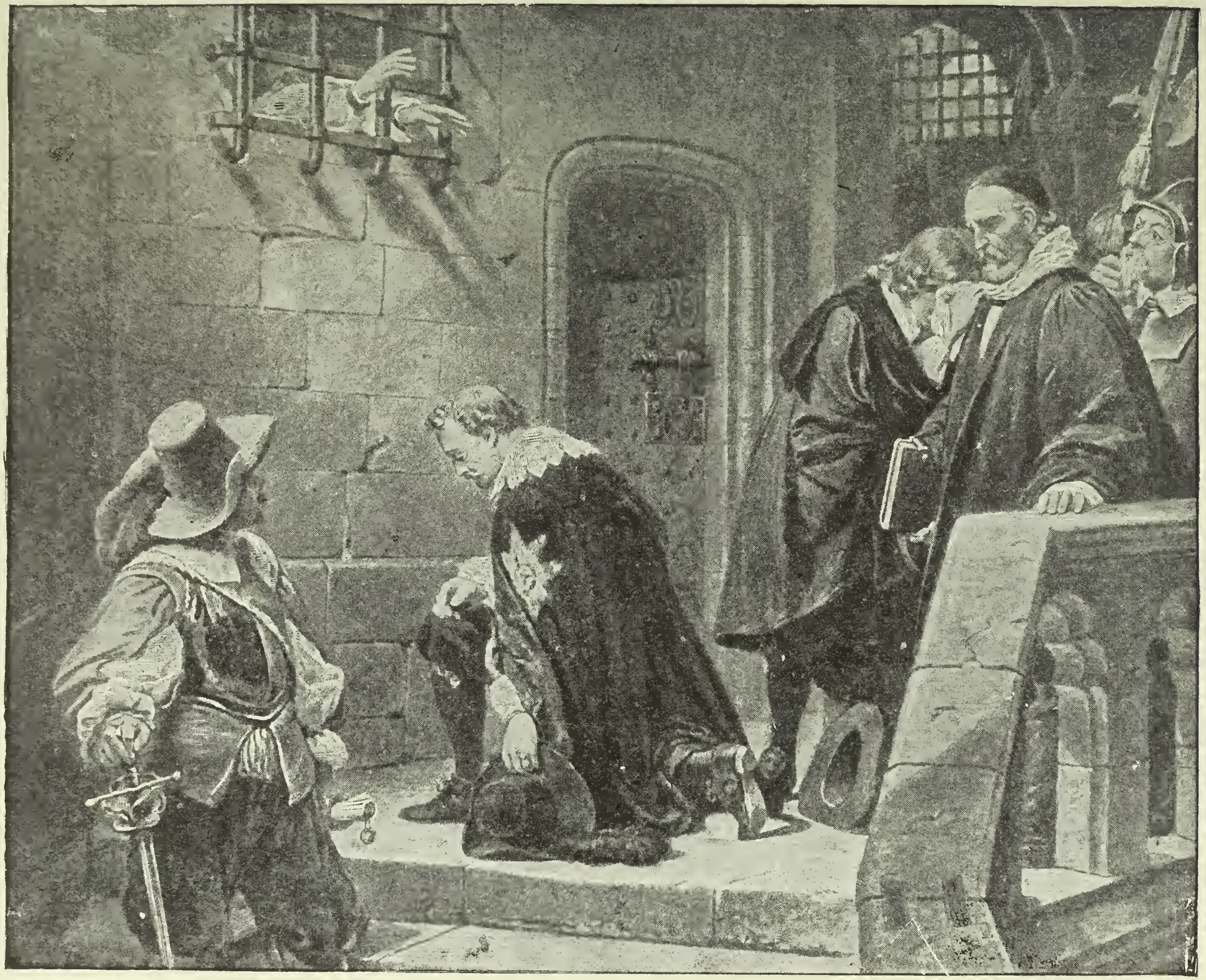
Delane, JOHN THADDEUS (1817–79), editor of the *Times*, was born in London. Joining the *Times* as assistant editor in 1839, he so impressed the proprietor with his capabilities that in 1841 he was appointed editor. He retained this position for thirty-six years and raised the *Times* to a position of importance and power. His tact, judgment, and public spirit were remarkable; yet he had no wide scholarship, nor did he write in its columns. He had a prodigious memory, and unequalled editorial capacity.

Delany, MARY GRANVILLE (1700–1788), English lady of wide literary and social connections. Her first husband (1718) was Alexander Pendarves, and her second (1743) Dr. Patrick Delany, an Irish divine. She was a friend and correspondent of Dean Swift. Her *Autobiography and Correspondence* (6 vols.) affords a comprehensive survey of 18th century life in England.

De la Ramée, LOUISA. See OUIDA.

Delarey, or **De la Rey**, JACOBUS HERKLAAS (1848–1914), assistant commandant general of the Transvaal forces in the Boer War of 1899–1902. He opposed Lord Methuen at Magersfontein in 1899; defeated General Clements at Nooitgedacht the next year, and, after numerous reverses and successes during the two following years, captured Lord Methuen at Tweebosch (March 7, 1902), but was repulsed by General Kitchener (March 31). On April 9 he joined the Boer peace delegates at Klerksdorp, and on May 31 signed the conditions of surrender at Vereeniging. Delarey sat (from 1893) for Lichtenburg, where he was born, in the First Volksraad. He was a Progressive in politics.

Delaroche, HIPPOLYTE, called PAUL (1797–1856), French painter, born in Paris. He dissented early from the classicism of David, and introduced the historical painting that prevailed throughout Europe during two-thirds of the 19th century. He met with less opposition than Delacroix, and rapidly attained popularity. His first notable pictures were *St. Vincent de Paul Preaching before Louis XIII, Joan of Arc in Prison*, and *St. Sebastian*. In 1827 he received the decoration of the Legion of Honor for his *Capture of the Trocadéro*, was elected a member of the Institute in 1832 and professor at the École des Beaux-Arts in 1833. In 1834, after his return from Italy, the minister of the interior commissioned him to decorate the amphitheatre of the École des Beaux-Arts. Among his historical pieces the most famous are *Cromwell at the Coffin of Charles I* (1831), *The Princes in the Tower, Mazarin Playing Cards, Richelieu and the Conspirators Cinq-Mars and De Thou, The Execution of Lady Jane Grey* (1834), and *The Murder of the Duke of Guise* (1835). He also painted portraits of great merit. His most famous pictures are in the Louvre, in the Bridgewater Gallery, and the Wallace Collection, London. See Rees, *Paul Delaroche* (1880); Vicomte Henri Delaborde and Jules Goddé, *Oeuvre de Paul Delaroche* (1858), and Tytler, *Modern Painters and Their Painting* (1899).



‘STRAFFORD RECEIVING ARCHBISHOP LAUD’S BLESSING ON HIS WAY TO EXECUTION.’
FROM THE PICTURE BY DELAROCHE.

Vol. III.—Page 591

Delaunay, de-lō-nā', Louis Arsène (1826–1903), French actor, was born in Paris. He made his first formal appearance at the Odéon as Damis in *Tartuffe* in 1845; was transferred three years later to the Théâtre Français, and remained one of the greatest ornaments of the Parisian stage till his retirement in 1887. He probably had no superior as *jeune premier,* and played with success in the dramas of Victor Hugo, Emile Augier, Molière, and De Musset.

Delaunay, Marguerite Jeanne. See Staal.

De Laval, de la-val', Carl Gustav Patrik (1845–1913), Swedish inventor, was born in Blasenborgs. He was graduated from the University of Uppsala (1866), and after working a short time in an iron mine and with a waterworks builder, went to Germany to study the manufacture of sulphuric acid. Upon his return to Sweden he built the first sulphur burners in that country. Later he became constructing engineer in an iron works and made many improvements in the various processes. His most important inventions are the steam turbine and the cream separator which bears his name. He was a member of the Lower (1892) and Upper (1894) Houses of the Swedish Parliament, but retired in 1896, to devote himself to the field of invention.

Delavan, del'*a*-van, city, Wisconsin, Walworth county, on the Chicago, Milwaukee, and St. Paul Railroad; 55 miles s.w. of Milwaukee. It is the seat of the Wisconsin Institute for the Deaf. There are mineral springs in the locality. Farming and dairying are important. Pop. (1930) 3,301; (1940) 3,444.

Delavigne, de-lä-vēn'y', Jean François Casimir (1793–1843), French poet and dramatist, was born in Havre. He was educated in Paris and at seventeen composed an *Ode* on the birth of the king of Rome (Napoleon's son). Devoting himself to literature, he wrote *Messéniennes* (1815) a series of satires against the restored French monarchy; and during the decade 1820–30 produced his principal plays: *Les Vêpres Siciliennes,* a tragedy (1818); *Le Paria* (1821); *Les Comédiens* (1820); *L'Ecole des Vieillards* (1823), probably his ablest composition; *Marino Faliero* (1829); and *Les Enfants d'Edouard* (1833). For the revolution of July, 1830, he composed a hymn called *La Parisienne;* and on the occasion of the Polish insurrection wrote *La Varsovienne.* His finest lyric was the ballad entitled *La Toilette de Constance.* In 1832 Delavigne produced his tragedy of *Louis XI.* (based on Scott's *Quentin Durward*); and, in 1835, *Don Juan d'Autriche.* A collected edition of his works appeared in 1885. Consult *Life,* in French, by Vaucheux.

Del'aware (popularly called the 'Diamond State'), one of the original thirteen states of the United States, belonging to the group called the Middle States, is situated between the parallels 38° 27' and 39° 50' n. lat., and between 75° 2' and 75° 47' w. long. It is bounded on the north by Pennsylvania; on the east by the Delaware River, Delaware Bay, and the Atlantic Ocean; on the south by Maryland; and on the west by Maryland and Pennsylvania. The state covers an area of 2,057 square miles, of which 79 square miles are water, and is, with the exception of Rhode Island, the smallest state in the Union.

Topography.—Constituting a part of the Atlantic coastal plain, Delaware exhibits little relief in surface features. Although there are some rolling and hilly lands in the northern part, most of the state is nearly level, the highest hill being but 280 feet above tide. A central sandy ridge extends north and south, nowhere more than 70 feet high, dividing the drainage of the Delaware and the Chesapeake basins; and numerous small streams, rising in the many swamps and morasses of this central ridge, flow into these two bays. The navigable streams are Christiana Creek, which is navigable to Wilmington; the Appoquinimink, navigable to Odessa; Duck Creek, navigable to Smyrna; St. Jones' Creek, navigable to Lebanon; Mispillion, navigable to Milford; and Broadkill Creek, navigable to Milton. In the western part of the state, the Choptank River is navigable for large boats to Seaford and Laurel. Extensive tidal marshy areas and several shallow bays occur along the coast; the largest of the bays, Indian River and Rehoboth, admit vessels of less than 6 feet draught. The only good harbors are those at Lewes, Wilmington, and New Castle.

At the southern border of the state, extending into Maryland, is the great Cypress Swamp, 12 miles in length, and covering 50,000 acres.

Climate and Soil.—The climate is mild, with ample rainfall, favorable for farming, and is generally healthful. The annual rainfall is 40 to 45 inches, well distributed. Killing droughts are unknown, and damaging storms are rare. The average annual temperature is about 55° f., although extreme temperatures of 103° for summer and 17° for winter have been recorded.

The soils are alluvial and residuary, varying from poor sands to clays and loams. A belt of loam soil follows the shores of Delaware Bay. Clay soils prevail in the north, and are the best for general agriculture, especially when treated with marl. The sandy loams of the middle belt are devoted to fruit and berry and vegetable culture, while the sandy soils of the south are given largely to strawberry and peach growing. The marsh lands, when drained, produce good crops.

Geology.—Except for limited outcrops of pre-Cambrian rocks in the extreme northern part and an area of granite near Wilmington, the formations of Delaware are sediments of the Cretaceous, Tertiary, and later age. There are some limestone and serpentine in the northern section.

Forestry.—There still remain parts of the former great forests which covered the state—of white and black oak, Spanish oak, yellow pine, cypress, and tulip-wood.

Mining.—Delaware has no extensive mineral deposits, and the mining industry is chiefly restricted to quarrying granite, marble, and serpentine for building purposes. Clay, the chief mineral product, is used principally for manufacturing brick and tile, and is found in the northern part of the state; a good quality of kaolin occurs in several localities. Glass sand and shell marl, valuable for fertilizing the clay lands, are abundant. There are small deposits of bog iron ore and phosphate rock. In several parts of the state are chalybeate springs of medicinal value.

Fisheries.—The fishing industry is carried on in the southern part of the state. Oysters, crabs, herring, shad, sturgeon, perch, weakfish, and menhaden (for oil and fertilizer) are of considerable value. Lewes, at the entrance to Delaware Bay, is an important fishing center.

Agriculture.—The soil of Delaware is well suited to farming, and this industry is the most important one in the state. Nearly three-fourths of the total area is in farms. Corn, wheat, and hay are the principal crops. Soy bean production has become considerable. The staple field crops predominate in the northern region, while in the middle section, and to the south, fruits and vegetables are most important. Apples of fine quality are grown in abundance and are exported in great quantity. Delaware peaches, famous in eastern markets especially during the latter half of the nineteenth century, again are raised with profit. The state serves, in fact, as a great orchard and market garden for many eastern cities, chiefly New York, Philadelphia, and Baltimore. Tomatoes and strawberries are the most valuable of the truck crops, followed by cantaloupes, asparagus, cucumbers, green peas, and lima beans. There is a large production of sweet potatoes, in Sussex County, and of white potatoes.

Stock Raising.—The state has a well regulated and profitable dairy industry. Three-fourths of the dairy products are exported. Philadelphia provides a market for much of the large milk production. A number of farmers, chiefly in the 'luxury' class, engage in the breeding of blooded cattle.

Manufactures.—The area centered at Wilmington is an important manufacturing district. The leather industry, one of the oldest in the state, is still one of the leading enterprises. Especially important is the manufacture of glazed kid. Foundry and machine-shop products have long been valuable, some of them being leather-working machinery, hydraulic jacks, and tube expanders. The state is also known for a number of manufacturing specialties, among them paper-making machinery, car wheels, and pumping and mining apparatus.

Other important industries or products are textiles, paper, building of cars for steam railroads, shipbuilding, canning and preserving, iron and steel, bathroom and electrical equipment, flour and gristmill products, lumber and timber products, slaughtering and meat packing, printing and publishing, and bread and other bakery products.

At Wilmington is the home office of the Du Pont Company, the largest manufacturer of diversified chemical products in the country, operating plants in more than half of the states. New Castle, six miles south of Wilmington, has developed in importance, with steel, shipbuilding, rayon, fiber, and aircraft plants.

Transportation.—There are about 300 miles of steam railway and 100 miles of electric railway in the state. The principal railroads are the Baltimore and Ohio and the Philadelphia, Baltimore and Washington; the latter is part of the Pennsylvania system.

Wilmington, New Castle, and Lewes are ports of entry. In the northern part of the state the Delaware and Chesapeake Canal (13½ miles long) connects the Delaware River with Chesapeake Bay. Made into a sea-level canal in 1927, it was widened and deepened in the 1930's.

For construction of the Du Pont Boulevard, a paved highway running the length of the state, T. Coleman du Pont contributed about $4,000,000.

Population.—According to the Federal Census for 1940 the population of Delaware was 266,505, an increase of 28,125, or 11.8 per cent, over 1930 (compared with an increase of 6.9 per cent during 1920–30). The urban population was 139,432, or 52.3 per cent of the total (compared with 51.7 per cent in 1930).

The population of the largest cities in 1940 was: Wilmington, 112,504; Dover, the capital, 5,517; Newark, 4,502; New Castle, 4,414; Milford, 4,214.

The population according to previous census reports for Delaware was: (1790) 59,096; (1820) 72,749; (1850) 91,532; (1880) 146,608; (1900) 184,735; (1910) 202,322; (1920) 223,003; (1930) 238,380.

Education.—The supervision of the public schools of Delaware is in the hands of the state department of public instruction and the state superintendent of public instruction. Education is compulsory, and separate schools are provided for white and for colored pupils.

The University of Delaware (q. v.), at Newark, and the State College for Colored Students, at Dover, are the only institutions for higher learning.

Charities and Corrections.—State institutions include a hospital for the insane, at Farnhurst; a training school for the feeble-minded, at Stockley; two tuberculosis sanatoriums, one for white patients, the other for colored, at Marshallton; the Blind Shop, at Wilmington; a detention home for juveniles, at Wilmington; Ferris Industrial School (for boys), at Marshallton; an industrial school for white girls, at Claymont, and one for colored girls, at Marshallton; and the State Welfare Home, at Smyrna. The last of these was opened in 1933 to take the place of the almshouses in the state's three counties. The whipping post is still maintained as a punishment for criminals.

Government.—The constitution of Delaware now in force was adopted in 1897. An amendment may be proposed in either house of the legislature, and, if favored by a two-thirds vote of all the members elected to each house, is entered in the legislative journals, and published in each county. If the succeeding legislature by a two-thirds vote of all the members elected to each house approves the amendment, it becomes a part of the constitution. A constitutional convention also may be convened when two-thirds of all the members elected to each house favor the project, provided a majority of the electorate concurs. The right of suffrage is restricted to those who are able to read the constitution in English and write their names; and due registration is required.

The executive officials comprise the governor, lieutenant-governor, attorney-general, insurance commissioner, secretary of state, treasurer, and auditor of public accounts. The governor has the power to remove any officer except the lieutenant-governor and the members of the legislature, when requested to do so by a two-thirds vote of all the members elected to each house. A three-fifths vote of all the members elected to each house is required to pass a bill over the governor's veto.

The legislature, termed the general assembly, consists of a house of representatives of 35 members, elected for two years, and a senate of 17 members, elected for four years. The judicial power is exercised in a supreme court, superior court, court of chancery, orphans' courts, common pleas courts, court of oyer and terminer, court of general sessions, and registers' courts. State judges are appointed by the governor with the consent of the senate for twelve years, and they in varying numbers administer the several courts mentioned, with the exception of the registers' courts, which are administered by the registers of wills. Justices of the peace are appointed by the governor with the senate's approval. The senate, when sitting as a court of impeachment, also exercises judicial functions.

Under the Congressional apportionment law, Delaware sends one member to the National House of Representatives. Dover is the State capital.

Recent Legislation.—In 1923 Delaware enacted a law creating the State Health and Welfare Commission. In the same year an act of the legislature provided for reading portions of the Holy Bible and repeating the Lord's Prayer in each public school and preventing other religious service or exercise. Also in 1923 an act was passed providing for the sterilization of mental defectives, and another act granted municipalities authority to adopt zoning regulations. A law of 1925 created the Forest Conservation Commission. In 1931 a law created a board of budget directors

Photo from Brown Bros., N. Y.

DELAWARE.

A four-year-old Jonathan apple orchard in bloom. Fruit-growing has long been extensively carried on, apples having succeeded peaches as the principal horticultural crop in recent years. In the background appear the rolling, sandy hills typical of northern Delaware.

and established a state budget system; also a law created the state Old Age Welfare Commission. In 1941 the long-standing Sunday blue laws were repealed, and a new law gave incorporated cities authority to regulate 'worldly activities' on Sunday, although a ban on such activities was continued for the rural areas.

History.—Delaware takes its name from Lord De la Warr, governor and first captain-general of Virginia, the name having been originally applied to Delaware Bay by the Virginians. The region was included in the British claim as a part of Virginia; but the Dutch, by virtue of the discovery of the Delaware River by Hudson, in 1609, and the subsequent explorations of Mey, ignored this claim, and in 1631 founded a colony on Lewes Creek. The settlers soon aroused the hostility of the Indians, who destroyed the colony.

In 1638 a Swedish settlement under Peter Minuit was established near the present site of Wilmington, and the country was called New Sweden. This action was strongly resented by the Dutch, who soon afterward founded a military post, Fort Casimir, near what is now New Castle. During the period 1640–55 the Swedes and the Dutch of New Netherland waged almost incessant warfare, until the latter finally succeeded in gaining the ascendency.

In 1664 New Netherland fell into the hands of the English, and Delaware remained under English rule, with the exception of a brief interval in 1673–4, when the Dutch regained control, until the War of the Revolution. The Duke of York made over the territory to William Penn in 1682, and Delaware (the 'Three Lower Counties on the Delaware') was considered a part of Pennsylvania until 1703, when it was allowed a separate legislature, continuing to be, however, under the proprietary government of Pennsylvania. In 1776 an independent state government was established. Delaware has the distinction of having been the first state to ratify the United States Constitution (Dec. 7, 1787).

During the Civil War public sentiment was divided in the State, the northern section being favorable to the Federal government, while the southern was favorable to the Confederacy. Through its official government, Delaware remained loyal to the Union, although slavery was retained until abolished by the Fifteenth Amendment.

From 1901 to 1903 Delaware was without representation in the United States Senate, as a result of dissensions in the Republican party, which arose from the senatorial candidacy of J. Edward Addicks. In 1903 a compromise was effected between the Republican factions, which resulted in the election of two Republican senators, one for the regular term and the other for the unexpired term. In 1904 another vacancy occurred, and a deadlock ensued until June, 1906, when H. A. du Pont was elected.

The tercentenary of the founding of the first Swedish settlement in Delaware was celebrated in 1938. In the illness of Crown Prince Gustav Adolf, who headed the Swedish delegation which arrived at Wilmington on June 27, his son, Prince Bertil, presented a memorial given by the people of Sweden to the United States, which was accepted by President Roosevelt.

In national politics Delaware allied itself with the Federal and Whig parties during its early political history, although it supported Monroe in 1820. In 1852 it cast its vote for the Democratic candidates, and remained under the control of the Democratic party until 1896, with the exception of the year 1872, when Grant, the Republican nominee, carried the state. In 1896 and subsequently the Republicans were successful, except in 1912 and again in 1936 and 1940, when the Democrats carried the state.

Bibliography.—Consult H. C. Conrad, *History of the State of Delaware* (3 vols., 1908); E. N. Vallandigham, *Delaware and the Eastern Shore* (1922); W. A. Powell, *History of Delaware* (1928); Bevan and Williams, *History of Delaware* (4 vols., 1929); C. Ward, *Dutch and Swedes on the Delaware, 1609–64* (1930); G. F. Bennett, *Early Architecture of Delaware* (1932); Federal Writers' Project, *Delaware: A Guide to the First State* (1938); Daugherty, *Early Taxation in Delaware;* de Valinger, *Colonial Military Organization in Delaware, 1638–1776;* Johnson, *The Swedish Settlements on the Delaware;* Ryden, *Delaware—The First State in the Union;* Messersmith, *The Government of Delaware;* see also 'New Sweden, or the Swedes on the Delaware' in Winsor's *Narrative and Critical History of America.*

Delaware, city, Ohio, county seat of Delaware county, on the Cleveland, Cincinnati, Chicago, and St. Louis (New York Central lines); the Hocking Valley; and the Pennsylvania railroads, 23 miles north of Columbus. It is noted for its mineral springs. Manufactures include furniture, carriages, hardwood articles, tiles, and cigars. Ohio Wesleyan University is situated here. Pop. (1930) 8,675; (1940) 8,944.

Delaware Bay, an arm of the Atlantic Ocean between New Jersey and Delaware. The width at the entrance, between Cape May and Cape Henlopen, is little more than 10 miles, and the greatest width within is about 25 miles. It is about 40 miles in length, and tapers gradually to the estuary of the Delaware River. A safe harbor is formed near Cape Henlopen by a huge breakwater, constructed by the U. S. Government. Delaware Bay is connected with Chesapeake Bay by a coastwise canal.

Delaware River, an important river in the eastern United States, rises in the Catskill Mountains, N. Y., and follows a southerly course, forming part of the boundary between New York and Pennsylvania, and the entire boundary between New Jersey and Pennsylvania. It becomes tidal at Trenton, the head of navigation, and below Philadelphia widens gradually, expanding into Delaware Bay (q. v.). The total length is 410 miles; the drainage basin is 12,012 square miles. The Lehigh and Schuylkill rivers from the west, and the Mongaup and Navesink from the east are the most important tributaries. There are several canals which connect the river with other waterways. The Delaware has been called the American Clyde because of the shipbuilding industries along its banks. Improvements between Philadelphia and the bay have cost the United States Government more than $12,000,000, the channel having been deepened to 12 feet at low water between Trenton and Philadelphia and to 35 feet below Philadelphia, this 35-foot channel extending from Philadelphia to Bombay Hook, the beginning of Delaware Bay. Consult Halsey, *Four Great Rivers.*

Delaware River Port Authority, a new body created by the New Jersey Legislature in June, 1931, to supervise transportation development between Camden, N. J., and Philadelphia. Under the law, the two state bodies hitherto regulating traffic on the Camden bridge became the Port Authority, the members being retained. Power was given to issue bonds to refinance the bridge.

Delawares, a tribe of North American Indians, of the Algonquin family. Their language is a typical Algonquin dialect, and they claim to be the parent stock. They call themselves Lenni Lenâpé ('genuine' or 'true-born men'). In 1664 they occupied Delaware, New Jersey, Pennsylvania, and New York; and it was with a tribe of this nation that Penn made his famous treaty of 1682. Like the Iroquois, the Lenni Lenâpé formed a league or confederacy, the 'Five Delaware Nations,' in which were comprised the now extinct Mohicans; but their league was broken up at an early date by the Iroquois.

Delaware Water Gap, from the New Jersey Side.

Forced westward by the whites, they settled successively in Western Pennsylvania, Ohio, Indiana, Missouri, Arkansas, Texas, and Kansas, removing from a Kansas reservation in 1867 to be incorporated with the Cherokees in Indian Territory. Large numbers of Delawares were converted by Moravian missionaries in the seventeenth and eighteenth centuries. The bulk of the nation is now in Oklahoma, while groups are scattered in Kansas, Wisconsin, and Ontario.

Delaware, University of, a state institution for higher education at Newark, Del., founded under private control as 'Newark College' in 1833, and renamed 'Delaware College' in 1843. It was closed from 1859 to 1869, but was reopened in 1870 under combined state and private control, when it was designated as beneficiary under the Land Grant Act of 1862. In 1913 all private ownership in the institution was surrendered and the college became the property of the state alone. In 1914 the Women's College was established by Act of Legislature, with separate buildings, class-rooms, and laboratories, but having the same Board of Trustees and President, and, in the main, the same faculty. In 1921 the name was changed by Act of Legislature from 'Delaware College and the Women's College' to the 'University of Delaware,' without change in form of organization or administration. The courses offered for men are those leading to degrees in arts, science, agriculture, and in civil, electrical, chemical, and mechanical engineering. The courses offered for women are those leading to degrees in arts, science, home economics, and education.

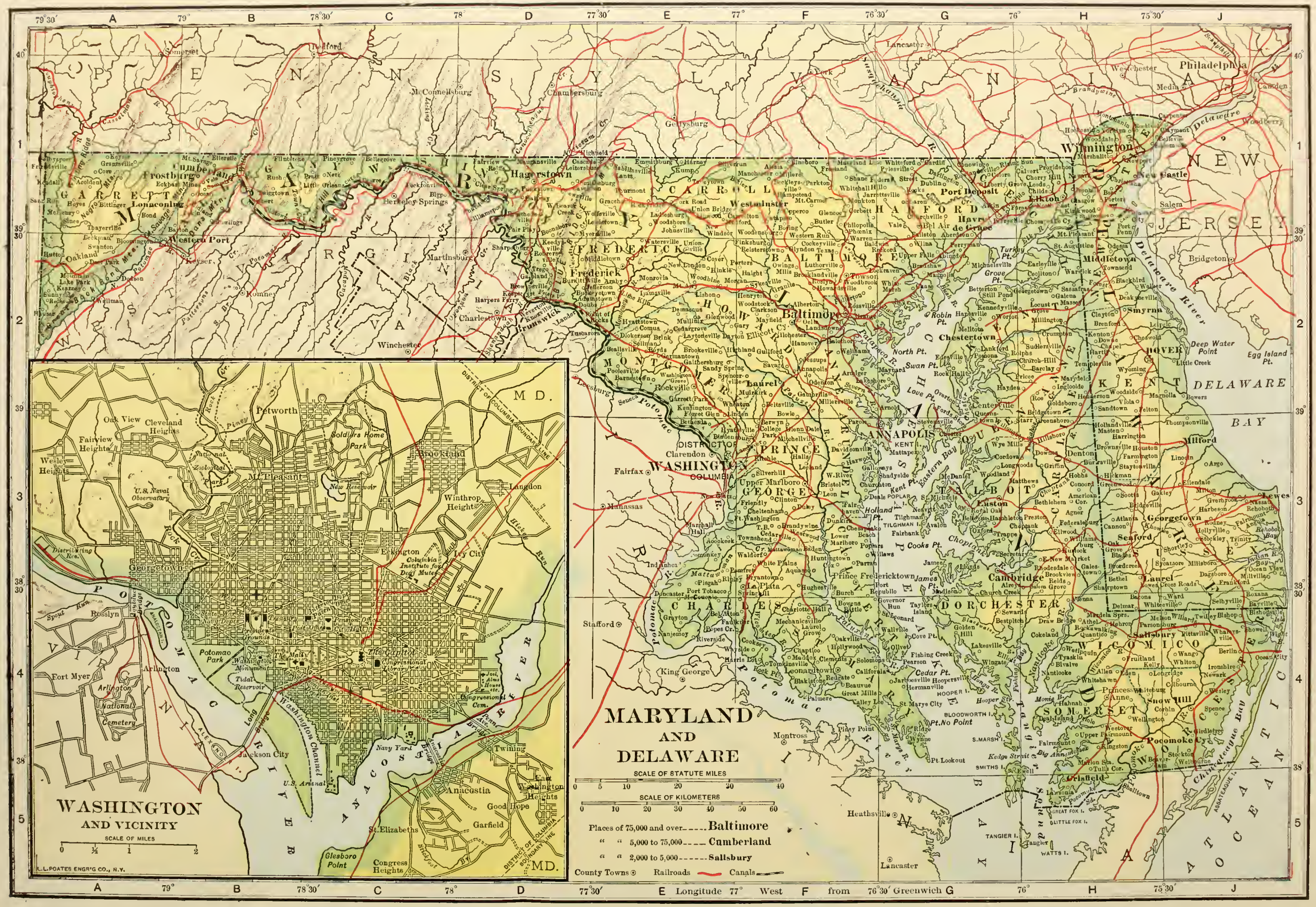
Delaware Water Gap, borough and summer resort, Pennsylvania, Monroe county, at the gap where the Delaware River breaks through the Kittatinny Mountains, on the New Jersey border, and on the Delaware, Lackawanna, and Western Railroad. The Delaware River flows through the gorge for about 2 miles between picturesque cliffs 1,000 to 1,200 feet high. Pop. (1930) 443; (1940) 410.

De La Warr, dẹ lȧ wâr' *or* del'a-wâr, THOMAS WEST, THIRD BARON (1577–1618), colonial governor of Virginia, was born in Hampshire, England. He was returned to the British Parliament in 1597, and served in the campaigns in the Low Countries and in Ireland. Succeeding his father in the peerage in 1602, he interested himself in the plans for the colonization of Virginia; became a member of the council of Virginia in 1609; and the next year was appointed first governor and captain-general for life. He sailed for Virginia in March, 1610, arriving at Jamestown in June with additional emigrants and supplies just in time to forestall the abandonment of the colony. He organized expeditions for food, and forwarded to the English government strong representations as to the necessity of support. Forts Henry and Charles, at the mouth of the James River, were established by him, and named for the king's sons. He had returned to England by June, 1611, and in that year published his *Relation . . . of the Colony Planted in Virginia,* in which he reported favorably on the condition of the colony. He again sailed for Virginia in 1618, but died on the voyage thither. The bay, river, and State of Delaware perpetuate his name.

Delbrück, del'brük, MARTIN FRIEDRICH RUDOLF VON (1817–1903), Prussian statesman, was born in Berlin. In 1849 he became connected with the Department of Commerce and Industry, was made its director in 1859, and in this capacity organized the (renewed) Zollverein or customs union between Prussia and the minor German states. Bismarck materially assisted him when he became minister in 1862; and, after the Austrian war of 1866, Delbrück was created president of the Federal Council. He was one of the moving spirits of the North German Bund. During the war of 1870–1 he practically governed Berlin, king and chancellor being absent. Later it became his duty to arrange the details of the new constitution of the empire. In 1876 he resigned the presidency of the Imperial Council.

Delcassé, del-kȧ-sā', THÉOPHILE (1852–1923), French statesman, was born in Pamiers, department of Ariège. He became one of the staff of *La République Française,* and Colonial Minister in the Dupuy Cabinet (1894). He was Minister of Foreign Affairs in the Brisson, Dupuy, Waldeck-Rousseau, Combes, and Rouvier cabinets, resigning from the last-named in 1905. He arranged the differences with Great Britain arising

Théophile Delcassé.



MARYLAND AND DELAWARE

SCALE OF STATUTE MILES

SCALE OF KILOMETERS

Places of 75,000 and over ---- **Baltimore**

" " 5,000 to 75,000 ---- **Cumberland**

" " 2,000 to 5,000 ---- **Salisbury**

County Towns ⊙ Railroads —— Canals —+—

WASHINGTON AND VICINITY

SCALE OF MILES

INDEX OF DELAWARE

DELAWARE
Angola, Del......J 3
Argo, Del........J 3
Atlanta, Del.....H 3

Bacons, Del.....H 4
Bayville, Del.....J 4
Bear, Del.......H 1
Bellevue, Del.....J 1
Bethel, Del......H 3
Blackbird, Del...H 2
Blades, Del.....H 3
Bowers, Del......J 2
Broadcreek, Del..H 3
Brownsville, Del..H 3
Brenford, Del...H 2
Bridgeville, Del..H 3

Cannon, Del.....H 3
Carpenter, Del...J 1
Cheswold, Del...H 2
Christiana, Del...H 1
Claymont, Del....J 1
Clayton, Del....H 2

Dagsboro, Del....J 3
Deakyneville, Del.H 2
Delaware Cy., Del.H 1
Delmar, Del.....H 4
Dover, Del......H 2
Downs Chapel,Del.H 2

Edgemoor, Del...J 1
Ellendale, Del....J 3

Fairmount, Del...J 3
Farmington, Del.H 3
Felton, Del......H 2
Forest, Del......H 2
Frankford, Del...J 3

Georgetown, Del..J 3
Glasgow, Del....H 1
Greenwood, Del..H 3

Habeson, Del.....J 3
Harrington, Del.H 3
Hartly, Del......H 2
Hickman, Del...H 3
Hockessin, Del...H 1
Hollandville, Del.H 3
Hollyville, Del....J 3
Houston, Del....H 3

Ironhill, Del.....H 1

Kenton, Del.....H 2
Kirkwood, Del...H 1
Knowles, Del.....J 3

Laurel, Del......H 3
Leipsic, Del.....H 2
Lewes, Del.......J 3
Lincoln, Del.....J 3
Little Creek, Del.J 2
Lowes Cross
Roads, Del.....J 3

Magnolia, Del....J 2
Marshallton, Del.H 1
Masten, Del....H 3
Middletown, Del.H 2
Milford, Del.....J 3
Millsboro, Del....J 3
Millville, Del.....J 3
Milton, Del......J 3
Montchanin, Del.H 1
Mt. Pleasant, Del.H 1

Nassau, Del......J 3
Newark, Del.....H 1
New Castle, Del.H 1
Newport, Del....H 1

Oak Grove, Del..H 3
Oakley, Del.....H 3
Ocean View, Del.J 3
Odessa, Del.....H 2
Overbrook, Del...J 3

Porters, Del.....H 1
Port Penn, Del..H 1

Rehoboth, Del....J 3
Rockland, Del...H 1
Rodney, Del......J 3
Roxana, Del......J 4

St. Georges, Del.H 1
Sandtown, Del ..H 2
Scotts, Del......H 3
Seaford, Del....H 3
Selbyville, Del....J 4
Shortley, Del.....J 3
Smyrna, Del.....H 2
Staytonville, Del..H 3
Stockley, Del.....J 3
Sycamore, Del....J 3

Thompsonville,Del.J 3
Townsend, Del...H 2
Trinity, Del......J 3

Viola, Del.......H 2

Walker, Del......H 2
Ward, Del.......J 4
Whitesville, Del..J 4
Wilmington, Del.H 1
Wooddale, Del...H 2
Woodside, Del...H 2
Wyoming, Del....H 2

Yorklyn, Del....H 1
Yost, Utah.......A 1

from the occupation of Fashoda by the Marchand expedition in 1898; and his proposals regarding the settlement of the Chinese question after the Boxer Rebellion were accepted by the powers. In 1902 he concluded the Morocco agreement with Spain, and in 1904 the Franco-Spanish Convention. In 1903–4 he coöperated in establishing cordial relations between France and England, and, in conjunction with Lord Lansdowne, prepared the Anglo-French agreement signed on April 8, 1904. He was Minister of Marine for the third time in 1912, was Ambassador at Petrograd (1913–14) and Minister of Foreign Affairs (1914–15). He was a chevalier of the Legion of Honor.

Del Credere Agent, del cred'er-i, an agent for the sale of goods who, in consideration of an additional commission known as *del credere* commission, undertakes to indemnify his principal against loss occurring through the insolvency or failure to complete their contracts of persons with whom he transacts business. See Factor; Principal and Agent.

Del'eb Palm (*Borassus æthiopum*), a species of Palmyra palm, native to India, Africa and other tropical countries where it replaces the date palm. The fruit is large and yellowish brown and its fiber is used for making ropes, brushes, and twine.

Deled'da, Grazia (1873–1936), Italian novelist, was born in Nuoro, Sardinia. She spent her early life in the little town of her birth but after her marriage removed to Rome. Her work, which was realistic and emotional, but highly restrained, was concerned almost entirely with the peasants and farmers of Sardinia, among whom she lived. She was remarkably adept at picturing the tragedy of virtue and idealism in a struggle against harsh realities of life. She received the 1926 Nobel prize for literature. Her published works include *La Giustizia* (Justice), *Reeds in the Wind, Ashes, The Mother, Nostalgia.*

Delegate, one who is elected or appointed to act for another person or number of persons. The term is used in the United States for Territorial representatives in Congress, for members of the lower house of the Virginia, West Virginia, and Maryland legislatures; for members of the lower house of the Protestant Episcopal General Convention, and in various other assemblies.

Delegate Apostolic, a papal representative, of lower rank than a nuncio, appointed to missionary countries, to countries that have not diplomatic relations with the Vatican (the United States, Mexico, Canada), and, with the addition of the title Envoy Extraordinary, to certain countries that maintain such relations (Colombia, Peru, and other South American republics).

In the United States the office (established in 1893) is of great importance, the power of the apostolic delegate to decide cases without appeal having been confirmed by the Holy See in 1909.

Delegate, Walking, the business agent employed by some trades unions in the United States. His duties are to discover and report to his union violations of agreements; and where a general arbitration board exists, to appear before it as a witness. Walking delegates have been especially influential in the building trades through their power (now curtailed) to call strikes.

Delegation, a name given to the administrative divisions of ancient Lombardy and Venice; also to the states of the Church. The term is also applied to the local representation in Alsace-Lorraine. 'Delegations' established in 1867 formerly existed in the Austro-Hungarian monarchy for legislating upon the common affairs of the kingdom of Hungary and the empire of Austria.

Delescluze, d*e*-lā'klüz, Louis Charles (1809–71), French communist, was born in Dreux. He was an active participant in the revolution of 1830 and after 1848 was deported to Cayenne (1853–9), his experiences being described in his *Journal d'un transporté* (1869). In 1868 he launched the *Réveil,* as organ of the Internationale; in 1871 he was a member of the Commune, and perished on the last barricade.

Delfshaven, delfs'hä-ven, or Delftshaven, town, Holland, now a western suburb of Rotterdam. It is the port where the Pilgrim Fathers embarked on July 22, 1620, for New England. It is also the birthplace of Admiral Piet Heijn (q. v.). It has distilleries and engineering works. See Rotterdam.

Delft, mediæval town of the Netherlands, in the province of South Holland, on the Schie River, and intersected by several canals; 5 miles by rail s.e. of The Hague. The Oude Kerk contains monuments to Admiral Heijn and Van Leeuwenhoek (born here in 1632), also the tomb of Admiral Van Tromp. In the Nieuwe Kerk (1384–96) is the grand monument which the United Provinces erected (1616–21) to William the Silent, who was assassinated (1584) in Delft; it was also for generations the burial place of the princes of the House of Orange. In the seventeenth and eighteenth centuries it was famous for its beautiful faïence pottery, and has of recent years again become a center of the Dutch china and pottery industry. It also has manufactures of chemicals, tobacco, carpets, and firearms. Pop. (1939) 54,108.

Delhi, del'i (*Sháh Jahánabád*), city, capital of British India, on the right bank of the Jumna River, and on several lines of railroad; 38 miles s.w. of Meerut, 956 miles from Calcutta, 982 miles from Bombay, and 907 miles from Karachi. A high wall, 5½ miles in circumference, surrounds the city, which, except in the native quarter, is laid out in broad streets and open spaces. It is the seat of St. Stephen's College and a Hindu college, and has a public library, hospital, town hall, and government high school. The magnificent palace (now called the Fort, and used in part for military purposes) and the Jama Masjid (the largest cathedral mosque in India) are monuments of Sháh Jáhan, who, in the seventeenth century, founded the present city. The Hall of Private Audience, in the palace, was the setting for the famous Peacock Throne, made of precious stones, which was carried off to Persia by Nadir Shah (1739). Beyond the walls, to the south, can be traced the sites of ancient Delhis. Of these memorials the most striking are the mausoleum of the Emperor Humayun, the iron pillar of Raja Dháva (319), and the Kutah Minar, a tower 240 feet high dating from the twelfth century. Outside the battered Kashmir Gate, on the northern side, is 'The Ridge,' crowned with a monument commemorating the siege of 1857.

In recent years Delhi has experienced great industrial and commercial development, following the improvement of transportation facilities, and has become the distributing center for the whole of Upper India. Industrial establishments include cloth and cotton-spinning and weaving mills, flour mills, ginning, ice, biscuit, sugar cane, shoe, pickle, and chemical factories, and iron foundries; while pottery manufacture, embroidery, ivory carving, miniature painting on ivory, and metal work are still trades of considerable importance. The commercial center of the city is the Chandni Chauk, a thoroughfare about a mile in length and more than 70 feet wide. It is lined with warehouses and shops wherein a bewildering array of gold and silver articles and embroideries is displayed.

Historical.—The plains about Delhi, with the ancient city Indraprastha, were the scene of the Hindu epic Mahabhárata (q. v.); and in the first Christian centuries new capitals were built by successive dynasties on or near the same site, the most imposing being Tuglukabad (fourteenth century), now occupied by a Hindu village. Once the seat of Buddhist religious life and culture, Delhi became in the twelfth century the splendid capital of the Moslem (Mogul) Empire, and the center of Mohammedan power. It was sacked by the Persian Nadir Shah in 1739, at which time there was appalling massacre and treasures worth millions were carried away. In 1759, it was captured by the Mahrattas who held it until 1803 when it was taken by Lord Lake. In the Sepoy War the rebel troops made it their headquarters, and it was captured by the British under General Nicholson, after a siege of nearly four months. (See Mutiny, Indian).

Delhi was the scene of the great coronation durbars of Jan. 1, 1903, and Dec. 12, 1911. (See Durbar). At the latter, proclamation was personally made by King George of the transfer (1912) of the capital of India from Calcutta to New Delhi. The superiority of New Delhi's climate shortens the government's annual retreat to the heights of Simla from seven or eight months to three or four. The administration buildings occupy a site outside the walls of the old city. An area of 180 square miles (taken chiefly from the Punjab, partly from the Meerut district of the United Provinces) is set apart for the imperial capital, which is thus removed from local politics. New Delhi, as the capital, was completed in December, 1929, and the formal opening took place in February, 1931. Pop. (1931) 447,442. Consult Fanshawe, *Delhi, Past and Present,* Finnemore, *Delhi and the Durbar.*

Delhi, village and summer resort, New York, county seat of Delaware county, on the Delaware River and the New York, Ontario, and Western Railroad; 64 miles N.W. of Poughkeepsie. It is the seat of Delaware Academy, founded in 1819. It has manufactures of silk and a good trade in flour, feed, coal, live stock, and dairy products. Pop. (1930) 1,840; (1940) 1,841.

Delian League (Confederacy of Delos), a confederacy of Ionian cities, founded in 478 B.C., with the object of presenting a united front to the common enemy, Persia, and of ridding the Ægean Sea of pirates. The League was under the nominal control of a synod that met at Delos; but Athens soon obtained supreme power, even to the extent of appropriating the common treasury to its own use. The League was dissolved in 404 B.C.; but was revived in 378, with the object of opposing Sparta, and lasted until 338. See Greece, *History.*

Delibes, d*e*-lēb', Clément Philibert Léo (1836–91), French musical composer, was born in St. Germain-du-Val (Sarthe). He studied at the Paris Conservatory and in 1865 became second director at the Grand Opera; in 1880 a professor in the conservatory; and in 1885 a member of the National Institute. His first important work was music for the ballet *La source* (1866), the success of which was followed by that of a similar work, *Coppélia* (1870), and an opera, *Le roi l'a dit* (1873). These were succeeded by a mythological ballet, *Sylvia* (1876), and a grand scena, *La mort d'Orphée.* His most famous opera was *Lakmé,* which was produced in Paris in 1883.

Deli'lah, a Philistine woman, beloved by Samson (q. v.), who was induced by a bribe to betray him to her countrymen. While he was asleep she cut off his hair, which she had learned was the source of his great strength, and he was easily captured. Consult Judges xvi. 4–31.

Delille, d*e*-lēl', Jacques (1738–1813), French poet, was born in Aigueperse, department Puy-de-Dôme. While professor at La Marche Collège his translation (1769) of the *Georgics* opened the Academy to him when only thirty-four. Escaping from the horrors of the Revolution, he devoted eighteen months in London to a translation of *Paradise Lost* (1805). After that he occupied the chair of poetry at the Collège de France. His *Jardins* (1782), *L'homme des champs* (1800), and other works achieved a temporary reputation. His collected works, which include a translation of Pope's *Essay on Man,* were issued in 1847.

Deliquescence, del-e-kwes'-ens, a property which certain substances possess of attracting moisture from the air, and thereby becoming liquid—*e.g.,* chloride of zinc, chloride of magnesium, and nitrate of copper.

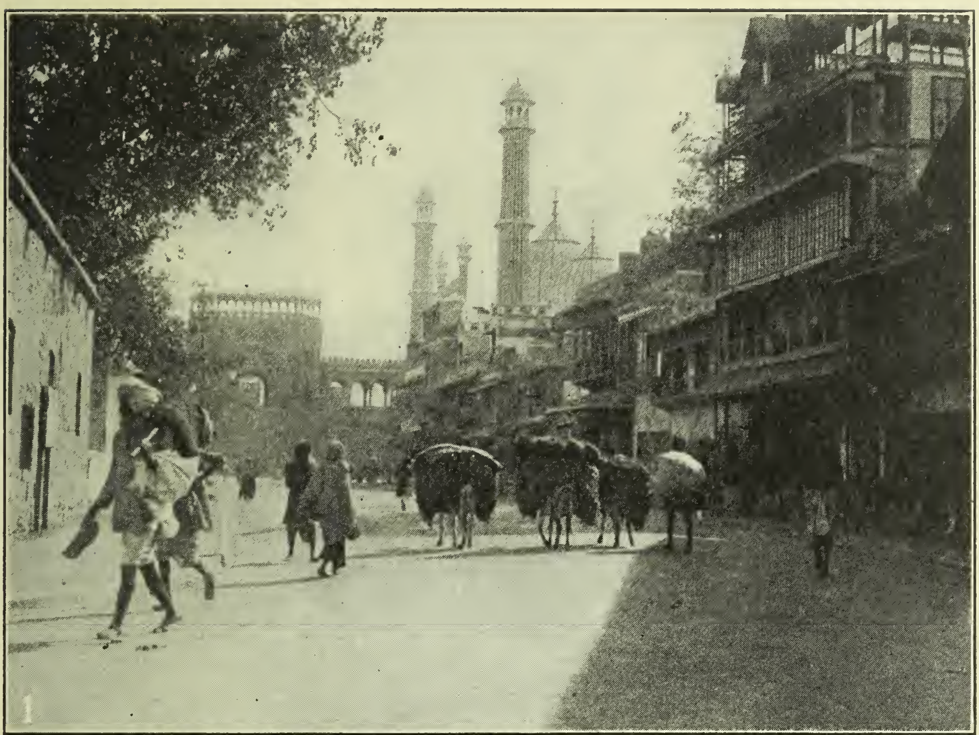
Delir'ium, a condition of temporary mental disorder, associated particularly with unreasonable, rambling, disjointed speech. It may accompany direct brain injury or disease; but in some people it is likely to be present whenever body temperature rises above a certain point. It is a symptom, not in itself a disease, and should be treated by removing or alleviating the cause—*e.g.,* pyrexia, pain, sleeplessness. See Delirium Tremens; Fever; Insanity.

Delirium Tremens ('trembling delirium'), that form of acute mania which follows the excessive and long continued drinking of alcoholic liquors. The onset may be comparatively gradual; or it may come on suddenly, if any accident deprive the patient either of appetite for food, or of food to satisfy the appetite.

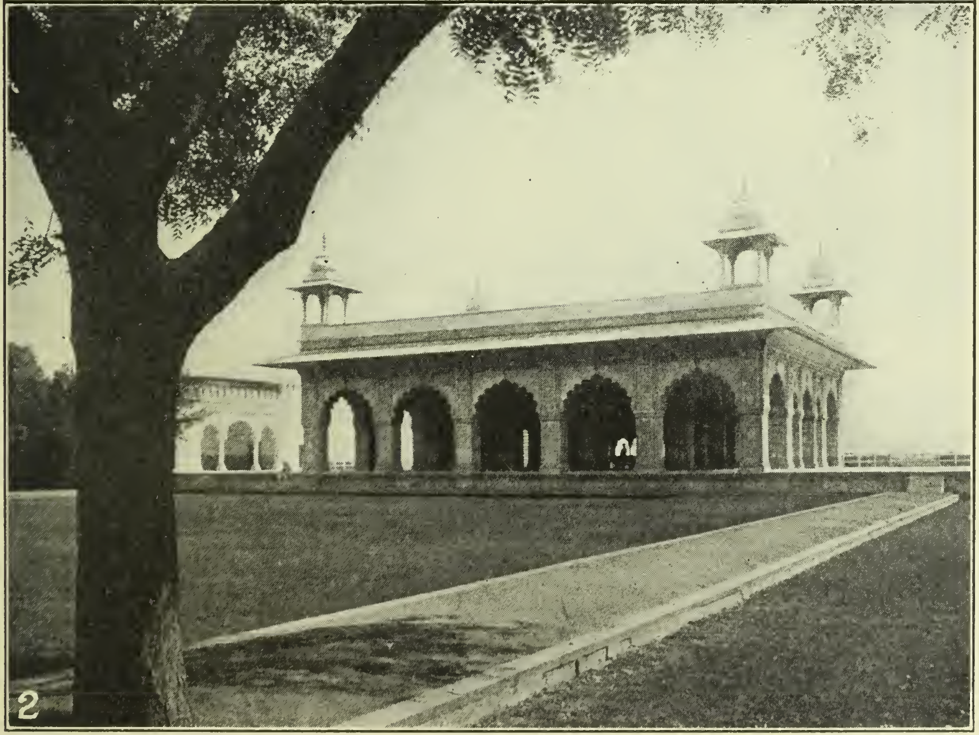
The delirium frequently begins at night. The patient cannot sleep, nor can he lie quiet. He is suspicious of every one about him, terrified of he knows not what, and finally has visual hallucinations. He sees dogs, cats, snakes and other reptiles, devils, and loathsome insects. There may be hallucinations of sound; but those of touch are rare, and the sense of smell seems unaffected. In this condition there is great risk of suicide or of homicide. The condition usually lasts for from four to seven days, and leaves the patient in an exhausted state. When death occurs it is generally due to heart failure. Pneumonia is a common complication; it is sometimes apparently the exciting cause of the delirium, and at other times develops with or after it.

Treatment.—All alcohol must be stopped at once, and careful feeding begun with light, nourishing food in small quantities, frequently repeated. The patient must be confined to bed, and constantly watched. At the same time force must not be used unless absolutely necessary. Sedative treatment is given according to the requirements of each case. Fluids should be forced. In acute cases, 1,000 to 1,500 cc. of 5 per cent glucose solution may have to be injected. Otherwise dehydration is combated by oral administration of not less than 4,000 cc. of fluids daily. A light, high caloric, high vitamin diet is prescribed with additional vitamin B complex. Intravenous dextrose, insulin and vitamin B_1, has also proved beneficial. Lumbar puncture may be required in some cases. See Alcoholism.

Delisle, d*e*-lēl, Léopold Victor (1826–1910), French historian and bibliographer, was born in Valognes, department of Manche. He was educated in his



1



2

© Publishers Photo Service

VIEWS IN DELHI

1. *A Street in Delhi with the Big Mosque in the Background.* 2. *The Palace of the Peacock Throne.*

native village and at the Ecole des Chartres in Paris. He served as assistant in the department of manuscripts in the Bibliothèque Nationale, in Paris, from 1852 to 1874; general administrator of the library from 1874 to 1905; and librarian for the Chantilly collection of the Institut de France from 1905 to 1910. He was elected to membership in the Académie des Inscriptions et Belles-Lettres of the National Institute in 1857. Under his direction a catalogue of the Bibliothèque Nationale was commenced in 1897, which had reached its forty-fourth volume at the time of his death. Among his books are *Le cabinet des manuscrits de la Bibliotheque Imperiale* (3 vols., 1868–81); *Catalogue des manuscrits des fonds libri et barrois* (1888); *Catalogue des livres imprimés ou publiés à Caen* (2 vols., 1903–4); *Récherches sur la libraire de Charles V.* (1907); *Recueil des actes de Henri IV.* (1909).

Delitzsch, dā′lich, Franz (1813–90), German theologian, was born in Leipzig. He became professor at Rostock in 1846, at Erlangen in 1850, and at Leipzig in 1867, where he labored till his death. He was one of the greatest Hebraists of the nineteenth century, his commentaries on Habakkuk, Job, Psalms, Proverbs, Song of Solomon and Ecclesiastes, Isaiah, and Genesis being of the highest value. He wrote *System of Biblical Psychology* (1855; Eng. trans.); and in collaboration with Baer issued revised Hebrew texts of the principal Old Testament books. His translation of the New Testament into Hebrew is considered a classic. He also published volumes on Hebrews (1857) and Apologetics (1869).

Delitzsch, Friedrich (1850–1922), German Assyriologist, son of Franz Delitzsch (q.v.), was born in Erlangen. He was successively professor of Assyriology at Leipzig (1877), Breslau (1893), and Berlin (1899). In the winters of 1902–4 he delivered lectures on 'Babel und Bibel' (q.v.), which, owing to the Emperor William II.'s personal intervention, gave rise to general discussion. They were published in 1904. He visited the United States in January 1906, and delivered a series of lectures at Columbia University and elsewhere. Among his works are *Assyrische Studien* (1874); *Wo lag das Paradies?* (1881); *Assyrisches Wörterbuch* (1887 *ff.*); *Assyrische Grammatik* (1903); *Beiträge zur Assyriologie* (with P. Haupt, 1889 *ff.*); *Assyriologische Bibliothek* (1881 *ff.*, also with Haupt); *Das Buch Hiob* (1902); *Zur Weiterbildung der Religion* (1908); *Asurbanipal und die assyrische Kultur seiner Zeit* (1909); *Handel und Wandel in Altbabylonien* (1910); *Das Land ohne Heimkehr* (1911).

Delitzsch, town, Prussia, in the province of Saxony, 17 miles east of Halle. It has market-garden and other industries. Pop. (1918) 13,865.

De′lium, town in Bœotia, ancient Greece, near the frontier of Attica. It received its name from a temple of the Delian Apollo close by. Near here—probably in the vicinity of the modern village Staniátaes—the Bœotians defeated the Athenians in 424 B.C.

Delius. dā′le-o͞os, Nikolaus (1813–88), German philologist and Shakespearean scholar, was born in Bremen. After visiting France and England he settled in Bonn where from 1855 to 1880 he was professor, lecturing at first on Sanskrit, and afterward on the English language and literature, especially Shakespeare, of whose works he published (1854–61) a valuable edition, with critical notes. His chief work was *Abhandlungen zu Shakespeare* (1878 and 1887).

Delivery, in law. See Deed; Possession.

Della Casa. See Casa.

Della Cruscan Academy. See Crusca, Accadenia della.

Della Gherardesca. See Ugolino della Gherardesca.

Della Porta. See Porta.

Della Quercia. See Quercia.

Della Robbia. See Robbia.

Dellys, del-lys′, maritime town and military post, Algeria, 50 miles east of Algiers, with which it is connected by rail. It is built in terraces on the eastern side of Cape Dellys. It is the seat of the National Arts and Trades School. There is a good harbor, and trade in wine and olives. Some Roman remains have been found, and the site is thought to be that of ancient Cissi. Pop. (1921) 13,949.

Del Mar, Alexander (1836–1926), American mining engineer and political economist, was born in New York City. He was educated at New York University and the Madrid School of Mines and edited *Hunt's Merchants' Magazine*, the *Social Science Review*, and *Financial and Commercial Chronicle*. In 1865 he organized the U. S. Bureau of Commerce, Navigation, Emigration, Mining, and Statistics (now the Department of Commerce and Labor), and was its director from 1865 to 1869. He was United States Mining commissioner to the United States Monetary Commission in 1876. His numerous publications include *History of the Precious Metals* (1879; a new edition, 1911); *History of Money in Ancient States* (1881); *Money and Civilization* (1886); *History of Money in America* (1900); *History of Ancient Britain in the Light of Modern Discoveries in Archaeology and Numismatics* (1908); *History of Monetary Systems* (1908); *History of the Middle Ages* (1908); *Tibet, or the Aryan Conquest of India* (1911), *Chronology of America from Pytheas of Marseilles to the Death of Charles V.* (1921).

Del′menhorst, town, Germany, in the republic of Oldenburg, 9 miles by rail west of Bremen. It has woollen, jute, linoleum, and cork factories. Pop. (1918) 21,878.

De Lolme, de-lōlm′, Jean Louis (1740–1806), Swiss jurist, was born in Geneva. He practised as an advocate in his native town until the publication of his *Examen de trois points des droits* compelled him to leave Switzerland, and take refuge in England in 1769. His principal work is *Constitution de l'Angleterre* (1771). Among his other works are *Parallel between the English Government and the Former Government of Sweden* (1772); *History of the Flagellants* (1782); *Essay Containing Strictures on the Union of Scotland with England* (1786).

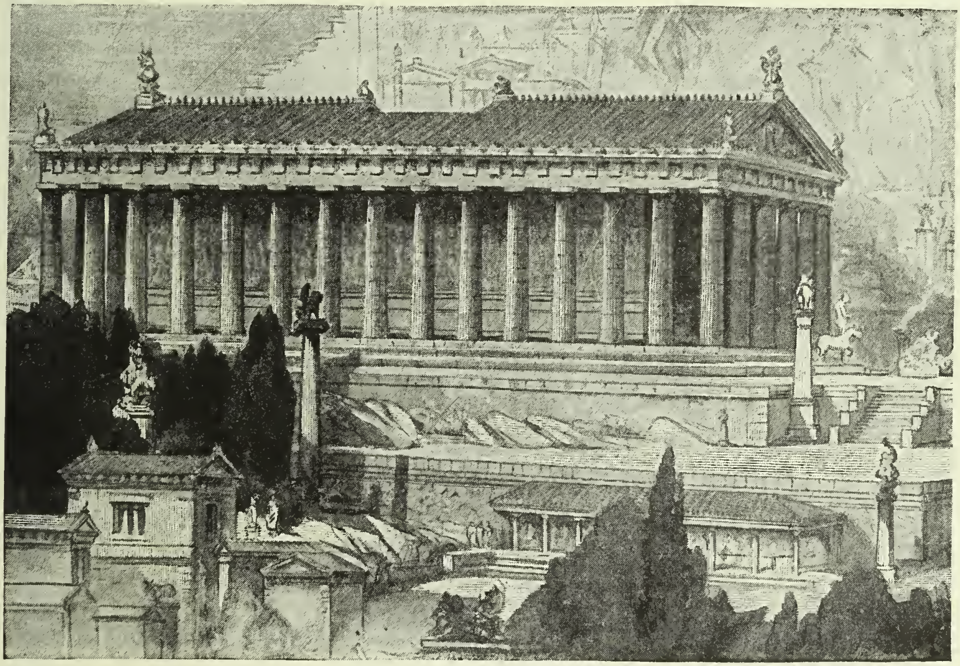
De Long, George Washington (1844–81), American explorer, was born in New York City, and was graduated (1865) from the U. S. Naval Academy. In 1873, as lieutenant, he assisted Capt. D. L. Braine, of the *Juniata*, in his search for the missing Arctic steamer *Polaris*. From 1879 to 1881 he commanded the *Jeannette*, fitted out by James Gordon Bennett for Arctic exploration under government auspices. The expedition sailed from San Francisco in July, 1879, through Bering Strait, to the northern coast of Siberia. Entering the pack, it was caught, and drifted 600 miles to the northwest, the *Jeannette* being crushed by the ice in June, 1881, in lat. 77° 15′ N. and long. 150° E. By sledges and boats the expedition made its way to the Lena delta, where its members became separated. De Long's boat reached the mainland, and he and his party proceeded up the Lena; but were obliged to halt on Oct. 9, 1881, sending messengers in advance. They perished, however, before assistance came. Their bodies were recovered the next year, and brought to New York for burial.

Delorme, Marion (1631–50), a celebrated French courtesan, was born in Baye Castle, Marne. Of brilliant beauty and salient wit she at first carried on an intrigue with Desbarreaux.She soon transferred her love to young Cinq-

NOV 19 1948

Mars, then at the zenith of royal favor. After the execution of Cinq-Mars she lived successively with Saint-Evremond, Buckingham, Grammont, Condé, and Richelieu. Her career is dramatized by Victor Hugo (1829), and treated in Alfred de Vigny's *Cinq-Mars* (1826); also by G. P. R. James in *De L'Orme* (1830).

Delos, MEGALE and MIKRA, small Greek islands of the Cyclades in the Ægean Sea, lat. 37° 22′–26′ N.; long. 25° 12′–16′ E. Greek story said that Poseidon raised Mikra Delos from the sea, and that it floated until Zeus fastened it to the bottom of the sea, that it might be a secure abode in which Leto might give birth to Apollo and Artemis. From the earliest ages it was a great centre for the worship of Apollo. From the 8th century B.C. it was closely allied with Athens. In 476 B.C. it was chosen as the place of assembly for the Delian league or confederacy of Ionian Greeks formed to resist Persia, the funds of which were kept in the temple, until in 454 they were removed to Athens. It remained in subjection to Athens until about 330 B.C. Then becoming independent, it prospered greatly as a commercial centre, especially under Roman protection after the decline of Rhodes, and the destruction of Corinth in 146 B.C. It was the central market of the Greek slave trade. In 87 B C. the devastations of Mithridates's general ended its prosperity; the town was destroyed in 69 B.C., during the wars with the pirates. The ruins of the temple of Apollo and of the ancient town have been thoroughly explored by the French Archæological School, which began work there in 1873, and continued it until 1889. The quinquennial festival of Apollo, celebrated with games and other competitions, brought multitudes of visitors; and the sanctity of the island was inviolable. For the excavations, see Homolle's *Delos* (1887).



Temple of Apollo at Delphi (restored).

Delphi (now *Kastri*), a small tn. in Phocis in ancient Greece, but made very famous by its association with the worship of Apollo. It lay on a steep slope on the south side of Mt. Parnassus, 2,130 ft. above sea-level. From the earliest times it was a sacred place to the primitive inhabitants of Greece, who worshipped, probably, the earth-goddess there. The worship of Apollo came into prominence with the immigration into Central Greece of the Dorians, the true Hellenic tribes. In 585 B.C. the first sacred war was fought against the Phocians of Crissa, who plundered pilgrims to the temple. Their town was destroyed, and the plain of Crissa left uncultivated, as sacred to the god. In 357 B.C the Phocians seized the temple and its treasures, and with them maintained an army which was at last defeated in 346 by Philip of Macedon. This was the second sacred war; the third followed in 339–338 B.C. Owing to the Phocians having cultivated the plain of Crissa Philip was again called in, and the war ended in his conquest of Greece. In 279 B.C. a Gallic invasion threatened the temple, but was repelled. In 86 B.C. the Roman general Sulla plundered the temple treasures. Nero is said to have carried off as many as five hundred statues from Delphi; but it retained its importance until the worship was put down by the Emperor Theodosius (379 to 395 A.D.). The site was thoroughly excavated and explored by the French Archæological School from 1892 onwards. In 1903 a museum was opened, in which their principal art and archæological discoveries are preserved. The great temple was approached by a winding path—'the Sacred Way.' On either side stood the treasuries of the various Greek cities, in which their votive offerings were deposited. The temple itself, half-way up the slope, was built in the latter half of the 6th century B.C. Above it was the theatre, and on the same level as the theatre the Lesche or club-house of the Cnidians, containing Polygnotus's famous frescoes. Higher up, almost on the top of the western spur, was the stadium or race-course, the scene of the Pythian games, which were celebrated every fourth year after 585 B.C. Under the temple ran the Cassotis stream, from the ravine of which arose the vapor that inspired the Pythian prophecies. For the antiquities, see *Pausanias* (Frazer's ed. 1898), *Bulletin de Correspondance Hellénique* (1893, etc.), and *Fouilles de Delphes,* 1892–1901 (ed. by Homolle, 1902).

Delphin Classics, a set of Latin and Greek classics, in sixty-four volumes, edited in France (1674–1730) by thirty-nine scholars, under the superintendence of Montausier, Madame Dacier, Bossuet, and Huet, for the use of the son of Louis XIV, called the Grand Dauphin.

Delphinium, or LARKSPUR, a genus of hardy plants belonging to the Ranunculaceæ. Among the species are *D. exaltatum,* a blue-flowering American kind; *D. staphysagria,* or stavesacre, a native of the south of Europe, having dingy blue flowers, and yielding seeds which are used in the preparation of an ointment to destroy pediculi; *D. Cashmerianum* and *D. formosum,* blue; *D. cardinale,* a Californian annual, with scarlet flowers in late summer; and *D. Zalil,* a sulphur-yellow variety. The leaves, with the exception of those near the ground, are finely divided and the long-spurred flowers are crowded, in the common blue varieties, on upshooting racemes or panicles. Some reach six ft. in height, and make magnificent garden groups. The stamens ripen before the pistil, and are so placed that the bee cannot get at the honey without covering its head with pollen; and the stigma does not appear until the stamens are dead, when it occupies the same position in the flower as that previously occupied by the stamens. The plant likes deeply-dug, rich soil of moderately heavy texture, and during summer, abundance of water. The simplest method of propagation is by root division or cuttings. Delphiniums are easily reared from seed sown in spring.

Delphinus, a constellation to the east of Aquila, of small size, but prehistoric antiquity. Its identification with the fabulous cetacean procured it the title of Vector Arionis, and it was also known to the Greeks as the 'Sacred Fish.' W. Delphini is a remarkable eclipsing star, discovered by Miss Wells in 1895 from an examination of photographic records.

Delphos, city, Ohio, in Allen and Van Wert counties, on the Miami and Erie Canal and on the Nickel Plate and the Pennsylvania Railroads; 4 miles N.W. of Lima. There are railroad shops here and manufactures of lumber, furniture, paper, wheels and staves. Pop. (1930) 5,672.

Del Rio, city, Texas, county seat of Val Verde county, on the Southern Pacific Railroad; 140 miles west of San Antonio, 3 miles from the Rio Grande. Fruit-growing is carried on extensively with the aid of irrigation. Cotton, wool and hides are exported. Pop. (1930) 11,693; (1940 est.) 15,000.

Delta, the alluvial plain built out into a body of relatively still water (sea or lake) by a river. It is normally fan-shaped in plan, and the resemblance of this plain at the mouth of the Nile to the Greek letter Δ gave it its name, delta. The main stream usually divides into two or more branches or distributaries, each of which may be bifurcated again and again. A sluggish river brings fine silt, which is easily transported, and also easily disturbed, by currents. The distributary channels are easily choked and new distributaries formed, and the delta is gradually extended along the lines of these distributaries (*cf.* the Mississippi). This gives rise to much shifting of stratification as in cross bedding. In the cases of deltas at the heads of lakes or fiords, in mountainous districts, and in regions where the streams are swift and easily transport waste material of varying sizes, the suspended matter becomes assorted when the current is checked: the finer mud is carried farthest out, and forms the foundation; the finer sand is dropped nearer the river mouth, round which the coarser sand and pebbles accumulate, and form a steep slope, which may even be 35°. As this is extended, the usual river deposits are laid down on the top with gentle dips. The lower, more nearly horizontal stratum is called the bottom-set bed, the inclined one is the fore-set bed, and the upper horizontal layers are the so-called top-set beds. The delta of the Ganges-Brahmaputra measures 220 m. from apex to base; that of the Volga, 280 m.; that of the Mississippi, 200 m.; that of the Nile, 110 m.; that of the Niger, 90 m. The rate of the seaward extension of deltas varies. The delta of the Po is estimated to increase by 0.29, that of the Danube by 0.31, that of the Rhone by 0.09 sq. m. per annum. The Tarim R., in E. Turkestan, furnishes an interesting instance of an inland delta. Owing to its insignificant fall and sluggish flow, it frequently shifts its channel, so that of its distributaries some are generally dry, while the main current fluctuates like a pendulum, carrying with it its receiving basin, the Lop-nor.

Delta Metal is an alloy of copper, zinc, and a little iron, patented in 1883–4 by A. G. Dick. It is a very tough brass of sp. gr. 8.4, and is capable of being forged. It is very liquid when melted, and forms sound, fine-grained castings. The cast metal resists a tensile strain of 20 tons per square inch, which is raised to about 30 tons by rolling or cold forging.

Deltoid, in anatomy, the delta-shaped muscle which caps the shoulder-joint, uniting the shoulder-blade and the arm; its principal action is to raise the upper arm from the side.

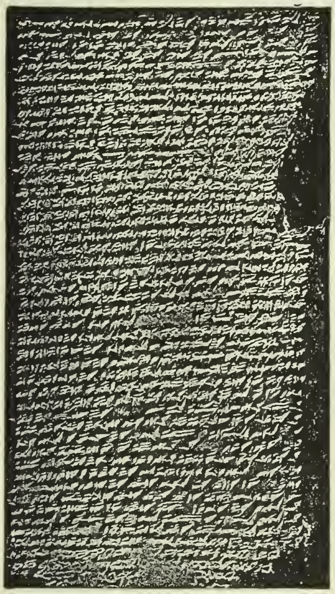
De Luc, JEAN ANDRÉ (1727–1817), Swiss geologist and philosopher, born at Geneva, was appointed professor of geology at Göttingen (1798). Previously to that, however, he had settled in England, and became (1773) reader to Queen Charlotte at Windsor Castle. He wrote *Recherches sur les Modifications de l'Atmosphère* (1772), *Lettres, Physiques et Morales, sur l'Histoire de la Terre* (1778–80), *Nouvelles Idées sur la Météorologie* (1786), *Bacon tel qu'il est* (1800), and *Voyages Géologiques* (1810–13).

Deluge, THE, a flood of unparalleled proportions with which, according to the book of Genesis, God overwhelmed the world as a penalty of its wickedness; sometimes called the Noachian Deluge. The story (Gen. 6–9) is certainly composite, and here and there shows considerable inconsistencies; for example, in 6:19, 20 one pair of every kind of animal is to be taken into the ark, while in 7:2 one pair of unclean and seven pairs of clean beasts are to be selected. These passages belong to the sources P and J respectively. (See HEXATEUCH). Chs. 7 and 8 contain statements regarding the duration of the inundation hard to reconcile with each other—*cf.* 7:12 (J) and 8:3 (P). It is thus impossible to construct from the Biblical narrative anything like a uniform and detailed account of the event. While the universality of the flood seems fairly enough to be implied, the more common

NOV 13 1940

modern opinion regards it rather as partial and local, and this view is borne out by geological findings as well as by the absence of all record of a deluge among the black races of the world.

Deluge legends are of common occurrence in folklore and early literature, the classical story of Deucalion (q. v.) and Pyrrha being typical of similar myths in India, Persia, Babylonia, Syria, and Asia Minor. The Babylonian (or Akkadian) tradition presents a striking correspondence with the Biblical story. It relates how Par-napishti or Xisuthros was forewarned by Ea, the god of wisdom, of the coming catastrophe, and commanded to construct a huge vessel. Accordingly, he builds a ship 600 cubits long, 60 broad, and 60 in height, smears it with bitumen, brings in the members of his family and the animals, and shuts the door. A storm of six days ensues. When the waters begin to abate, Xisuthros steers for Mount Nizir, and sends forth in turn a dove and a swallow, which return; then a raven, which does not. Xisuthros then comes out, offers a sacrifice to the gods, who are well pleased with it, the rainbow appears in the sky, and a covenant is struck between Xisuthros and Bel, the former, together with his wife, being now exalted to the godhead.



Part of the Babylonian Story of the Deluge.

(From a clay tablet found at Nineveh.)

It is now widely held that, as the Babylonian account is the older, the narrative in Genesis must have been borrowed from it, though some authorities believe that they are both derived independently from a common Semitic source. Both are connected with moral and religious ends, in both man's sin is the cause of the catastrophe, both end with sacrifice and a covenant. The principal difference is in the virtual monotheism of the Hebrew as against the polytheism of the Babylonian story.

Consult R. Andree, *Die Flutsagen,* a classic on the subject; A. H. Sayce, *Higher Criticism and the Monuments;* Vail, *The Deluge and its Causes;* Hilprecht, *The Earliest Version of the Babylonian Deluge Story;* Fiske, *The Great Epic of Israel;* Jastrow, *Hebrew and Babylonian Tradition;* J. G. Frazer, *Folklore in the Old Testament.*

Delu'sion, in pathology and psychology, a false conviction so fixed that not even the evidence of the senses will convince the patient of his error. It differs from illusion and hallucination (qq. v.) in that it always involves a mental error. Delusions are usually classified as systematized and unsystematized. Systematized delusions, while based on false reasoning, are slowly and coherently evolved and carried out by the patient in a logical manner. Unsystematized delusions are made up of disconnected parts with no correlation to the subject's surroundings. Familiar types of delusion are those of grandeur and persecution. See INSANITY; PARANOIA.

Delyan'nis, or DELIJANNI, THEODORE (1826–1905), Greek statesman, was born at Kalavryta. He studied law in Athens, entered the government service in 1843, and from 1862 was on various occasions minister of foreign affairs, plenipotentiary to Berlin, minister of the interior, minister of finance, and minister of public instruction. He was present at the Congress of Berlin (1878), and the extension of territory allotted to Greece by the Congress was due to his efforts. When, however, as chief minister, in 1885, he demanded the fulfilment of the Berlin promise, the great powers sent a fleet to blockade the Greek coast in order to prevent war with Turkey, whereupon Delyannis resigned (1886). He returned to power in 1890, but two years later was summarily dismissed as a result of his failure to adjust a financial crisis and a subsequent conflict with the throne. In 1895 he was prime minister for the third time, but the humiliating defeat at the opening of the war with Turkey in 1897 led to his immediate resignation. He was again premier in 1902–03 and 1904–05. He was assassinated June 13, 1905.

Demades, dem'*a*-dēz *or* de-mā'dēz, Athenian orator, prominent from about 350 to 318 B.C. A member of the Macedonian party from 335 to 323 (when Alexander died) he, along with Phocion (q. v.), exerted a considerable influence at Athens. He was executed by Antipater (q. v.) for treachery.

Demain. See DEMESNE.

Demand and Supply. See SUPPLY AND DEMAND.

Demaratus, dem-*a*-rā'tus, king of Sparta from about 510 to 491 B.C., when, owing to the intrigues of the joint king, Cleomenes, he was deposed. He retired to the Persian court, and accompanied Xerxes in his invasion of Greece (480 B.C.).

Dem'arest', WILLIAM HENRY STEELE (1863–), American educator, was born in Hudson, N. Y. He was graduated from Rutgers College and from the New Brunswick Theological Seminary (1888), was ordained to the ministry of the Reformed Church in America, and served as pastor. He was professor of church history in New Brunswick Theological Seminary from 1901 to 1906; president of Rutgers College, 1905–24; president of the New Brunswick Theological Seminary, 1925–35 (emeritus). He wrote a history of Rutgers.

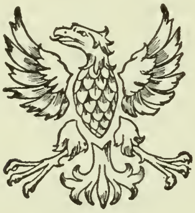
Demavend, dem-*a*-vend', MOUNT, extinct volcano in the Elburz Mountains, Persia, 45 miles N.E. of Teheran. Its altitude has been fixed at 18,600 feet.

Dembea, LAKE. See TSANA.

Dembinski, dem-bēn'ski, HENRYK (1791–1864), Polish general and patriot, was born near Cracow. He served in the French campaigns against Austria and Russia (1809–13), and distinguished himself at the battle of Leipzig. He played a prominent part in the Polish insurrection against Russia (1830–1), and when Warsaw was taken fled to France. In 1849 he was made commander-in-chief of the Hungarian army by Kossuth; but after being defeated by the Austrians at Kápolna, he resigned his command. Later he was in command of the Northern Hungarian army and was defeated at Temesvár (Aug. 9, 1849). He took refuge with Kossuth in Turkey, and then settled in France.

Deme, dēm, in Greek history, in its original sense, meant the district inhabited by a tribe, forming an independent community. As these small communities were by degrees united into larger states, the word 'deme' came to mean a country district, township, or parish. The demes were particularly important in the constitution of Attica, as established by Clisthenes in 508 B.C. He created 100 demes, 10 demes for each of the ten tribes. The demes increased rapidly and in the second century numbered over 174. Each had its own officers, assembly (called *agora*), and property. Every Athenian was formally designated by his own name, his father's, and that of his deme.

Démembré, dā-mäṅ-brā′, DEMEMBERED, or DISMEMBERED, in heraldry, an animal or bird with the limbs, etc., severed, but not removed, blazoned thus:



Démembré.

De Mendoza. See SANTILLANA.

Dementia. See INSANITY.

Demerara, dem-*e*r-ä′r*a*, county, British Guiana, between the Essequibo and Berbice Rivers, takes its name from the river Demerara (q. v.). Pop. 175,000.

Demerara, river of British Guiana, rising in the Maccari Mountains, and flowing north into the Atlantic. It is 170 miles long, and is navigable to the rapids, 95 miles above Georgetown.

Demesne, dē-mēn′, or DEMAIN, under the feudal system, a term signifying actual dominion over land as opposed to the theoretical dominion of the king or over-lord. Thus, demesne lands were lands not let out in tenancy but reserved by the lord or by the crown for use and occupation. The term is used in a more restricted sense to denote that portion of an estate which comprises the land around the mansion, the park, or chase.

Ancient demesne signifies lands vested in the king at the time of the Norman Conquest, though perhaps subsequently granted to tenants; also the form of tenure by which these lands were held. See TENURE.

Deme′ter, called CERES by the Romans, was one of the chief divinities of the Greeks, her name signifying Earth-mother. She was patroness of agriculture and of fruits, and was the sister of Zeus, by whom she became the mother of Persephone (q. v.).

In art Demeter is generally represented fully clothed, a garland of corn-ears round her head, in her hand a scepter, corn-ears, or a poppy, and sometimes with a torch and mystic basket. The worship of Demeter reached Rome from Sicily, and ultimately acquired great political importance. Her chief festival there was the Cerealia.

Deme′trius, or DIMITRI, the name of several pretenders to the Russian throne between the years 1603 and 1613. See RUSSIA, *History.*

Demetrius I, of Macedonia (337–283 B.C.), surnamed POLIORCETES (*i.e.*, 'the Besieger'), from his skill and success in conducting sieges, was a son of Antigonus Cyclops (q. v.), king of Asia. From 317 onwards he was engaged in his father's war with Seleucus, Ptolemy, and Cassander. In 307 he liberated Athens from Cassander, and in 305 he conducted the famous siege of Rhodes (q. v.), but after a year made terms with the Rhodians. After his father's defeat and death at Ipsus (301), Demetrius was accepted as king by the Macedonians (294). Seven years later, however, his troops deserted him, and proclaimed Pyrrhus king in his stead. After some years of varying fortune in Asia, he was compelled to surrender to Seleucus (286) and was imprisoned for the remainder of his life.

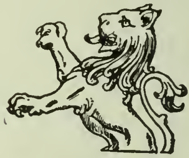
Demetrius II, of Macedonia, was a son of Antigonus Gonatas (q. v.), and a grandson of Demetrius I (q. v.). He reigned from 239 to 229 B.C.

Demetrius I, of Syria (*c.* 187–150 B.C.), surnamed SOTER, was a son of Seleucus IV. As a child he was sent as a hostage to Rome, where he remained until he was twenty-three. Escaping to Syria in 163, he was received as king by the Syrians. He was killed in battle in an insurrection raised against him by the usurper Alexander Balas.

Demetrius II, of Syria, surnamed NICATOR (164–125 B.C.), son of Demetrius Soter (q. v.), was king from 146 to 142 B.C., having put down the insurrection against his father with the aid of Ptolemy Philometer. He was captured and held prisoner by the Parthians for ten years (138 to 128 B.C.), and was again king from 128 to 125 B.C. He engaged in a war against Ptolemy Euergetes, king of Egypt, who set up a pretender, Alexander Zebina, against him. After being defeated and expelled by Alexander, Demetrius was murdered at Tyre, where he had taken refuge.

Demidoff, dye-mē′dōf, a Russian family distinguished for wealth and beneficence, descended from Nikita Demidoff, originally a blacksmith at Tula, who in the time of Peter the Great became famous as a manufacturer of arms, and amassed an immense fortune. Of the numerous princes of the line, the most famous is Prince Anatol (1813–70), eminent in letters and in the sciences; his principal work being his *Travels in Southeast Europe* (4 vols. 1839–49).

Demi-lion, DEMI-MAN, DEMI-ROSE, in heraldry, the fore quarters of a lion (or other beast), the upper half of a man, or a bird, or the dexter half of an inanimate charge. When the demi-lion, or other beast, is rampant, the end and tuft of the tail are shown.



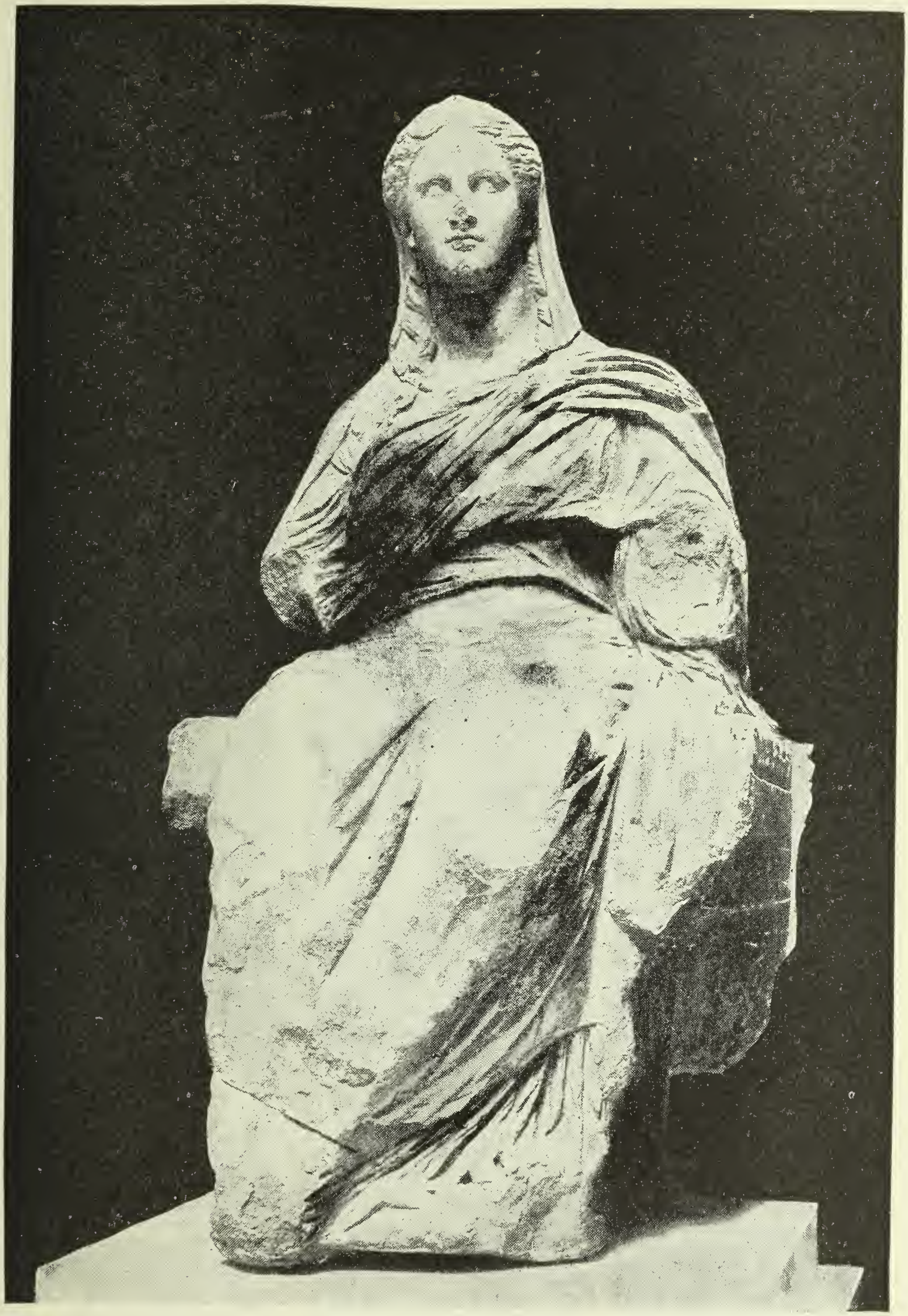
Demi-lion.

De Mille, CECIL BLOUNT (1881–), American playwright, actor and motion picture producer, gathered his training at the Pennsylvania Military College and the American Academy of Dramatic Art, New York City. Among his most famous productions are *The Ten Commandments, The Volga Boatman, The King of Kings, The Sign of the Cross, Cleopatra, The Crusades, The Plainsman, The Buccaneer, Union Pacific, Northwest Mounted Police.*

De Mille, HENRY CHURCHILL (1850–93), American dramatist, was born in North Carolina. In 1882 he was appointed examiner of plays in the Madison Square Theatre. His first play, *Delmar's Daughter,* was produced at that theatre in 1883. It was followed by *Sealed Instructions* and *Young Mrs. Winthrop* in 1884, and in the same year by *The Main Line,* in collaboration with Charles Barnard. He subsequently entered into a literary partnership with David Belasco, writing with him *The Wife, Lord Chumley, The Charity Ball, Men and Women.*

De Mille, JAMES (1833–80), Canadian author, was born in Saint John, New Brunswick. He wrote a large number of novels, including *Andy O'Hara* (1860); *The Dodge Club* (2 vols. 1866–9); *Helena's Household* (1868); *The Living Link*

NOV [illegible]



STATUE OF DEMETER, OR CERES, THE EARTH-MOTHER.
(From an antique Greek statue now in the British Museum.)

(1874); *A Castle in Spain,* and *A Strange Manuscript Found in a Copper Cylinder,* the two last named published posthumously.

De Mille, William Churchill, (1878–), American playwright, son of Henry Churchill De Mille (q. v.), was born in Washington, N. C. He was graduated from Columbia University (1900) and from the American Academy of Dramatic Arts (1901). His plays include *Strongheart, The Warrens of Virginia, The Land of the Free,* and *The Woman.* He collaborated also in the authorship of *The Genius, The Royal Mounted, Classmates,* and *The Forest Ring.*

Demise, dē-mīz', a legal term signifying the transference of an estate by will or lease for a term of years, or, less often, for life. When used in a lease at common law the word demise implied a covenant for quiet enjoyment, and no other word had this effect. To-day this is still the proper term in many jurisdictions, especially in those States where the common law still largely prevails, but in many States any other word of similar significance does as well, as let, lease, etc. In English law the term is also employed to denote the transmission or passing of all sovereign rights and properties to the successor of a sovereign, as a matter of law, upon the latter's death or abdication. It is spoken of as 'the demise of the crown.' (See Crown).

Demiurge, dem'i-ûrj, the name applied by Plato in the *Timæus* to the creator of the universe, who stands between the pure 'ideas' and chaotic matter (*hyle*) and combines them in the actual world. Among the Gnostics—*e.g.* in the system of Valentinus—he is identified with Jehovah, the God of the Old Testament. (See Gnosticism).

Demobilization. The demobilization of a great military force may be accomplished in four ways: (1) by military classes; (2) by trades, professions, etc.; (3) by organizations; (4) by individuals. In practice, however, it is found to be inadvisable to attempt to adopt either of the first three methods to the complete exclusion of the last.

The plan of demobilizing by military classes can be followed only in those countries where a system of universal military training is in operation, and hence is inapplicable in the case of the American Army. Under this plan, which was the one followed in France (1919), the soldiers are demobilized according to their ages, the oldest men being the first to be returned to civil life. These are succeeded by the next oldest class, and so on.

Following the World War (1914–18) the U. S. War Department gave serious consideration to the plan of demobilizing the Army by trades, professions, etc., which was being followed in Great Britain, but was constrained to reject it on account of the insuperable difficulties which it presented. Demobilization under this plan affects, to a greater or less extent, every organization in the Army; some would be practically disrupted, not one would remain intact. The integrity of every unit would be immediately destroyed, and its efficiency as a military instrument, the result of months of conscientious work and infinite pains, impaired at a stroke. Moreover, actual demobilization would necessarily have to be deferred pending the Department's decision as to relative priority of the various trades and professions.

With these two plans eliminated, the choice lay between demobilization by organizations and demobilization by individuals; and, after careful consideration of the merits of each, viewed in the light of existing conditions, it was decided to effect the demobilization of the Army by organized units, the plan to be modified, however, so as to permit the discharge, in proper cases, of individuals in advance of the demobilization of the organizations in which they were serving.

While it is of prime importance that the Army shall be demobilized as rapidly as military considerations will permit, care must be taken not to discharge the men so rapidly as to disorganize industrial conditions in the United States. As the result of the signing of the armistice (q. v.), orders for war material practically ceased and the demand for labor fell off markedly. The return of soldiers to civil life must, therefore, not be at a rate so great as to create a vast army of unemployed civilians, with the attendant danger of a panic in the labor market. With this idea in mind, every practicable arrangement is made for providing employment to the soldier as soon as he is discharged from service, and orders have been issued to commanding officers to take steps to insure that every enlisted man in their command understands thoroughly that the War Department does not desire to discharge any soldier who can not secure civil employment, and that he may remain in the military service until such time as he can secure employment.

At the time the armistice was signed, November 11, 1918, the total strength of the United States Army was in excess of 3,670,000, of whom approximately 1,634,000 were in the United States. Plans were at once laid to demobilize the forces in the United States in the following order: (1) development battalions; (2) conscientious objectors not serving sentences, (3) Spruce Production Division, (4) central training schools for officers, (5) United States Guards, (6) railway troops, (7) depot brigades, (8) replacement camps, (9) combat divisions. Orders were later issued for the immediate demobilization of all units of the Students' Army Training Corps.

Instructions were issued to the effect that no man would be discharged except at a place which is within 350 miles of the point at which he entered the military service, it being the policy of the War Department, so far as practicable, to return individuals to the sections of the country from which they were called into military service. These instructions were later modified to permit the discharge at their present stations of men who desired to take up their residence in that vicinity. Some thirty camps, distributed throughout the country, were designated as demobilization centers, and the commanding officers of these camps were authorized to expedite the discharge of all men sent to them for the purpose. However, should any man be found, because of physical disability, to be ineligible for discharge, he is assigned to a development battalion, to be discharged as soon as he becomes eligible.

With regard to the discharge of emergency officers, the President determined, under the provisions of Section 9 of the act of Congress approved May 18, 1917, that the public service would be promoted by the discharge, as rapidly as their services could be spared, of officers in the U. S. Army, except those holding commissions or desiring appointment in the Regular Army. For the purpose of determining the order of discharge, officers appointed for the emergency were arranged in the following classes: (1) officers desiring full and immediate separation from the service; (2) officers desiring prompt separation from the service and subsequent appointment or reappointment in the Officers' Reserve Corps and whom commanding officers recommend for such appointments; (3) officers

NOV 18 1940

desiring appointment, if opportunity permitted in the Regular Army and whom commanding officers recommended for such appointment. Orders directing the reduction of the enlisted strength of a command were to be construed as requiring a corresponding reduction of the commissioned strength.

Many details incident to demobilization demand careful attention. Only a few will be mentioned for the purpose of illustration. Before discharge each soldier must undergo a critical physical examination, for it is the policy of the War Department, for the protection of the Government as well as the soldier, to return no man to civil life until he shall have become as nearly fit physically as medical and surgical skill can make him. A copy of the report of physical examination must be transmitted to the Bureau of War Risk Insurance (q. v.), if he has been disabled in the service, in order that he may receive compensation provided by law. Every soldier must receive the full amount of pay due him after settlement of his indebtedness to the Government, and to this end his accounts must be scrutinized. His discharge certificate must be executed and delivered to him, and transportation to his home provided. In the case of officers, qualification cards and final ratings must also be made up. Disposition must be made of organization and post exchange funds and Government property. Arrangements must be perfected for the abandonment of camps and the salvage of valuable material on hand.

Up to February 1, 1919, orders had been issued for the discharge of approximately 1,396,000 men, or more than 38 per cent of the strength of the entire Army at the time the armistice was signed. Including all reports received in the War Department up to the date mentioned, a total of 1,013,648 men had been actually returned to civil life, of whom 61,237 were officers and 952,411 were enlisted men. Of the 1,634,000 men who were in service in the United States on November 11, 1918, over 76 per cent, or approximately 1,243,000 men, had been designated for discharge.

Final demobilization was accomplished by July 2, 1921.

Democracy, a term signifying by its derivation government by the people, and popularly contrasted since Aristotle (333 B.C.) with monarchy, or the government of one, on the one hand, and with aristocracy or oligarchy, the government of the few, on the other. In modern political science the meaning of the term varies. By continental writers it is commonly used to designate a society based upon political, economic, and social equality. By English and American authorities it is applied in a somewhat narrower sense to that form of government which derives its powers from the consent of the governed, and to the state in which such a government exists, whether its outward form be that of a monarchy, as in Great Britain, or of a republic, as in France and the United States.

The history of democracy may be traced back to ancient Greece. The Grecian states, however, differed fundamentally from modern democracies, first in that they were immediate or 'pure' democracies rather than mediate or representative, only those citizens who were actually present at the assemblies voting, and then not as representing the will of the people but merely as expressing their individual desires; second, in that the franchise was limited, the great mass of the people being excluded from political rights; third, in the conception that the citizens lived for the state rather than that the state existed for the citizen—the ruling principle of modern autocracy, finding its extreme expression in the boasted 'kultur' of imperial Germany.

'Modern democracy,' said Woodrow Wilson (1901), 'wears a very different aspect and rests upon principles separated by the whole heaven from those of the Roman or Grecian democrat. Its theory is of equal rights without respect of blood or breeding. It knows nothing of a citizenship won by privilege or inherited through lines of descent which cannot be changed or broadened. Its thought is of a society without castes or classes, of an equality of political birthright which is without bound or limitation. Its foundations are set in a philosophy that would extend to all mankind an equal emancipation, make citizens of all men, and cut away everywhere exceptional privilege. . . . It makes the general welfare of society the end and object of law and declares that no class, no aristocratic minority, however numerous, however capable, however enlightened, can see broadly enough or sufficiently free itself from bias to perceive a nation's needs in their entirety or guide its destinies for the benefit of all. The consent of the governed must at every turn check and determine the action of those who make and execute the laws.'

Such a conception of democracy is of comparatively recent development. It may be said to have manifested itself first in the great Reformation which swept over Europe in the sixteenth century, with its spirit of revolt against the existing ecclesiastical system and its renewed emphasis on man's individual responsibility to his Creator. Politically it found expression in the British revolution of 1688 and the overthrow of James II; a century later it reached a fuller development in the French Revolution; while the history of the nineteenth and twentieth centuries is a history of its progress not only in Europe but in Asia as well.

In the United States the idea of democracy, or self-government, was a powerful factor even before the Revolution, taking national form in the Declaration of Independence and the Constitution. In no country, however, has the development of popular government been the affair of a moment. The extension of the suffrage has been a gradual process, and everywhere popular control has won its way in the face of opposition and distrust. Among the more recent advances in the United States are the widespread extension of the suffrage to women (see SUFFRAGE, WOMEN); the initiative, referendum, and recall (qq. v.); the popular election of senators, secured by constitutional amendment, May 31, 1913 (see ELECTIONS); and the direct primary system for the nomination of public officials (see ELECTIONS).

The advantages of a democratic government seem obvious enough to the citizens of a democratic state, but they are by no means unchallenged. A prolonged discussion of the subject from either point of view is without the scope of this article but the more important arguments *pro* and *con* may be briefly stated.

In favor of democracy it is generally held: That the people are the best guardians of their own interests and that democracy is, therefore, the surest guarantee of civil liberty; that participation in the government is to the best interest of the individual, bringing with it, as it does, in full measure, the discipline of responsibility; that it carries with it the safeguard of publicity, the public interests being protected by incessant watchfulness and public criticism; that the people obey more willingly laws in the making of which they themselves have had a share; that it makes for a higher type of patriotism.

The principal objections to democracy are enumerated by Bryce in his *American Common-*

wealth. They include: Weakness in emergencies and an incapacity to act with promptitude and decision; fickleness and instability, with frequent changes of opinion and consequent changes in the conduct of affairs and in executive officials; insubordination, internal dissension, and disregard of authority; a desire to level down and an intolerance of greatness; tyranny of the majority over the minority; a passion for changing customs and for destroying old institutions; the growth of the demagogue, playing on the passions and selfishness of the masses, and too often replacing the true statesman in the regard and esteem of the people.

The New Democracy.—The World War (1914–18), representing in its very essence a conflict between two theories of government—that of modern democracy and that of modern autocracy (see EUROPE, GREAT WAR OF)—has tremendously influenced democratic ideals. More and more democracy has come to mean not so much merely a form of popular government as the spirit of which that government is a manifestation. Less and less men are limiting it to a single state, more and more they are realizing its significance in international relationships and world affairs.

This new conception of democracy is nowhere more strikingly expressed than in the public utterances of President Wilson. In an address delivered on Sept. 4, 1916, he declared:

'The hopes of mankind cannot be kept alive by words merely, by constitutions and doctrines of right and codes of liberty. The object of democracy is to transmute these into the life and action of society, the self-denial and self-sacrifice of heroic men and women willing to make their lives an embodiment of right and service and enlightened purpose.'

Again, in his address of Jan. 22, 1917, outlining the principles which he believed should guide the United States in participating in a league for peace, the President said:

'No peace can last or ought to last which does not recognize and accept the principle that governments derive all their just powers from the consent of the governed, and that no right anywhere exists to hand peoples about from sovereignty to sovereignty as if they were property . . . I am proposing government by the consent of the governed . . . These are American principles, American policies. We can stand for no others. And they are also the principles of forward-looking men and women everywhere, of every modern nation, of every enlightened community. They are the principles of mankind and must prevail.'

A similar idea is embodied in the War Message delivered before Congress April 2, 1917:

'We are accepting this challenge of hostile purpose because we know that in such a government, following such methods, we can never have a friend; and that in the presence of its organized power, always lying in wait to accomplish we know not what purpose, there can be no assured security for the democratic governments of the world. We are now about to accept the gauge of battle with this natural foe to liberty, and shall, if necessary, spend the whole force of the Nation to check and nullify its pretensions and its power. We are glad, now that we see the facts with no veil of false pretence about them, to fight thus for the ultimate peace of the world and for the liberation of its peoples, the German peoples included; for the rights of nations, great and small, and the privilege of men everywhere to choose their way of life and of obedience. *The world must be made safe for democracy.* Its peace must be planted upon the tested foundations of political liberty. . . .

'The right is more precious than peace, and we shall fight for the things which we have always carried nearest our hearts—for democracy, for the right of those who submit to authority to have a voice in their own governments, for the rights and liberties of small nations, for a universal dominion of right by such a concert of free people as shall bring peace and safety to all nations and make the world itself at last free.'

One more quotation of a later date may be cited. It is from an address before the American Federation of Labor, made on Nov. 12, 1917:

'Let us show ourselves Americans by showing that we do not want to go off in separate camps or groups by ourselves, but that we want to co-operate with all other classes and all other groups in a common enterprise which is to release the spirits of the world from bondage . . . That is the meaning of democracy.'

See CONSTITUTION; GOVERNMENT; REPRESENTATION; ELECTIONS; STATE.

Bibliography.—De Tocqueville, *Democracy in America;* Sir T. E. May, *Democracy in Europe;* Sir H. J. Maine, *Popular Government;* Motley, *Historic Progress of American Democracy;* Lecky, *Democracy and Liberty;* Giddings, *Democracy and Empire;* Webb, *Industrial Democracy;* Ostrogorski, *Democracy and the Organization of Political Parties;* Hobhouse, *Democracy and Reaction;* Woodrow Wilson, *The State;* Bryce, *The American Commonwealth;* H. E. Barnes, *History and Social Intelligence* (1926); N. Angell, *The Public Mind* (1927); J. A. R. Marriott, *Dictatorship and Democracy* (1935); H. F. Armstrong, *"We or They"* (1936); C. I. Barnard, *Dilemmas of Leadership in the Democratic Process* (1939); E. Beneš, *Democracy Today and Tomorrow* (1939); L. Bryson, *Which Way America* (1939); J. Dewey, *Freedom and Culture* (1939).

Democratic Party. During the greater part of the history of the United States, the fundamental political questions with respect to which party lines have been drawn have related to the distribution of powers between the Federal and the State governments, and to the extent to which government should be subjected to direct popular control. The party now known as Democratic has consistently defended the particularistic or States' Rights view, and has advocated the widest extension of the suffrage and the highest degree of popular control of government. Such has been the traditional opposition to a protective tariff, to a large national debt and extensive military and naval establishments. Such also was the early Democratic opposition to the national bank, to internal improvements, and to indirect taxation. Other issues not connected with the fundamental principles have been annexed as an incident of practical party policy. Thus before the Civil War, despite its tendency toward equalitarianism, the Democratic party was forced to adopt at least a passive tolerance of slavery in consequence of the fact that a large part of its strength lay in the slave States; for a similar reason it opposed the extension of suffrage to the blacks in 1868. In 1896, and again in 1900, political exigencies induced the party to embrace the advocacy of the free coinage of silver. There has always been a tendency, however, to return to fundamental principles, after a brief trial of the newer issues.

The germ of the Democratic party is to be found in the Anti-Federalists (q. v.), who opposed the adoption of a Federal constitution. A moderate party, led by Jefferson and Madison, recognized the need of a stronger central government than the Articles of Confederation afforded, but viewed with alarm the centralizing tendency manifested by Hamilton and the Federalist

Democratic National Convention of 1916

Thomas Woodrow Wilson of New Jersey and Thomas Riley Marshall of Indiana have been renominated in 1916 by the Democratic Party for a second term as President and Vice-President of the United States. The Democratic National Convention convened in the Coliseum at St. Louis four days after the adjournment of the Republican and Progressive Conventions at Chicago. It began at 12:30 P. M. on Wednesday, June 14, and ended at 3:12 P. M. on Friday, June 16. It was briefer by five days than the Democratic Convention at Baltimore in 1912, and briefer by a day than the other party Conventions of the preceding week. One of the Democratic leaders called it 'a ratification meeting.'

First Day: Temporary Organization.—In Washington, President Wilson led a great flag day parade of fifty thousand marchers down Pennsylvania Avenue, and flung a challenge to disloyalty from the foot of the Washington Monument. In St. Louis, William Jennings Bryan, as a private citizen and a reporter, slipped into the press galleries of the Democratic Convention while ten thousand flags waved an ovation to him from the floor and the galleries. The delegates *en route* along the sunny streets to the Coliseum had passed for more than a mile through a still and silent lane of women dressed in white and gold, a unique, wordless appeal for the right to vote.

The Convention atmosphere was surcharged with harmony and enthusiasm. The world had moved and changed since the June days four years before when Delegate Bryan had ridden the storm in Baltimore, and Governor Wilson had heard the news at Sea Girt. The young Princeton graduate who had introduced the President of his University into national politics, William F. McCombs, chairman of the Democratic National Committee, called the Convention of 1916 to order. The audience sang *America* and *The Star Spangled Banner;* and the Rev. James W. Lee read a prayer. Chairman McCombs had a fighting leader's words to say about division at Chicago and unity at St. Louis. A committee escorted Martin H. Glynn, former Governor of New York, to the platform to deliver the opening address and to preside as temporary chairman.

As Chairman Glynn recited historic precedent after historic precedent, showing how Presidents of the United States had settled grave international difficulties by diplomacy, the audience took the keynote. President Wilson was being justified with rare skill for using patient negotiation in preference to war. The audience halted the speaker with a mighty outburst, and made him repeat his words, when he said:

'This policy may not satisfy those who revel in destruction and find pleasure in despair. It may not satisfy the fire-eater or the swashbuckler. But it does satisfy those who worship at the altar of the God of Peace. It does satisfy the mothers of the land at whose hearth and fireside no jingoistic war has placed an empty chair. It does satisfy the daughters of this land from whom bluster and brag has sent no loving brother to the dissolution of the grave. It does satisfy the fathers of this land and the sons of this land who will fight for our flag, and die for our flag when Reason primes the rifle, when Honor draws the sword, when Justice breathes a blessing on the standards they uphold.'

This opening address praised at length the domestic achievements of the Democratic Administration, the Federal Reserve Act, the Underwood Tariff Act, and other laws, and pictured in detail the marvellous increase of American prosperity. There was cheering for twenty minutes when the orator predicted victory in November.

The Convention listened, on motion of Sheriff Alfred H. Smith, Tammany leader of New York City, to the President's flag day proclamation, and adjourned at 2:50 P. M. The Committee on Resolutions held an afternoon session, and a public hearing that lasted far into the night.

Second Day, Day Session: Permanent Organization.—The first session of Thursday began at 11 A. M. Senator Ollie M. James of Kentucky became again, as in 1912, the permanent chairman of the Convention. He attacked the Republican Party's Congressional record, and the platform just promulgated by it at Chicago. He spoke along the same lines as his predecessor, Governor Glynn, in defence and praise of President Wilson's domestic and foreign policies and achievements. The climax of his address came when, speaking of President Wilson's recent diplomatic success in the matter of the U-boats, he said:

'Without orphaning a single American child, without widowing a single American mother, without firing a single gun, or shedding a drop of blood, he wrung from the most militant spirit that ever brooded above a battlefield the concession of American demands and American rights.'

The vast audience went wild before he had completed this sentence; then suddenly paused because it had lost his last words, and when it had induced him to repeat, went wild again. The applause lasted twenty minutes.

Following Senator James' speech there were repeated calls for Bryan, who had left the Coliseum to address the City Club. An important event of the day was the election, at President Wilson's instance, of Vance McCormick as chairman of the Democratic National Committee and director of the coming campaign. Mr. McCormick was the joint candidate of the Democrats and Progressives for Governor of Pennsylvania in 1914; and Colonel Roosevelt stumped the State for him. His appointment was considered an appeal to the Progressives. Throughout the day the platform makers kept steady session.

Second Day, Night Session: Bryan's Address and Nominations.—The hospitality of St. Louis delayed the second session of Thursday until 9 P. M. The greatest audience of the Convention gathered early, for Bryan was expected to speak, and the nominations were to be made. The door keepers admitted everybody; the Coliseum filled to its uppermost galleries; and thousands besieged its doors. Inside, the audience demanded Bryan, as the preceding audiences had repeatedly done. At the City Club, in the afternoon, Bryan had outlined his ideas of a new diplomacy of world-wide friendliness, had decried the entry of America into the European War, and had condemned as false the doctrine that preparedness makes for peace. Now, the Convention laid aside its rules and called him to the platform. He addressed himself to the same topics as his predecessors. He praised President Wilson's Administration, without qualification or stint, and dedicated the Democratic Party to humanity. In the humble capacity of a reporter he had appeared in the press galleries of all three of the great Conventions of 1916, just as he had appeared as a reporter in the St. Louis and Chicago Conventions of 1896. In his daily syndicated articles of 1916 he addressed an audience incomparably vaster than the Convention crowds that cheered his comings and goings.

When Bryan had finished his speech, John W. Westcott of New Jersey, who nominated Wilson for President at Baltimore in 1912, renominated him for President in 1916. A demonstration lasting forty-five minutes followed his oration. Judson Harmon, former Governor of Ohio, and one of Governor Wilson's rivals at Baltimore in 1912, and Henry C. Stuart, Governor of Virginia, seconded the nomination. Just before midnight the Convention of 1,093 delegates cast its vote for Wilson by acclamation, with one dissenting voice.

Other names than that of Vice-President Marshall had been suggested for the Vice-Presidency. It has not been the usual thing for a Vice-President to succeed himself, but President Wilson's plainly expressed wish for Mr. Marshall's renomination, and the selection of the Republican Vice-Presidential nominee from Indiana, caused the disappearance of all rivals. Senator John W. Kern of Indiana put Marshall in nomination, and he was chosen by acclamation. The Convention waited half an hour for the platform, and adjourned when it was not forthcoming.

Third Day: Party Platform. —The Convention met at 11 A. M. on Friday, and listened to Senator James A. Reed of Missouri while it waited for the Committee on Resolutions. From the galleries, thousands of women in yellow sashes and ribbons, and with yellow parasols, looked down upon the scene. Senator Stone of Missouri, chairman of the Resolutions Committee, worn out by thirty hours without sleep, appeared at last on the platform. He delegated the reading to Senators Walsh of Montana and Hollis of New Hampshire. The Convention and audience applauded popular passages, especially the plank against disloyalty and the plank that praised President Wilson for keeping the country out of war. Senator Stone's motion to adopt the platform brought forth a minority report which offered a substitute for the woman suffrage plank.

The proposed plank read: 'We recommend the extension of the franchise to the women of the country by the States upon the same terms as to men.' The proposed substitute plank read: 'The Democratic Party always has stood for the sovereignty of the several States in the control and regulation of elections. We reaffirm the historic position of our Party in this regard, and favor the continuance of that wise provision of the Federal Constitution which vests in the several States of the Union the power to prescribe the qualifications of their electors.'

Chairman James announced that the majority and minority of the committee would each have thirty minutes for debate. The question of woman suffrage, hitherto handled in the comparative privacy of committees, had at last appeared on the open floor of a National Convention. James E. Ferguson, Governor of Texas, presented and advocated the substitute. He advanced the time-honored argument of States' Rights, of which the resolution's wording was an exponent. He declared that the majority of the Committee had surrendered this great principle to mere vote catching. An Ohioan asked Senator Stone if a vote for the resolution by a delegate committed such delegate to woman suffrage. The Senator thought that it did not have such effect. Sentimental arguments of Key Pitman, Senator from the equal suffrage State of Nevada, brought jeers from Texans and others. His defiance of his interrupters roused the galleries; and the Texans heard what they had possibly never heard before, the cheer of thousands of women. Thomas J. Walsh, Senator from the equal suffrage State of Montana, turned the scale. Four million women, he said, would vote for President at the coming election. Their representatives attending the Chicago Conventions of 1916 had founded a Woman's Party with the single object of disciplining parties and elective officers hostile or indifferent to woman suffrage. The 11 equal suffrage States of the Far West and the equal suffrage State of Illinois had 91 Presidential Electors and 15 Democratic Senators. The Woman's Party had a campaign fund of half a million dollars. The Republican and Progressive Conventions had surrendered to these arguments at Chicago and had approved woman suffrage. Adverse action by the Democrats would imperil their chances for re-electing their President and retaining their majority in the United States Senate. The President considered the suffrage plank essential.

Upon the conclusion of the debate the chairman ordered the roll call of the States. Maryland's delegation of 16 went solidly against the suffrage plank; New York and Pennsylvania's delegations of 90 and 76, solidly for it, and many other States cast unanimous votes against the substitute. Seventeen States showed divided delegations. The totals revealed the defeat of the proposed anti-suffrage substitute by 888½ to 181½.

The Convention then adopted the platform as read, without change, and amended its rules to make the election of national committeemen uniform. At 3:12 P. M. it adjourned without date, the delegates and audience singing, as they filed out, *Onward, Christian Soldiers.*

The Democratic Platform. — In 1912 Bryan built the Democratic platform, and Governor Wilson took no part; in 1916 President Wilson built the platform, and Mr. Bryan kept hands off. An innovation of 1912 named the candidates before adoption of the platform; the Convention of 1916 pursued the same course. To whatever extent this innovation may have left President Wilson free, relative to the pledges of 1912, it has no such effect relative to those of 1916. The platform of 1916 is known to have been written by the President's own hand in large part and in its most important planks. It bears throughout the stamp of his ideas, personality, and linguistic gift. He telegraphed the plank on disloyalty to St. Louis.

More than twelve hundred tentative planks were submitted to the platform committee. It listened especially to pleas for and against preparedness, and for and against woman suffrage. In its prolonged sessions it discarded an anti-dumping protective tariff declaration, rejected prohibition and government ownership, and fought out the suffrage issues that the minority of the full committee afterward carried to the Convention floor.

Comparison of the Democratic platforms of 1912 and 1916 reveals the remarkable effect of the European War upon American politics. The platform of 1916 boasts of achievements, such as the Federal Reserve Act and Federal Trade Commission, that received no mention in the platform of 1912. The declarations of 1916 for a tariff commission, government ownership of merchant vessels, woman suffrage, Pan-American friendship, and expedition of business in the U. S. Senate, are new platform policies. The platform of 1912 favored Territorial government for Alaska; the platform of 1916 favors traditional Territorial government for Alaska, Hawaii, and Porto Rico, and a residence qualification for their appointive officials. The single Presidential term has been left out of the platform of 1916.

Important declarations of the Democratic platform of 1916 are as follows:

Americanism. — 'The Democratic Party recognizes the assertion and triumphant demonstration of the indivisibility and coherent strength of the nation as the supreme issue of this day in which the whole world faces the crisis of manifold change. It summons all men, of whatever origin or creed, who would count themselves Americans, to join in making clear to all the world the unity and consequent power of America.'

Disloyalty.—'We condemn as subversive of this nation's unity and integrity, and as destructive of its welfare, the activities and designs of every group or organization, political or otherwise, that has for its object the advancement of the interest of a foreign power.' . . . 'We condemn all alliances and combinations of individuals in this country, of whatever nationality or descent, who agree and conspire together for the purpose of embarrassing or weakening our Government, or of improperly influencing or coercing our public representatives in dealing or negotiating with any foreign power.'

World Influence.—'We hold that it is the duty of the United States to use its power not only to make itself safe at home, but also to make secure its just interests throughout the world; and both for this end and in the interest of humanity, to assist the world in securing settled peace and justice. We believe that every people has the right to choose the sovereignty under which it shall live; that the small states of the world have a right to enjoy from other nations the same respect for their sovereignty and for their territorial integrity that great and powerful nations expect and insist upon; and that the world has a right to be free from every disturbance of its peace that has its origin in aggression or disregard of the rights of peoples and nations; and we believe that the time has come when it is the duty of the United States to join with the other nations of the world in any feasible association that will effectively serve these principles.'

Protection of Citizens.—'The American Government should protect American citizens in their rights not only at home, but abroad; and any country having a government should be held to strict accountability for any wrongs done them, either to person or property.'

Mexican Outrages.—'The want of a stable, responsible government in Mexico, capable of repressing and punishing marauders and bandit bands, who have not only taken the lives and seized and destroyed the property of American citizens in that country, but have insolently invaded our soil, made war upon and murdered our people thereon, has rendered it necessary temporarily to occupy, by our armed forces, a portion of the territory of that friendly state. Until, by the restoration of law and order therein, a repetition of such incursions is improbable, the necessity for their remaining will continue. Intervention, implying as it does military subjugation, is revolting to the people of the United States, notwithstanding the provocation to that course has been great, and should be resorted to, if at all, only as a last resort.'

Preparedness.—'We favor the maintenance of an army fully adequate to the requirements of order, of safety, and of the protection of the nation's rights, the fullest development of modern methods of seacoast defence, and the maintenance of an adequate reserve of citizens trained to arms and prepared to safeguard the people and territory of the United States against any danger of hostile action which may unexpectedly arise; and a fixed policy for the continuous development of a navy worthy to support the great naval traditions of the United States, and fully equal to the international tasks which the United States hopes and expects to take part in performing.'

Pan-Americanism. —'We favor the establishment and maintenance of the closest relations of amity and mutual helpfulness between the United States and the other republics of the American Continents.'

Government of Territories.—'We favor granting to the people of Alaska, Hawaii, and Porto Rico the traditional Territorial government accorded to all Territories of the United States.'

Philippine Independence.—'We reiterate our indorsement of the purpose of ultimate independence for the Philippine Islands.'

Woman Suffrage.—'We recommend the extension of the franchise to the women of the country by the States upon the same terms as to men.'

Tariff Doctrine.—'We reaffirm our belief in the doctrine of a tariff for the purpose of providing sufficient revenue for the operation of the Government, economically administered, and unreservedly indorse the Underwood Tariff law as truly exemplifying that doctrine.'

Tariff Commission.—'The Democratic Congress is providing for a non-partisan tariff commission to make impartial and thorough study of every economic fact that may throw light, either upon our past or upon our future fiscal policy, with regard to the imposition of taxes on imports, or with regard to the changed and changing conditions under which our trade is carried on. We cordially endorse this timely proposal.'

Merchant Marine.—'We heartily endorse the purposes and policy of the pending shipping bill, and favor all such additional measures of constructive or remedial legislation as may be necessary to restore our flag to the seas.'

National Highways.—'We favor national aid in the construction of post roads and roads for military purposes.'

Waterways.—'We renew the declaration in our last two platforms relating to the development of our waterways.'

Labor Pledges.—'We declare our faith in the Seamen's Act, passed by the Democratic Congress, and we promise our earnest continuance of its enforcement.

'We favor the speedy enactment of an effective Federal Child Labor law, and the regulation of the shipment of prison-made goods in interstate commerce.

'We favor the creation of a Federal bureau of safety in the Department of Labor, to gather facts concerning industrial hazards, and to recommend legislation concerning the maiming and killing of human beings.

'We favor the extension of the powers and functions of the Federal Bureau of mines.

'We favor the development upon a systematic scale of the means already begun under the present Administration to assist laborers throughout the nation to seek and obtain employment, and the extension by the Federal Government of the same assistance and encouragement as is now given to agricultural training.'

Prison Reform.—'We demand that the modern principles of prison reform be applied in our Federal penal system.'

Tuberculosis Hospitals. — 'We favor the establishment by the Federal Government of tuberculosis sanatoriums for needy tubercular patients.'

Country Life.—'We favor continued liberal provision, not only for the benefit of production, but also for the study and solution of problems of farm marketing and finance, and for the extension of existing agencies for improving country life.'

Federal Budget.—'We demand careful economy in all expenditures for the support of the Government, and to that end favor a return by the House of Representatives to its former practice of initiating and preparing all appropriation bills through a single committee chosen from its membership, . . . as a practicable first step toward a budget system.'

Comparison of Party Platforms.—The making of a platform requires deliberation, consultation, abilities of expression and arrangement. The party that frames its platform last has the platforms of the other parties, the public opinion they have evoked, and their convention conduct as guides. These conditions have favored the Democrats in 1916. Their leaders and their Convention, with no contests for nominations, have given their entire attention and energies to platform making. The Democrats have been in complete possession of the government for four years: their platform task has been to defend and praise their achievements and conduct. The Republicans and Progressives have been out of power: their platforms may criticise and condemn.

The Democratic platform heartily endorses the President's Administration, and reviews the important constructive laws enacted by two Democratic Congresses. It is much the lengthier for this reason, and for the reason that it justifies its pledges by liberal explanations and statements of principle. The Republican platform denounces the Democrats relative to failure to protect American lives and property, conduct of foreign relations, abandonment of the Philippines, inadequate preparation for national defence, tariff legislation, government ownership, extravagance, and spoils. The Progressive platform—possibly the briefest national platform ever written—reaffirms the Progressive platform of 1912, and does not criticise the Democrats. The Democratic and Progressive platforms bear the unifying impress of Wilson and Roosevelt.

All three platforms place first emphasis upon international relations. The most interesting and significant line of comparison relates to departure from traditional foreign policies. The Republicans believe in straight and honest neutrality between the European belligerents; a firm, consistent and courageous foreign policy; the pacific settlement of international disputes; the establishment of a world court; and assurance of full equal rights, civil and religious, to all men in every land. They reaffirm the Monroe Doctrine, recognize Philippine responsibilities as a duty to civilization and the Filipino people, and call upon Americans to be true to the spirit of America. The Democrats justify a present keeping to the old paths of neutrality, but see the dawn of a new day of world relationships in which America must play a part for the securing of settled peace and justice, for freedom of smaller states from aggression, and for the common and unhindered use of the highway of the seas. The Progressives make no mention of neutrality, champion the wrongs of weaker nations, declare the tradition of isolation ended, and assert positive policies of world-wide American influence.

The Americanism planks of the Republicans and Progressives extol patriotism in general; the Democratic plank specifically attacks active groups of disloyal citizens for subordinating American interests to the interests of foreign powers. Relative to Mexico, the Democrats cite the Monroe Doctrine, justify the present occupation, and deprecate intervention; the Republicans pledge aid for restoration of order and maintenance of peace; the Progressives demand the use forthwith of every resource of the Government.

Relative to preparedness, the Democrats want a navy equal to the international tasks which the United States expects and hopes to take a part in performing; the Republicans, a navy that will prevent enemies from landing in the United States in force; the Progressives, a navy of second rank in battle efficiency. The Democrats and Republicans want an adequate army and trained reserves, without specifying whether the reserves shall be under State or national control; the Progressives, an army of 250,000 men, a national citizen soldiery, and universal military training.

Relative to domestic questions, the Democrats are for a revenue tariff; the Republicans and Progressives, for a protective tariff. All three favor a tariff commission. All three favor extension of suffrage to women, the Democrats 'upon the same terms as to men,' and the Progressives 'in full political right.' The Republicans recognize the right of each State to settle woman suffrage; the Democrats favor its extension by the States; the Progressives ask for both State and Federal action. The Republicans are for mail ship subsidies; the Democrats, for government ownership of merchant vessels. Both Democrats and Republicans ask for a Federal child labor law; the Republicans and Progressives, for Federal workmen's compensation legislation; and the Democrats, for a Federal bureau of safety.

Insert in Volume **III.**, at page **605.**

Democratic National Convention of 1920

The Democratic National Convention met in the Auditorium at San Francisco at 12:20 o'clock on Monday, June 28, 1920, and adjourned on Tuesday, July 6, at 3:29 P.M. It nominated James Middleton Cox of Ohio and Franklin D. Roosevelt of New York for President and Vice-President of the United States.

Ballot for Candidates.—The total membership of the Convention was 1,092 after the exclusion of Senator Reed of Missouri by the Committee on Credentials; the majority necessary to nominate was 728. The balloting began Friday evening, July 2, when two ballots were taken, and continued until early Tuesday morning, July 6. In all 44 ballots were taken. On the first ballot twenty-one persons received votes. The votes for leading candidates stood as follows: William Gibbs McAdoo, 266; Governor James M. Cox of Ohio, 134; A. Mitchell Palmer, Attorney-General of the United States, 256; Governor Edward I. Edwards of New Jersey, 42; Vice-President Thomas R. Marshall, 35; John W. Davis, 32; Homer S. Cummings, 25; one other significant figure being the complimentary vote for Governor Alfred E. Smith of New York of 109 votes. The course of the balloting revealed a struggle between the McAdoo and Cox forces. The votes for Palmer, who was third man in the race, never rose much above the number of the first ballot, but were held well in hand until the thirty-eighth, when the manager for Palmer announced his candidate's withdrawal. The course of the McAdoo strength was consistently upward, until a climax was reached on the fortieth ballot with 467 votes. This seemed to represent the total Administration strength in the Convention. By this time the vote for Cox had reached 490, and thereafter the rise of the tide in his favor was rapid. On the fortieth ballot he had 490 votes, on the forty-first, $497\frac{1}{2}$, on the forty-second, $540\frac{1}{2}$; on the forty-third, 567, and on the forty-fourth, $701\frac{1}{2}$. At this stage, Michigan, which had previously asked for permission to be passed in the record for the time being, tried to cast her thirty votes for Cox and other States endeavored to change their votes to him, but the confusion was so great that these States were not recorded and the nomination was suddenly made by acclamation.

The nomination for the Vice-Presidency required no detailed balloting. A list of eight candidates was presented to the Convention, including the name of Franklin D. Roosevelt of New York, Assistant Secretary of the Navy. The latter was placed in nomination by a delegate from the District of Columbia. Almost immediately Governor Alfred E. Smith of New York took the platform to second Mr. Roosevelt's nomination, and it became evident that Roosevelt had been agreed upon by the leaders. Immediately, without further oratory, there was a rush for the Roosevelt column; it was suggested that the nomination of Roosevelt be made unanimous, and the Convention by a *viva voce* vote ratified the proposal.

An Interpretation of the Struggle of Ideas in the Convention.—William Jennings Bryan, who was a delegate from Nebraska, represented rigid enforcement of the eighteenth Amendment, and the retaining of the Volstead Act, passed by Congress as a measure of enforcement. Upon this matter the Convention preferred to be more conservative and strategic than Mr. Bryan; it preferred to look upon the eighteenth amendment as a closed incident and to avoid an open fight upon the liquor issue in the campaign. In this their strategy was similar to that of the Republicans at Chicago. Upon the issue of the League of Nations and the ratification of the Treaty as it came from Paris, a compromise was effected between the out-and-out ratificationists and those who were critical of both the League and the Treaty, by a provision in the declaration of policy which applauded President Wilson and his great effort for international humanity, but admitted that reservations which would not nullify the spirit and purpose of the Paris document were permissible. This compromise resulted in Convention unity upon the subject. (See LEAGUE OF NATIONS; PEACE TREATY.)

The Convention refused to deal definitely with the question of self-determination for Ireland, except in general terms of self-determination for all countries, in line with international principle and custom. Up to the time of the adoption of the platform, the Administration forces of President Wilson seemed on the whole to be in the ascendant and the ideas of the Administration seemed to prevail.

When it came to the nomination of candidates, however, the Administration forces generally were behind William G. McAdoo, son-in-law of President Wilson, former Secretary of the Treasury in the President's cabinet. James M. Cox, the nominee, represented the views and influences in the Convention which, while not hostile to the Administration, found themselves in disagreement with the Administration upon certain fundamental matters of policy. Cox was not an out-and-out ratificationist. He represented sympathy with the wet side of the liquor fight, within certain limitations. Roosevelt, the nominee for Vice-President, was selected among other reasons because of his rather close friendship with the Administration. Thus the views in the platform and the personality and policies of the candidates represent a reasonable merging of the variant points of view of the Convention upon the subjects and the personalities which were necessarily before it.

First Day: Temporary Organization.—J. Bruce Kremer of Montana, Vice-Chairman of the Democratic National Committee, called the Convention to order at 12:20 P.M. on Monday, June 28. At his signal a bugler sounded "Attention," the first notes of "The Star Spangled Banner" came from a band and the organ, the vast audience of delegates and spectators stood in tribute, and a monster flag was unfurled from behind the platform. As the flag again slowly rose, it disclosed an illuminated portrait of President Wilson, which was greeted with tumultuous applause. Homer S. Cummings, Chairman of the Democratic National Committee, addressed the Convention as its temporary chairman.

A resolution was unanimously adopted acclaiming President

Wilson, felicitating him upon his measurable recovery from illness, and congratulating America that the President 'with unclouded vision and undaunted courage' was able to press on.

Senator Carter Glass, representing the Administration, and the author of the Virginia platform, approved by President Wilson, was elected chairman of the Resolutions Committee at its organization. Senator Joseph T. Robinson of Arkansas was unanimously recommended by the Committee on Permanent Organization for the permanent chairmanship of the Convention.

Second Day.—The second day's session was marked by the seating of the Palmer delegation in the contest from Georgia and by the exclusion of Senator Reed of Missouri, in whose case the action of the Credentials Committee was endorsed by the Convention with only a few dissenting votes. So also the famous unit rule of previous Democratic Conventions, enabling the machine organizations of certain States to vote their delegates as a unit, was overturned without much opposition. A notable advance was the determination that the National Committee of the party should hereafter be made up of one man and one woman from each State. To this there was very little opposition.

Then followed the speech of the permanent chairman, Senator Joseph T. Robinson of Arkansas, who made a vigorous attack upon the recent record of the Republicans; detailed the legislative achievements of the Wilson administration and pleaded for the League of Nations.

Third Day.—It was 11:30 o'clock when the Convention was brought to order by Chairman Robinson on the third day. After the usual preliminary invocation, Senator King of Utah offered a resolution providing for the admission of two delegates and two alternates from the Panama Canal Zone to the next Democratic Convention. The resolution was adopted unanimously. Chairman Robinson then announced that, the permanent draft of the platform not being ready, the Convention would proceed to the nomination of candidates. Ten candidates were presented as follows: Senator Robert L. Owen of Oklahoma, by D. Haden Linebaugh; James W. Gerard, by U. S. G. Cherry of South Dakota; Homer S. Cummings, by John S. Crosby of Connecticut; Senator Gilbert N. Hitchcock of Nebraska, by Ex-Governor A. C. Shallenberger; U. S. Attorney-General A. Mitchell Palmer, by John H. Bigelow of Pennsylvania; Secretary of Agriculture Edwin T. Meredith, by Claud R. Porter; Governor James M. Cox of Ohio, by Judge James S. Johnson; Governor Alfred E. Smith of New York, by W. Bourke Cockran; William G. McAdoo, by Dr. Burris A. Jenkins of Kansas City; Governor Edward I. Edwards of New Jersey, by F. X. O'Brien of that State. After these nominations had been seconded, the rules were suspended and the Convention took a recess until 11 o'clock the next morning, when the nominating speeches were continued.

Fourth Day.—There were two sessions on the fourth day, the first being taken up with the presentation of four more candidates for the presidency. W. C. Newland of North Carolina presented Senator Simmons of that State. Congressman Henry D. Flood of Virginia nominated Senator Carter Glass of that State. Governor John J. Cornwell of West Virginia nominated Ambassador John W. Davis, whose home is in West Virginia. Miss Bessie Dwyer of the Philippine delegation presented finally for consideration the name of Francis Burton Harrison, Governor General of the Philippines. The evening session of the Convention was barren of result, for the Resolutions Committee was not yet ready to report and in this committee discussions about the platform lasted until morning.

Fifth Day.—The Convention was continuously in session for eight and one-half hours, discussing the platform, from 10:40 o'clock in the morning to 7:15 o'clock in the evening. The document was finally adopted without change.

The discussion of the platform was vigorous and determined. William J. Bryan's proposal of a bone-dry plank was defeated by a vote of 929½ to 155½. So the resolution of W. Bourke Cockran, favoring light wines, beer, and cider, was defeated by vote of 726½ to 352. A feature of this session was the personal demonstration for Bryan, the Convention evidently wishing to express its admiration for the man and his career, even though it could not support his views upon the liquor question or upon the League of Nations.

In the early balloting, McAdoo and Palmer were close together and Cox was in third place .

Sixth Day.—Eight hours of balloting resulted in the displacing of William G. McAdoo of New York as leader in the contest for the presidential nomination, and the bringing to the front of James M. Cox, Governor of Ohio.

A feature of the day was the reading of a message from President Wilson in reply to a telegram of appreciation and greeting sent him by the Convention.

After the sixteenth ballot, taken at 5 P.M., the Convention voted to take a recess until 8 P.M. No result marked the further deliberations of the Convention on this day.

Seventh Day: Monday.—Fourteen ballots were taken, with McAdoo taking the lead over Cox on the thirtieth.

Eighth Day.—The climax of the struggle came on the eighth day, when James M. Cox was nominated on the forty-fourth ballot. The Convention then proceeded to the nomination of candidates for Vice-President, and Franklin Delano Roosevelt was chosen by acclamation.

The ticket, Cox and Roosevelt, was favorably received both by party leaders and the Democratic party voters. For biographies of the candidates, see COX, J. M., and ROOSEVELT, FRANKLIN.

The Democratic Platform of 1920.—The platform condemns the Republican Party in the following particulars: (1) the Senate 'for its refusal to ratify the treaty merely because it was the product of Democratic statesmanship, thus interposing partisan envy and personal hatred in the way of the peace and renewed prosperity of the world.' (2) For its 'attempt . . . . to deprive the American people of their legitimate pride in the financing of the war—an achievement without parallel in the financial history of this or any other country, in this or any other war. And in particular we condemn the pernicious attempt of the Republican party to create discontent among the holders of the bonds of the Government of the United States, and to drag our public finance and our banking and currency system back into the arena of party politics.' (3) 'The failure of the present Congress to respond to the oft-repeated demand of the President and the Secretaries of the Treasury to revise the existing tax laws.' (4) 'Claiming to have effected great economies in Government expenditures, the Republican party cannot show the reduction of one dollar in taxation as a corollary of this false pretence.' (5) 'Failure to restore peace and peace conditions in Europe, which is a principal cause of post-armistice inflation the world over.' (6) 'Republican leaders at Washington have failed utterly to propose one single measure to make rural life more tolerable. They have signalized their fifteen months of congressional power by urging

Insert in Volume **III.**, following page **604.**

Democratic National Convention of 1924

The National Convention of the Democratic Party met in Madison Square Garden, New York City, at 12:45 P.M. Tuesday, June 24, 1924, and adjourned toward midnight of July 9. It nominated John W. Davis (q. v.) of West Virginia for President of the United States and Governor Charles W. Bryan (q. v.) of Nebraska for Vice-President.

Ballot for Candidates.—The total number of votes in the Convention was 1098; necessary for choice, 732. The balloting began at 10:30 Monday, June 30, and continued until late afternoon of Wednesday, July 9. One hundred and three ballots were taken, a greater number than has ever before been required to nominate a candidate for President. On the first ballot nineteen candidates received votes. The votes for the leading candidates stood as follows: McAdoo 431½; Smith 241; Cox 59; Harrison 43½; Underwood 42½; Silzer 38; John W. Davis 31; Ferris 30; Ralston 30; Glass 25; Ritchie 22½; Robinson 21. The real struggle, as revealed in the balloting, was between the forces of William Gibbs McAdoo and those of Alfred E. Smith—a struggle resulting in a deadlock which kept the Convention balloting through nine weary days. On the 70th ballot McAdoo reached his high water mark with 528½ votes to Smith's 334½. After the 93d ballot, which showed Smith first, McAdoo second, Ralston third and John W. Davis fourth, Governor Smith made an offer to withdraw his name from the ballot, if McAdoo would agree to do the same. It had become plain to everybody by this time that neither Smith nor McAdoo could be nominated, and the delegates began to transfer their votes to Davis. Ralston withdrew after the 94th ballot. Before the 100th ballot was taken, McAdoo sent a message to the Convention releasing his delegates but not withdrawing his candidacy. Thereafter the delegates went over rapidly to John W. Davis, who was nominated on the 103d ballot with 839 votes, and immediately afterward by acclamation of the whole Convention.

The tired delegates desired to get the nomination for Vice-President out of the way at once and clamored for Senator Thomas J. Walsh of Montana, the permanent chairman, as their candidate. Senator Walsh did not want the nomination and was able to put the decision over until the evening session. In the meantime the leaders met in conference and agreed upon Charles W. Bryan for Vice President; when the Convention reconvened he was nominated by unanimous consent.

As in the Convention of 1920, a marked cleavage was evident between two factions in the Convention, and the results, both in platform and candidates, represented a reasonable compromise between these variant points of view. The platform plank relating to the League of Nations is a striking example of this fact, in that it neither repudiates the League nor commits the party to it finally and irrevocably, after the Wilson manner. The Ku Klux Klan, which stirred up a heated controversy both in the Committee on Resolutions and on the floor of the Convention, is not mentioned directly in the platform.

First Day: Temporary Organization.—The Convention was called to order at 12:45 P.M., Tuesday, June 24, by Cordell Hull, Chairman of the Democratic National Committee, who announced that the invocation would be given by his Eminence Patrick Cardinal Hayes. As the band struck up *The Star-Spangled Banner* at the close of the Cardinal's prayer, and the vast assemblage rose to its feet, thousands of small silk American flags were released from containers strung at intervals across the ceiling and fluttered slowly down. Senator 'Pat' Harrison of Mississippi addressed the convention as its temporary chairman. He assailed the alleged misrule and corruption of the Harding-Coolidge administration and appealed to all good Democrats to stand together in the fight for a political victory.

The adoption of a resolution that the rules of the House of Representatives 'so far as applicable' should govern the Convention, put an end to a movement on the part of the McAdoo supporters to have the two-thirds rule done away with and a majority rule substituted for the nomination of candidates. The Convention adjourned until the following day as a tribute of respect for the memory of Woodrow Wilson.

Second Day.—Early in the second day the Convention perfected its permanent organization and disposed of its routine business. Senator Thomas J. Walsh of Montana, chief prosecutor in the Teapot Dome investigations, was made permanent chairman. The American people will be on trial before the world in the coming election, he declared in his address upon taking the chair. It remains to be seen whether they will remain indifferent to the corroding influence of corruption in office high or low, or whether, as the honor and prosperity of our country demand, they will 'return to the ideals of Woodrow Wilson and resume the place he won for them—the moral leadership of the world.'

The convention voted unanimously to retain the two-thirds rule for nomination of candidates for President and Vice-President. Under the plan of procedure as adopted, a two-thirds vote means two-thirds of the ballots of delegates present and voting, and not two-thirds of the number of accredited delegates.

The first to place a candidate in nomination for President was Fordney Johnston of Alabama, who presented the name of Senator Oscar W. Underwood. He spoke in vehement denunciation of secret intrigue and when he announced the fact that Senator Underwood favored a party platform plank repudiating in no uncertain terms the Ku Klux Klan and all its activities, a riotous demonstration ensued. Governor C. H. Brough of Arkansas next proposed the nomination of Senator Joseph Robinson of Arkansas. Senator James D. Phelan placed in nomination William Gibbs McAdoo of California, and the demonstration which followed lasted until the motion to recess was carried.

Third Day.—During a seven-hour session seven more candidates for the presidency were placed in nomination. A second demonstration for McAdoo followed a speech from Governor Sweet of Colorado, seconding his nomination, at the beginning of the third day. This was quickly swallowed up, however, in the long-planned demonstration for Governor Alfred E. Smith of New York, who was placed in nomination by Franklin D. Roosevelt. The demonstration lasted a full hour and a half.

The names of the following candidates were also presented to the Convention: Senator Samuel M. Ralston of Indiana; Willard Saulsbury of Delaware; Governor Jonathan Davis of Kansas; Governor Ritchie of Maryland; former Secretary Houston; and Senator Ferris of Michigan.

Fourth Day.—The fourth day's session was completely taken up with more nominating and seconding speeches for candidates.

Governor James M. Cox of Ohio, the Democratic candidate in 1920, was placed in nomination by Newton D. Baker, former Secretary of War under President Wilson. Harry B. Flaharty of Omaha, who was to have nominated Governor Charles W. Bryan of Nebraska, was unable to be present at the Convention, and his speech was read by Eugene D. Sullivan of Omaha. Senator Carter Glass of Virginia was nominated by Senator Swanson of Virginia; Governor Fred H. Brown of New Hampshire by Francis Clyde Keefe; and Governor George S. Silzer of New Jersey by John A. Matthews. To Judge John H. Holt was accorded the privilege of placing in nomination the successful candidate, John W. Davis of West Virginia.

Fifth Day.—The delegates spent eleven hours in session the fifth day, during which time a bitter struggle over the two most controverted planks in the proposed platform—the Ku Klux Klan and the League of Nations—took place. The reading of the platform began at 4:18 P.M. and was ended at 5:32. There followed two hours of debate on the League plank. Ex-Secretary Baker, who had presented a minority report for part of the Resolutions Committee, made an eloquent and impassioned plea for the League of Nations. The opposition was represented by Mr. Lucking of Michigan and Senator Pittman of Nevada. The vote in the committee had been 34 to 16 against the League, and the Convention voted 742½ to 353½ for the majority plank.

Then came the argument over the Ku Klux Klan. The majority report made no direct reference to the Klan. The minority wished to repudiate the Klan in open terms. As in the case of the League, the debate was limited to one hour for each side. William Pattangall of Maine led the movement to denounce the Klan and Mr. Cummings led the opposition. Senator Owen of Oklahoma spoke first in opposition to the minority. He urged religious tolerance but contended that the Klan could not be denounced as a whole for acts of individuals. Mr. Pattangall spoke for the minority, and Mrs. Miller of Pennsylvania also spoke against the Klan. The Governor of Louisiana urged ignoring the Klan, which he said was already wearing itself out in the South. William Jennings Bryan spoke last in behalf of the majority report. Of the $1083^{3}/_{20}$ votes cast, $541^{3}/_{20}$ were against the majority report, 542 for it. The convention adjourned at 2 o'clock in the morning.

Sixth Day.—Balloting for President of the United States was begun on the sixth working day of the session. Fifteen ballots were taken during the day and evening sessions. On the fifteenth ballot the leading candidates stood as follows: McAdoo 479, Smith 305½, J. W. Davis 61, Cox 60.

Seventh Day.—Balloting through two more long sessions. McAdoo still in the lead, Smith second, Davis third.

Eighth Day.—Twelve ballots were taken. On the 40th ballot McAdoo reached his highest strength with 505½ votes. William Jennings Bryan went before the Convention early in the day and spoke eloquently for McAdoo. As a result of this speech, McAdoo got over one hundred votes from John W. Davis' delegates.

Ninth Day.—Nineteen ballots were taken with leading candidates remaining in the same relative positions.

Tenth Day.—Nine ballots taken with no change in the relative position of leading candidates.

Eleventh Day.—Seven indecisive ballots were taken. A motion to adjourn the Convention and meet again July 21 in Kansas City to select a candidate for President, was lost. The Convention also rejected another proposal to drop the low men on each ballot until only two remained, and then, if at the end of the fifth ballot no candidate had been nominated, to dissolve the unit rule which bound delegations, and let the delegates vote their personal convictions.

Twelfth Day.—On Monday, July 7, the Convention passed its 87th ballot before it adjourned for the day. A resolution by Mr. Gilchrist, expressing the opinion that delegates should be released from all pledges or instructions relating to any candidate for the nomination for President, was adopted by a vote of 895 to 105. On the previous day a similar resolution had been agreed upon in informal conference and signed by representatives of all the leading candidates except Mr. McAdoo. On the 86th ballot McAdoo lost first place to Smith, and Ralston climbed to third place over John W. Davis.

Thirteenth Day.—The Convention reached its 94th ballot during the day session and took six more ballots at the night session. At the opening of the night session Franklin D. Roosevelt appeared before the Convention as Governor Smith's representative to say that Smith would agree to withdraw his name from the contest if McAdoo would agree to do the same. Early in the morning Chairman Walsh received a letter from McAdoo signifying his willingness to release his delegates, but not withdrawing his name. Senator Ralston of Indiana withdrew after the 94th ballot. The 100th ballot, which showed the McAdoo delegates beginning to go over to J. W. Davis, resulted as follows: Smith 351½; J. W. Davis 203½; McAdoo 190.

Fourteenth Day.—Three more ballots were taken, with John W. Davis steadily increasing his vote, until on the 103d ballot, late in the afternoon, the Convention stampeded to him and he was nominated by acclamation. A recess was taken until evening, when Charles W. Bryan of Nebraska was nominated as Davis' running mate, with practically no opposition.

The Democratic Platform of 1924.—After a tribute to the memory of Woodrow Wilson, the platform proceeds to a statement of Democratic principles: 'The Democratic party believes in equal rights to all and special privilege to none. . . . The Republican party is concerned chiefly with material things; the Democratic party is concerned chiefly with human rights. . . . The Democratic party stands for remedial legislation and progress. The Republican party stands still.'

Comparison of Parties.—The following characteristics and achievements are attributed to the eight years of Democratic administration: (1) 'no corruption'; (2) 'party pledges faithfully fulfilled'; (3) economic life of the nation quickened; (4) tariff taxes reduced; (5) Federal trade commission created; (6) Federal farm loan system established; (7) child labor legislation enacted; (8) good roads bill passed; (9) eight-hour laws adopted; (10) Secretary of Labor given seat in the Cabinet; (11) Clayton amendment to Sherman anti-trust act passed, freeing labor and taking it from the category of commodities; (12) improvement of agricultural conditions; (13) corrupt practice act adopted; (14) Federal employment bureaus created, farm loan banks organized, and the Federal reserve system established; (15) 'privilege was uprooted. A corrupt lobby was driven from the national capital.' 'Between the inauguration and our entrance into the World War . . . more effective, constructive and remedial legislation was placed upon statute books than the Republican party had placed there in a generation.'

Republican Inefficiency and Corruption.—The Republican party is condemned (1) for 'attempting to limit inquiry into official delinquencies and to impede, if not to frustrate, the investigations to which in the beginning Republican party and leaders assented, but which later they regarded with dismay.' These investigations compelled the retirement in disgrace of the former

Secretary of the Interior, the Secretary of the Navy, and the Attorney General; 'disclosed appalling conditions of the Veterans' Bureau . . . fraud upon the Government . . . and cruel neglect of the sick and disabled soldiers of the World War . . . revealed the criminal and fraudulent nature of the oil leases which caused the Congress, despite the indifference of the executive, to direct recovery of the public domain and the prosecution of the criminal'; (2) for 'teaching the strange doctrine that public censure should be directed against those who expose crime rather than against criminals who have committed the offenses'; (3) for failure or inability to redress the following conditions: Dishonesty, discrimination, and extravagance in government, unbearable burdens of taxation, distress and bankruptcy in agriculture, the high cost of living, the slowing down of industry, the tariff and the destruction of our foreign markets and the high cost of transportation, the burden of cost of large standing armies and of preparing for war.

The Democratic party pledges itself to the following program:

Honest Government.—'To drive from public places all who make barter of our national honor, its resources or the administration of its laws; to punish those guilty . . .; to put none but the honest in public office; to practice economy in the expenditure of public money; to reverence and respect the rights of all under the Constitution.'

Tariff and Taxation.—Condemns the Fordney-McCumber tariff act as 'the most unjust, unscientific, and dishonest tariff tax measure ever enacted in our history . . . class legislation, which defrauds all the people for the benefit of a few; increases the cost of living, penalizes agriculture, corrupts the government, fosters paternalism.' Denounces Republican tariff laws 'which are written in great part in aid of monopolies.' 'We declare our party's position to be in favor of a tax on commodities entering the customs houses that will promote effective competition, protect against monopoly and at the same time produce a fair revenue to support the government.'

'We hold that the fairest tax with which to raise revenues for the Federal government is the income tax. We favor a graduated tax upon incomes so adjusted as to lay the burdens of government upon the taxpayers in proportion to the benefits they enjoy and their ability to pay. We oppose the so-called nuisance taxes, sales taxes and all other forms of taxation that unfairly shift to the consumer the burdens of taxation. . . . We hold that all taxes are unnecessarily high, and pledge ourselves to further reductions.

'We denounce the Mellon tax plan as a device to relieve multimillionaires at the expense of other taxpayers.'

Agriculture.—To offset Republican policies which have caused the bankruptcy of American farmers, and their disastrous results . . . 'we pledge ourselves: (*a*) To adopt an international policy of such coöperation as will re-establish the farmers' export market by restoring the industrial balance in Europe and the normal flow of international trade'; (*b*) to adjust the tariff; (*c*) to readjust and lower rail and water rates; (*d*) to bring about the early completion of internal waterway systems for transportation and to develop our water powers for cheaper fertilizer and use on our farms; (*e*) to stimulate by every proper governmental activity the progress of the coöperative marketing movement and the establishment of an export marketing commission; (*f*) to secure for the farmer credits suitable for his needs; (*g*) by these policies to reduce the margin between what the producer receives for his products and the consumer has to pay for his supplies, to the end that we secure an equality for agriculture'

Railroads.—The Esch-Cummins transportation act of 1920 . . . has failed to accomplish its purposes. 'It must, therefore, be so rewritten that the high purposes which the public welfare demands may be accomplished. Railroad freight rates should be readjusted so as to give the bulky basic, low-priced raw commodities, such as agricultural products, coal and ores, the lowest rates, placing the higher rates upon more valuable and less bulky manufactured products.'

Muscle Shoals and Fertilizers.—'We reaffirm and pledge the fulfillment of the policy with reference to Muscle Shoals, as declared and passed by the Democratic majority of the Sixty-fourth Congress in the national defense act of 1916, "for the production of nitrates or other products needed for munitions of war and useful in the manufacture of fertilizers." We demand prompt action by Congress for the operation of the Muscle Shoals plants to maximum capacity in the production, distribution and sale of commercial fertilizers to the farmers of the country.'

Republican Contraction of Credit and Currency.—'We denounce the recent cruel and unjust contraction of legitimate and necessary credit and currency, which was directly due to the so-called deflation policy of the Republican party. . . . We demand that the Federal Reserve system be so administered as to give stability to industry, commerce and finance, as was intended by the Democratic party, which gave the Federal Reserve system to the nation.'

Reclamation.—'The Democratic party pledges itself actively, efficiently and economically to carry on the reclamation projects, and to make equitable adjustment for the mistakes the Government has made.'

Conservation.—'We pledge recovery of the navy's oil reserves and all other parts of the public domain which have been fraudulently or illegally leased or otherwise wrongfully transferred to the control of private interests; vigorous prosecution of all . . . that participated in these transactions; revision of the water power act, the general leasing act and all other legislation relating to the public domain that may be essential to its conservation and honest and efficient use on behalf of the people of the country. . . . We favor strict public control and conservation of all the Nation's natural resources.'

Improved Highways.—'We favor a continuance of Federal aid under existing federal and state agencies.'

Mining.—'It is the duty of our Government to foster this industry and to remove the restrictions that destroy its prosperity.'

Regulation of Corporations Controlling Necessities of Life.—'We pledge the Democratic party to regulate by governmental agencies the anthracite coal industry and all other corporations controlling the necessities of life where public welfare has been subordinated to private interests.'

Merchant Marine.—'We declare for an American-owned merchant marine, American built and manned by American crews, which is essential for naval security in war and is a protection to the American farmer and manufacturer against excessive ocean freight charges. . . .'

Education.—'We believe . . . that each State, being responsible for the intellectual and moral qualification of its citizens and for the expenditure of the moneys collected by taxation for the support of its schools, shall use its sovereign right in all matters pertaining to education.'

Civil Service.—'We pledge the Democratic party faithfully to comply with the spirit as well as the regulation of civil service; to extend its provisions to internal revenue officers and to other employes of the Government not in executive positions and to secure to ex-service men preference in such appointments.'

Postal Employes.—'We declare in favor of adequate salaries to provide decent living conditions for postal employes.'

Popular Elections.—'We pledge the Democratic party to a policy which will prevent members of either House who fail of re-election from participating in the subsequent sessions of Congress. This can be accomplished by fixing the days for convening the Congress immediately after the biennial national election; and to this end we favor granting the right to the people of the several States to vote on proposed constitutional amendments.'

Probation.—'We favor the extension of the probation principle to the courts of the United States.'

Veterans of Wars.—'We favor generous appropriations, honest management, and sympathetic care and assistance in the hospitalization, rehabilitation, and compensation of the veterans of all wars and their dependents.'

Campaign Contributions.—'We favor the prohibition of individual contributions, direct and indirect, to the campaign funds of congressmen, senators, or presidential candidates, beyond a reasonable sum to be fixed in the law, for both individual contributions and total expenditures, with requirements for full publicity. We advocate a complete revision of the corrupt practices act.'

Narcotics.—'Recognizing in narcotic addiction . . . a grave peril to America and to the human race, we pledge ourselves vigorously to take against it all legitimate and proper measures for education, for control, and for suppression at home and abroad.'

Law Enforcement.—'The Democratic party pledges itself to respect and enforce the Constitution and all laws.'

The Rights of the States.—'We demand that the States of the Union shall be preserved in all their vigor and power. . . . We oppose the extension of bureaucracy . . . and the multiplication of offices and officeholders. We demand a revival of the spirit of local self-government.'

Asiatic Immigration.—'We pledge ourselves to maintain our established position in favor of the exclusion of Asiatic immigration.'

Philippine Independence.—'We declare that it is now our liberty and our duty to keep our promise to [the Filipino people] by granting them immediately the independence which they so honorably covet.'

Alaska.—'We pledge ourselves to correct the evils which have grown up in the development of Alaska under the Republican administration. An adequate form of local self-government must be provided and to that end we favor the establishment of a full territorial form of government.'

Territory of Hawaii.—'We believe in a policy for continuing the improvements of the national park, the harbors and breakwaters, and the Federal roads of Hawaii.'

Virgin Islands.—'We recommend legislation for the welfare of the inhabitants of the Virgin Islands.'

Armenia and the Lausanne Treaty.—'We condemn the Lausanne treaty. It barters legitimate American rights and betrays Armenia for the Chester Oil Concession. We favor the protection of American rights in Turkey and the fulfillment of President Wilson's arbitral award respecting Armenia.'

Republic of Greece.—'We welcome to the sisterhood of republics the ancient land of Greece, which gave to our party its priceless name.'

War.—'In the event of war in which the man-power of the Nation is drafted, all other resources should likewise be drafted.'

Disarmament, War Referendum, and National Defense.—'We demand a strict and sweeping reduction of armaments by land and sea, so that there shall be no competitive military program or naval building. Until agreements to this end have been made, we advocate an army and navy adequate for our national safety. Our Government should secure a joint agreement with all nations for world disarmament and also for a referendum of war, except in case of actual or threatened attack.'

Deep Waterways.—'We favor and will promote deep waterways from the Great Lakes to the Gulf and to the Atlantic Ocean.'

Flood Control and Water Transportation.—'We favor a policy for the fostering and building of inland waterways and the removal of discrimination against water transportation. . . . We favor the expeditious construction of flood relief works on the Mississippi and Colorado Rivers and also such reclamation and irrigation projects upon the Colorado as may be found to be feasible and practicable. We favor liberal appropriations for prompt coördinated surveys to determine the possibilities of general navigation improvement and water power development. . . .'

Fraudulent Stock Sales.—'We favor the immediate passage of such legislation as may be necessary to enable the States efficiently to enforce the laws regulating the financial strangulation of innocent investors, workers, and consumers, caused by the indiscriminate promotion, refinancing and reorganizing of corporations on an inflated and overcapitalized basis. . . .'

Private Monopolies.—'We declare that a private monopoly is indefensible and intolerable, and pledge the Democratic party to vigorous enforcement of existing laws against monopoly and illegal combinations and to enactment of such further measures as may be necessary.'

Aviation.—'We favor a sustained development of aviation both by the Government and commercially.'

Labor and Child Welfare.—'We favor collective bargaining and laws regulating hours of labor and conditions under which labor is performed. . . . In order to mitigate unemployment . . . we urge the enactment of legislation authorizing the construction and repair of public works in periods of acute unemployment. We pledge the party to coöperate with the State governments for the welfare, education, and protection of child life and all necessary safeguards against exhaustive, debilitating employment conditions for women.'

The League of Nations.—'The Democratic party pledges all its energies to the outlawing of the whole war system. . . . The only hope for world peace and for economic recovery lies in the organized efforts of sovereign nations coöperating to remove the causes of war and to substitute law and order for violence. Under Democratic leadership a practical plan was devised under which 54 nations are now operating and which has for its fundamental purpose the free coöperation of all nations in the work of peace. . . . It is of supreme importance to civilization and to mankind that America be placed and kept on the right side of the greatest moral question of all time and therefore the Democratic party renews its declaration of confidence in the ideals of world peace, the League of Nations and the World Court of Justice as together constituting the supreme effort of the statesmanship and religious conviction of our time to organize the world for peace. Further the Democratic party declares that it will be the purpose of the next administration to do all in its power to secure for our country that moral leadership in the family of nations which in the providence of God has been so clearly marked out for it. There is no substitute for the League of Nations as an agency working for peace; therefore we believe that . . . it is desirable, wise and necessary to lift this question out of party politics and to that end to take the sense of the American people at a referendum election, advisory to the Government, to be held officially under act of Congress, free from all other questions and candidacies. . . .'

Democratic National Convention of 1928

The Democratic National Convention of 1928 met in Sam Houston Hall, Houston, Texas, at 12:12 P.M., Tuesday, June 26, and adjourned at 1:47 P.M., Friday, June 29. It nominated Governor Alfred E. Smith of New York for President of the United States and United States Senator Joseph T. Robinson of Arkansas for Vice-President.

Ballot for Candidates.—The total number of votes in the convention was 1100; necessary for choice, 733⅓. Balloting for President took place late in the evening of Thursday, June 28. Governor Smith was nominated on the first ballot, after Ohio, which had first cast her full strength for Senator Pomerene, obtained permission to change her vote and gave Governor Smith 45 and Pomerene 3. The final vote for all candidates was as follows: Smith, 768⅔; Hull 71⅚; Reed 48; George 52½; Pomerene 3; Jones 43; Woollen 32; Harrison 20; Ayres 20; Watts 18; Hitchcock 16; Donahey 5; Thompson 2. Balloting for Vice-President took place Friday shortly after noon. On the first ballot Senator Robinson received 914⅙ votes and thereafter many States obtained permission to change their votes to him, so that he finally received 1035⅙ of the total 1099 votes cast. The vote for other candidates was as follows: Allen 21; Barkley 9; Ross 2; not voting 1.

So effective had been the preconvention campaign for Governor Smith of New York, that from the first day it was evident that his supporters were in complete control of the convention proceedings. A minority group composed largely of Southern dry supporters tried to stem the tide, but were completely overwhelmed by the Smith sentiment. Their one victory was won in the Committee on Resolutions where they succeeded in securing the adoption of a platform plank pledging the Democratic party to 'an honest effort to enforce the Eighteenth Amendment.'

First Day. The opening session of the convention was called to order at twelve minutes past noon on Tuesday, June 26, by Chairman Clem Shaver of the Democratic National Committee. Bishop Samuel Ross Hay of the Methodist Episcopal Church, South, delivered the opening invocation, after which Miss Melvina Passmore of Houston sang 'The Star-Spangled Banner,' 'My Country 'Tis of Thee' and 'Dixie,' accompanied by one of the three bands which played together and by turns throughout the convention. The Secretary of the National Committee, Charles A. Greathouse of Indiana, read the official call of the convention. An address of welcome was delivered by Mayor Oscar F. Holcombe of Houston. Chairman Shaver was presented with a gavel made of hickory grown on the Tennesseee state of Andrew Jackson, whose nickname was 'Old Hickory.' For the benefit of the thousands of radio listeners of the country, it had been decided to postpone the temporary organization of the convention with the keynote speech until an evening session, and the convention therefore took a recess until 7:30 P.M., without completing any further business.

The evening session was slow in assembling and did not get under way until about eight o'clock. The opening prayer was offered by the Rev. William States of the Frst Presbyterian Church, Houston. Temporary officers of the convention were nominated and elected viva voce, and the temporary chairman, Claude G. Bowers of New York, was escorted to the rostrum and proceeded to deliver the key-note address. He referred to the Democratic party as the 'party of Jefferson, Jackson, Cleveland and Wilson,' and was outspoken in his denunciations of the Republican party and the Republican administration. His reference to the veto by President Coolidge of the McNary-Haugen bill, followed by the words 'We demand that the hand of privilege be taken out of the farmers' pocket and off the farmers' throat,' was the signal for a demonstration lasting several minutes, in which the Middle Western and Southern States were particularly active. He dwelt at considerable length upon the oil scandals in the previous Republican administration and implied that the Republican candidate for President, who was then a member of the cabinet, should have done something about it. He announced that the Democratic party was prepared to lead the country back to the old ideals of liberty and justice for all, and predicted a great victory for the party in the coming campaign.

Second Day.—Permanent Organization. — The convention was called to order by temporary chairman Bowers at 11:45 A.M. The Rev. George Gilmour of the First Unitarian Church offered the invocation, which was followed by the report of the Credentials Committee, J. Bruce Kremer of Montana, chairman. The report followed the recommendations of the National Committee and was adopted, although Colonel Carl L. Ristine of Missouri submitted a minority report recommending the seating of a contested delegation on the ground that the State Executive Committee selected the delegates without calling a State convention. Mr. W. W. Durbin of Ohio, Chairman of the Committee on Permanent Organization, presented the name of Senator Joseph T. Robinson of Arkansas for permanent chairman, and his selection was unanimously approved by the delegates. Senator Robinson was escorted to the rostrum and addressed the convention. He pleaded for party harmony, attacked the Republican party for corruption and for betraying the interests of the farmers, and finished with a strong plea for religious tolerance which had unmistakable reference to the religious affiliations of Governor Alfred E. Smith of New York, leading candidate for the presidential nomination. His speech was followed by a demonstration and parade during which battles over the standards were fought in three State delegations between opposing groups of delegates. After seven minutes, when order had been restored, the Utah delegation presented a gavel to the convention and another gavel was presented by James B. Fogarty for the State of Pennsylvania. W. C. Newland of North Carolina presented the report of the Committee on Rules, which provided that the convention might, if it seemed expedient, nominate candidates prior to adopting a platform. It limited nominating speeches to twenty minutes and seconding speeches to five minutes. J. H. Lewis of Illinois presented a resolution providing for the ratification by the National Convention of newly elected members of the National Committee, which was unanimously adopted. The list of newly selected members of the National Committee was then read and adopted with few protests. Mayor Walker of New York City moved for a recess until 7:15 P.M.

The evening session was opened with prayer by Mgr. George T. Walsh of the Roman Catholic Church of the Annunciation at Houston. A motion was carried authorizing the National Committee to fix the time and place of the next National Convention and the number of delegates from territories and the District of Columbia. Charles A. Greathouse of Indiana offered a resolution in honor of the late Thomas R. Marshall of Indiana, who was Vice President with President Wilson, and the convention rose while one of the bands played 'Nearer My God To Thee.' Josephus Daniels then presented a resolution in memory of William Jennings Bryan, saying that this was the first National Convention of the Democratic party for many years in which Mr. Bryan had not played an influential part. The convention applauded and stood while the band softly played 'Rock of Ages.'

The business of nominating candidates for the office of President of the United States was next in order. Arizona yielded to Georgia and Representative Charles R. Crisp placed in nomination U. S. Senator Walter F. George. A twenty-minute demonstration and parade followed, in which a large banner bearing the words 'The Constitution Must Be Preserved' was prominently displayed. The second State on the roll yielded to New York and Franklin D. Roosevelt placed in nomination Governor Alfred E. Smith in a speech remarkable for its earnestness and sincere admiration of the candidate. A tremendous prepared demonstration followed. Seconding speeches for Governor Smith were made by Mrs. Nellie Taylor Ross of Wyoming, Thomas V. Hickey of San Francisco, Alben W. Barkley of Kentucky, Mrs. Carroll Miller of Pittsburgh and Mrs. Stella Hawlin of New Orleans. William H. O'Brien of Lawrenceburg, Indiana, presented the name of Evans Woollen to the convention. William A. Ayres of Kansas was placed in nomination by George McGill of Wichita. Fred T. Cone of Florida seconded the nomination of Senator George of Georgia, and the convention adjourned at 11:15 P.M. until the following day.

Third Day.—Three sessions were held on the third day. The morning session opened with prayer by the Rev. A. Frank Smith of the First Methodist Episcopal Church, Houston. After some preliminary routine business, the roll call of States was continued. Governor Smith's nomination was seconded by Governor Ritchie of Maryland, Andrew J. Peters of Massachusetts, Andrew Nelson of Minnesota and William Woodburn of Nevada. Charles M. Howell placed in nomination Senator James A. Reed of Missouri, and a twenty-minute demonstration followed. Eugene D. O'Sullivan of Omaha presented the name of Senator Gilbert M. Hitchcock of Nebraska. At 12:40 the convention adjourned to reassemble at three o'clock. The Rev. J. M. R. Score of the St. Paul Methodist Episcopal Church opened the afternoon session with prayer. Representative Cordell Hull of Tennessee was placed in nomination by Harvey H. Hannah. J. L. Page of North Dakota was prevented by hoarseness from delivering his prepared seconding speech for Governor Smith and obtained permission to have the clerk read it for him. The name of former Senator Atlee Pomerene of Ohio was then placed in nomination by Joseph C. Breitenstein of Cleveland and a seconding speech was made by Mrs. Josephine M. McGowan of Canton, Ohio. Senator Thomas P. Gore of Oklahoma, in seconding the nomination of Senator Reed, delivered a witty and scathing attack upon the Republican party and its candidates. Congressman G. M. Fuller of Oklahoma seconded the nomination of Senator George of Georgia and was followed by Bert E. Haney of Portland, Oregon, seconding Governor Smith. The name of Jesse H. Jones of Texas was placed in nomination by State Senator Thomas H. Ball of Houston and a thirteen-minute demonstration was accorded to Texas' favorite son, whose nomination was seconded by Mrs. Lee Rountree of Bryan, Texas, and Governor Dan Moody. R. O. Evans of North Carolina seconded the nomination of Representative Hull; Senator William H. King of Utah, Park H. Pollard of Vermont, and Stephen F. Chadwick of Washington State expressed their approval of Governor Smith's nomination. The West Virginia delegation seemed to be divided into three camps: Mrs. Frank N. Mann seconded the nomination of Senator George of Georgia; Camden S. Taney announced that the West Virginia delegation was for Governor Smith; and Samuel T. Spears of Elkins, West Virginia, nominated Huston Thompson of Colorado, former Chairman of the Federal Trade Commission. George A. Jagerson of Wisconsin, R. Wilmer Bolling of the District of Columbia, and W. H. Heen of Hawaii in turn seconded the nomination of Governor Smith. Chairman Robinson read a petition signed by persons in sixteen Southern States, protesting against the nomination of any candidate for President or Vice-President who would not support the Eighteenth Amendment to the Constitution.

The Committee on Resolutions, Senator Key Pittman of Nevada, chairman, presented its report to the convention at its Thursday evening session. There had been some disagreement between the wet and dry elements in the Committee over the prohibition enforcement plank in the platform and the dry minority led by Governor Moody of Texas was rumored to be planning a fight on the convention floor for a minority report. A plank framed by Senator Glass of Virginia, making no special mention of the Volstead Act but pledging the party to enforcement of the Eighteenth Amendment and all laws enacted pursuant thereto, was adopted by the majority of the Committee in the interests of party harmony, and Governor Moody announced that he would accept the report of the Committee and would not present a minority report. Governor Ritchie of Maryland, in spite of the protests of the dry faction, addressed the convention upon the prohibition issue, pleading for tolerance and party harmony. Senator Glass moved the adoption of the platform, by a viva voce vote. The Chairman then ordered the roll to be called on the nomination of a candidate for President. Governor Smith was nominated with one ballot, and the convention adjourned until the following day.

Fourth Day.—Senator Harrison of Mississippi presided over the last session of the convention at which Senator Joseph T. Robinson of Arkansas, the permanent chairman of the convention, was nominated for Vice President by an overwhelming majority. Candidates placed in nomination for the Vice Presidency were as follows: Major General T. Allen of Kentucky, by Michael Sollie of Ozark, Alabama; Senator Joseph T. Robinson, by Senator S. G. Bratton of Albuquerque, New Mexico; Mrs. Nellie Taylor Ross, former Governor of Wyoming, by Mrs. T. S. Taliaferro; Senator Alben W. Barkley of Kentucky by A. O. Stanley, former Governor of Kentucky; Senator Duncan U. Fletcher of Florida, by Fuller Warren.

Just before final adjournment, a telegram was read to the convention from Governor Smith, the presidential nominee, in which he pledged himself to the carrying out of the platform adopted by the party, but made it clear that although he favored 'the equal and even enforcement of the law' with regard to prohibition, yet he believed 'there should be fundamental changes in the present provisions for national prohibition,' and felt it 'to be the duty of the chosen leader of the people to point the way which, in his opinion, leads to a sane, sensible solution of a condition which . . . is entirely unsatisfactory to the great mass of our people. . . . I am satisfied that . . . by the application of the democratic principles of local self-government and States' rights, we can secure real temperance, respect for law and eradication of the existing evils.'

The Democratic Platform of 1928.—The platform opens with a tribute of love and respect to the memory of Woodrow Wilson and a reaffirmation of devotion to the principles of Jefferson. It pledges the Democratic party 'to encourage business, small and great alike; to conserve human happiness and liberty; to break the shackles of monopoly . . . ; to respond to popular will. The function of a national platform is to declare general principles and party policies. We do not, therefore, assume to bind our party respecting local issues or details of legislation.'

The Rights of the States.—'We demand that the constitutional rights and powers of the States shall be preserved in their full vigor and virtue. These constitute a bulwark against centralization and the destructive tendencies of the Republican party.'

Republican Corruption. — In scathing terms the Republican party is accused of prostrating agriculture, depressing industry, destroying American shipping, causing unemployment, 'sordid corruption,' 'shocking thieveries and startling depravities of officials high and low.' 'From Cabinet Ministers with their cheap crimes to the cheap vendors of official patronage; . . . vulgar grafters upon alien trust funds and upon the hospital resources of disabled veterans of the World War; . . . the whole Republican rule has become saturated with dishonesty.' . . . 'The watchword of the day should be "Turn the rascals out." . . . To this fixed purpose should be devoted every effort of the party. . . . Every minor difference should be put aside and a determined and united fight be made to rescue the Government from those who have betrayed their trust by disgracing it.'

Economy and Reorganization.—The Democratic party pledges 'efficiency and economy in the administration of public affairs,' . . . 'business-like reorganization of all the departments of government; elimination of duplication, waste and overlapping; substitution of modern business-like methods for existing obsolete and antiquated conditions. No economy resulted from the Republican party rule.'

Finance and Taxation.—'The Federal Reserve system, created and inaugurated under Democratic auspices, is the greatest legislative contribution to constructive business ever adopted. The administration of the system for the advantage of stock market speculators should cease.' Republicans in Congress are accused of blocking tax reduction, in line with the 'proverbial desire of the Republican party always to discriminate against the masses in favor of privileged classes.' The Democratic party avows its belief in the fiscal policy inaugurated by the last Democratic Administration, which has provided a sinking fund sufficient to extinguish the nation's indebtedness within a reasonable period of time without harassing the present and next succeeding generations with tax burdens. Taxes . . . beyond the actual requirements of the . . . sinking fund are but an added burden upon the American people and the surplus thus accumulated in the Federal treasury is an incentive to increasingly extravagant expenditures. . . . We . . . favor further reduction of the internal taxes of the people.'

Tariff.—'Democratic tariff legislation will be based on . . . maintenance of legitimate business and a high standard of wages for American labor; . . . reduction of extortionate tariff rates bestowed in payment of political debts; . . . restoration of a fact-finding tariff commission . . . from executive domination . . .; duties that will permit effective competition, insure against monopoly and at the same time produce a fair revenue for the support of government. Actual difference between the cost of production at home and abroad, with adequate safeguard for the wage of the American laborer, must be the extreme measure of every tariff rate. . . . Wage earner, farmer, stockman, producer and legitimate business in general have everything to gain from a Democratic tariff based on justice to all.'

Civil Service.—'We shall preserve and maintain the civil service.'

Agriculture.—The Republican party and Republican administration is accused of 'deception upon the farmer and stock raiser . . . through false and delusive promises for more than fifty years;' . . . of 'virulent hostility to the advocates of farm relief' and of 'failure to offer a constructive programme to restore equality to agriculture.' 'We condemn the policy of the Republican party which promises relief to agriculture only through a reduction of American farm production to the needs of the domestic market. . . . The Democratic party recognizes that the problems of production differ as between agriculture and industry. . . . Producers of crops whose total volume exceeds the needs of the domestic market must continue at a disadvantage until the Government shall intervene as seriously and as effectively in behalf of the farmer as it has intervened in behalf of labor and industry. There is need of supplemental legislation for the control and orderly handling of agricultural surpluses, in order that the price of the surplus may not determine the price of the whole crop. . . . The Democratic party . . . pledges the united efforts of the legislative and executive branches of Government . . . to the immediate enactment of such legislation, and to such other steps as are necessary to . . . the complete economic equality of agriculture. . . . We pledge that in its tariff policy the Democratic party will insist upon equality of treatment between agriculture and other industries.' A farm relief 'remedy must be found which will include . . . (a) Credit aid by loans to coöperatives on at least as favorable a basis as the Government aid to the merchant marine. (b) Creation of a Federal Farm Board to assist the farmer and stock raiser in the marketing of their products, as the Federal Reserve Board has done for the banker and business man. . . . (c) Reduction through proper Government agencies of the spread between what the farmer gets and the ultimate consumer pays. . . . (d) Consideration of the condition of agriculture in the formulation of . . . tax measures. We pledge the party to foster and develop coöperative marketing associations through appropriate Government aid. . . . We pledge . . . an earnest endeavor to solve this problem of the distribution of the cost of dealing with crop surpluses; . . . we promise thorough-going administration of our rural credits laws, so that the farmers in all sections may secure the maximum benefits intended.'

Mining.—'Mining has suffered like agriculture and from similar causes. It is the duty of our Government to foster this industry and to remove the restrictions that destroy its prosperity.'

Foreign Policy.—'The Republican administration has no foreign policy; . . . . . . We declare for a constructive foreign policy based on these principles: (a) Outlawry of war . . . (b) Freedom from entangling political alliances. . . . (c) Protection of American lives and rights. (d) Non-interference with the elections or other internal political affairs of any foreign nation. . . . (e) Rescue of our country from its present impaired world standing and restoration to its former position as a leader in the movement for international arbitration, conciliation, conference and limitation of armament by international agreement. (f) International agreements for reduction of all armaments and the end of competitive war preparations, and, in the meantime, the maintenance of an army and navy adequate for national defence. (g) Full, free and open coöperation with all other nations for the promotion of peace and justice throughout the world. (h) . . . foreign policies must have the approval of the American people. (i) Abolition of the practice of the President of entering into and carrying out agreements with a foreign Government . . . when such agreements have not been advised and consented to by the Senate as provided in the Constitution. . . . (j) Recognition that the Monroe Doctrine is a cardinal principle of this Government promulgated for the protection of ourselves and our Latin-American neighbors. . . . (k) We condemn the Republican administration for lack of statesmanship and efficiency in negotiating the 1921 treaty for the limitation of armaments, and for the same ineffectiveness in the Geneva Conference of 1928.'

Waterpower, Waterways and Flood Control. — 'The Federal Government and State Governments, respectively, now have absolute and exclusive sovereignty and control over enormous waterpowers. . . . This sovereign title and control must be preserved in the State and Federal Governments, to the end that the people may be protected against exploitation of this great resource. . . . We favor and will promote waterways and removal of discrimination against water transportation; . . . expeditious construction of flood relief works on the Mississippi and Colorado Rivers and such irrigation projects upon the Colorado River as may be found feasible; . . . appropriation for prompt coördinated surveys by the United States to determine the possibilities of general navigation improvement and water power development . . .; and the strict enforcement of the Federal Waterpower Act. . . .'

Conservation and Reclamation.—'We shall conserve the natural resources of our country for the benefit of the people and to protect them against waste and monopolization.'

Transportation.—'We must . . . promote every form of transportation to a state of highest efficiency. Recognizing the prime importance of air transportation, we shall encourage its development by every possible means. . . . We reaffirm our approval of the Federal Roads law, enacted by a Democratic administration.'

Labor.—'(a) We favor the principle of collective bargaining and the Democratic principle that organized labor should choose its own representatives without coercion or interference. (b) . . . Labor should be exempt from the operation of the anti-trust laws. (c) We recognize . . . grave abuse in the issuance of injunctions in labor disputes. . . . The . . . purpose of representative capital, labor and the bar to devise a plan for the elimination of (these) evils must be supported. . . . (d) We favor legislation providing that products of convict labor shipped from one State to another shall be subject to laws of the latter State.'

Unemployment.—'We favor the adoption by the Government . . . of a scientific plan whereby during periods of unemployment appropriations shall be made available for the construction of necessary public works and the lessening as far as consistent with public interests, of Government construction work when labor is generally and satisfactorily employed in private enterprise.'

Accident Compensation to Government Employees.—'We favor legislation making fair and liberal compensation to Government employees who are injured in accident or by occupational disease and to the dependents of such workers as may die as a result thereof.'

Federal Employees. — 'Federal employees should receive a living wage based upon American standards of decent living. . . . We favor a fair and liberal retirement law for Government employees in the classified service.'

Veterans.—'We pledge the veterans that none of the benefits heretofore accorded by the Wilson administration and the votes of Democratic members of Congress shall be withdrawn; that these will be added to more in accordance with veterans' and their dependents' actual needs.'

Women and Children.—'We declare for equality of women with men in all political and governmental matters.' We favor protection of women and children against exploitation; and 'an equal wage for equal service and . . . adequate appropriations for the Women's and Children's Bureau.'

Immigration. — 'Laws which limit immigration must be preserved . . . but the provisions contained in these laws that separate husbands from wives and parents from infant children are inhuman and not essential to the purpose or the efficacy of such law.'

Radio.—'Government supervision must secure to all the people the advantage of radio communication, and likewise guarantee the right of free speech. Governmental control must prevent monopolistic use of radio communication and guarantee equitable distribution and enjoyment thereof.'

Coal.—'The demoralization of this industry . . . demands constructive legislation that will allow capital and labor a fair share of prosperity with adequate protection to the consuming public.'

Congressional Election Reforms.—'We favor legislation to prevent defeated members of both Houses of Congress from participating in the sessions of Congress by giving the date of convening the Congress immediately after the biennial national election.'

Law Enforcement.—'. . . this convention pledges the party and its nominees to an honest effort to enforce the Eighteenth Amendment and all other provisions of the Federal Constitution and all laws enacted pursuant thereto.'

Campaign Expenditures.—'We condemn the improper and excessive use of money in elections. . . . We favor publicity in all matters affecting campaign contributions and expenditures. . . . We agree to keep and maintain a permanent record of all campaign contributions and expenditures, and to insist that contributions by the citizens of one State to the campaign committees of other States shall have immediate publicity.'

Merchant Marine.—'We reaffirm our support of an efficient, dependable American merchant marine for the carriage of the greater portion of our commerce and for the national defense. . . . We favor the transfer of these United States lines gradually to the local private American companies when such companies can show their ability to take over and permanently maintain the lines. . . . We are unalterably opposed to a monopoly in American shipping. . . . We oppose favoritism . . . in the matter of sales. . . .'

Armenia.—'We favor the most earnest efforts on the part of the United States to secure the fulfillment of the promises and engagements made during and following the Great War by the United States and the Allied powers to Armenia and her people.'

Education.—'We believe with Jefferson . . . that ignorance is the enemy of freedom and that each State . . . shall use its sovereign right in all matters pertaining to education. The Federal Government should offer to the States such counsel, advice, results of research and aid as may be made available through the Federal Agencies for the general improvement of our schools in view of our national needs.'

Insert in Vol. **III,** following page **604**
(Discard **1928** Temporary Pages)

Democratic National Convention of 1932

The Twenty-Fifth National Convention of the Democratic Party met in the Stadium, Chicago, Illinois, at noon, Monday, June 27, 1932 and adjourned at 6:50 P.M., Saturday July 2. It nominated for President of the United States Franklin Delano Roosevelt of New York; and for Vice-President Speaker of the House of Representatives John Nance Garner of Texas.

Ballot for Candidates.—The total number of votes in the Convention was 1,154; necessary to nominate, 769⅓. Contests between Roosevelt and anti-Roosevelt delegates in the States of Minnesota and Louisiana and of Porto Rico resulted in the seating of the Roosevelt delegates. The balloting for President began in the early morning of Friday July 1, when three successive ballots showed Mr. Roosevelt with a majority of the delegates. Mr. Roosevelt was nominated on the fourth ballot on Friday evening July 1st, receiving 945 votes. Former Governor Alfred E. Smith of New York received 190½ votes; Ritchie, 3½; White, 3; Baker, 5½; and Cox, 1 vote.

The candidate for Vice-President was nominated on the first ballot, receiving practically the entire vote of the Convention. Only one other was nominated and this candidate at the close of the roll-call moved to have Mr. Garner's nomination made unanimous.

Chief Struggle.—The Democratic Convention of 1932 lacked nothing in enthusiasm and color. Many delegates came there to vote for a favorite or to place a special plank in the party platform. With several contenders for the main prize, the nomination for the Presidency, the main objective of the adherents of 'favorite sons' was to 'stop Roosevelt,' the one candidate who had a majority of the delegates pledged to him. Another struggle was that over the prohibition plank in the party platform—the moderates holding out for resubmission and the out-and-out 'wets' maintaining a determined stand for outright repeal of the Eighteenth Amendment.

First Day: Temporary Organization.—The convention was called to order at 12:45 P.M., Monday, June 27, by John J. Raskob, chairman of the Democratic National Committee. Commander Evangeline Booth, of the Salvation Army, pronounced the invocation, after which 'The Star-Spangled Banner' was sung by Miss Rose Zulalian, of Massachusetts. Edward N. Hurley, chairman of the Citizens' Convention Committee, then introduced Mayor Anton J. Cermak, of Chicago, who officially welcomed the convention. The pronouncedly Democratic speech of the mayor elicited wild applause. He was followed by Mr. Raskob in a brief address in which he paid tribute to Jouett Shouse, chairman of the Democratic National Executive Committee, for his services to the party since 1928. Isador Dockweiler, of California, read the inaugural address of Thomas Jefferson as a restatement of the principles of Democracy. The secretary then read the official call of the convention. Mr. Raskob then presented the National Committee's recommendation for temporary officers subject to the approval of the convention, as follows: Chairman, Alben W. Barkley, Kentucky; Secretary, Robert Jackson, New Hampshire; Executive Secretary, Ewing Laporte, Pennsylvania; Parliamentarian, Clarence Cannon, Missouri; Chief Tally Clerk, Kenneth Romney, Montana; Assistant Tally Clerks, S. Lamar Gill, Texas, E. G. Sherrill, North Carolina; Maurice J. Freeman, New York, and Arthur J. O'Keefer, Massachusetts; Chief Reading Clerk, P. F. Haltigan, Washington, D. C.; Reading Clerk, Emory L. Frazier, Kentucky; Sergeant-at-Arms, Edwin A. Halsey, Virginia; Chief Doorkeeper, Joseph J. Sinnott, Washington, D. C.

After the election of this temporary slate the chair appointed former Governor Nellie Tayloe Ross, Wyoming, former Governor Harry Flood Byrd, Virginia, and John W. Davis, New York, as a committee to escort Senator Barkley to the platform. The new temporary chairman at once launched into his keynote address in which he diagnosed the country's ailments as due to 'twelve years of Republican quackery.' He was not only complete and thorough but also satiric. No responsible Democrat, he remarked, ever had remotely reflected on Mr. Hoover's character. Nor, he added, 'do we hold him, or his Administration, exclusively responsible for all the evils which have befallen us.' But that they have contributed to the disaster, he shouted with vigorous gesture, 'no intelligent observer can dispute.' Attacking the Republican prohibition plank, Senator Barkley said: 'Nicholas Murray Butler condemns it because it's dry; Senator Borah condemns it because it's wet, and the American people will condemn it because it's a fraud.' When he reached his recommendation that the platform to be adopted should contain a plank advocating the repeal of the Eighteenth Amendment, he was interrupted by a great demonstration and a parade of delegates. After 15 minutes he proceeded to finish his address, promising at its close that the convention would present to the nation a candidate of ability, courage and experience, without regard to class, creed, or geography. Senator James F. Byrne, of South Carolina, offered a resolution, which was adopted, thanking Senator Barkley for his address. Senator Barkley resumed the gavel and hurried on to the official appointment of committees. At 4:10 the convention adjourned until 12 noon, Tuesday, June 28th.

Second Day.—It was 1 P.M., Tuesday, before Senator Barkley, temporary chairman, got the convention in order. The invocation was pronounced by Mgr. Francis G. Ostrowski, of St. Josaphat's Church, Chicago. Mrs. Howard Austin, of Missouri, entertained with a song. Judge W. G. Ragland, of Missouri, offered a resolution of condolence upon the death of Frank C. Niles, of Kansas City, a member of the Missouri delegation. The convention then received the report of the committee on credentials, which seated the delegates as previously approved by the National Committee on the temporary roll. Scott W. Lucas, of Illinois, presented a dissenting report in the case of seating the delegates from Louisiana; Alfred N. Phillips, of Connecticut, presented minority reports in the case of the Minnesota and Porto Rico contests. The majority and minority reports were then debated, Mr. Lucas speaking in behalf of the minority report on Louisiana. Senator Huey Long, of Louisiana defended the majority report and Arthur F. Mullen of Nebraska followed in favor of the minority report. On the roll-call the Long-Roosevelt combination won by 638¾ to 514¼. The Minnesota contest was next decided in favor of the pro-Roosevelt delegates by 658¼ to 492¾ votes. The next order of business was the election of a permanent chairman, where a contest developed between Jouett Shouse and Senator Thomas J. Walsh, of Montana. Senator Walsh was the victor by 626 votes to 528 for Shouse. Senator Walsh was conducted to the platform by a committee consisting of Senator C. C. Dill, of Washington, Senator Robert J. Bulkley, of Ohio, and Mrs. Caroline O'Day, of New York. The newly-chosen permanent chairman addressed the convention, depicting the conditions that afflicted the country and giving an exposition of the Jeffersonian principles and applying them to present-day conditions. Senator Walsh received a great ovation at the close of his address. On motion of Homer S. Cummings, of Connecticut, the convention adjourned at 5:40 P.M. until noon Wednesday, June 29th.

Third Day: Afternoon Session.—Senator Walsh called the convention to order at 12:47 P.M. Wednesday. The Rev. Dr. Hartwell Hodge Browne, dean of St. James' Episcopal Cathedral, Chicago, pronounced the invocation. The chair then announced that the Resolutions (platform) Committee would not be ready to report before 2 o'clock. The delegates remained and were entertained by the Columbus (Ohio) Glee Club. The gavel was turned over to Eddie Dowling, musical comedy comedian, who introduced stars of the stage, radio, the prize ring, and politics. Just after 2 o'clock, Senator Walsh called the convention back to its more serious business and announced that the Resolutions Committee report would not be ready before 4 o'clock. The convention accordingly adjourned until 7 P.M.

Third Day: Evening Session.—Chairman Walsh called for order at 7:45 P.M., Wednesday, but five minutes passed before the convention was in order. The invocation was offered by Rabbi Louis D. Mann, of the University of Chicago faculty. Former Senator Gilbert N. Hitchcock, chairman of the Resolutions Committee, was recognized and began the reading of the report which contained the party platform. The platform, of 1396 words, was the shortest on record of any major political party. The reading proceeded with minor bursts of approval until Mr. Hitchcock read: 'We advocate repeal of the Eighteenth Amendment.' At these words delegates and spectators were on their feet and a parade started the round of the Stadium. The demonstration lasted 15 minutes and the reading of the platform was finished to another minor demonstration. Senator Hull then presented a minority report, protesting against the prohibition plank. Governor Murray, of Oklahoma, offered a minority report which was a complete substitution for the majority report, with the exception of the majority prohibition plank. William G. McAdoo proposed to add to the banking plank a provision safeguarding depositors in banks of the Federal Reserve system. Unanimous consent was asked that debate on the platform be limited to three hours and thirty minutes. The chairman then granted one hour each to the prohibition planks, thirty minutes to Governor Murray, fifteen minutes to Mr. McAdoo and three minutes each to any delegate. Senator David I. Walsh, Massachusetts, took the floor to defend the majority report on the platform. The close of his speech was the signal for a storm of cheers. Senator Hull was recognized and proceeded to defend the minority plank on prohibition. A storm of boos from the gallery interrupted his argument. Robert H. Anderson, of Florida, defended the majority prohibition plank to the accompaniment of enthusiastic approval from the crowd. Ed Pollard, of Iowa, also defended the majority plank. The next speaker was Alfred E. Smith, of New York. The whole convention rose and cheered him for minutes. Mr. Smith in a vigorous speech defended the majority report. Michael Igoe, of Illinois, followed Mr. Smith to support the majority plank as did also Murray Hughes, of Texas, and Mrs. James F. Whittemore, of Porto Rico, and Mayor T. S. Walmsley, of New Orleans. T. A. Walters, of Idaho, advocated the minority report. Mrs. Catherine J. Sloate, of Virginia, and Senator Robert J. Bulkley, of Ohio, followed in favor of the majority plank as did also Fay Des Portes, South Carolina, and Robert C. Murchie, New Hampshire. Jouett Shouse was the next speaker in favor of the majority plank, which was supported also by the last speaker, William A. Comstock, of Michigan. The majority repeal plank was adopted on roll-call by 934¾ to 213¾ votes. Fifteen proposed amendments were then rejected by *viva voce* votes, including the proposal for cash payment of the soldiers' bonus, safeguards for bank depositors, the monetization of silver, home rule for Hawaii and Alaska, Congressional representation for the District of Columbia and a moratorium on home loans. The convention recessed at 1 A.M. to 9 A.M. Thursday.

Fourth Day: Morning Session.—The convention was resumed at 12:45 P.M. Thursday, June 30th. George S. Cooke, of the Christian Science Church, said the prayer. It proceeded to adopt those portions of the platform not reached at the previous session. Fifteen proposed amendments were rejected by *viva voce* vote, including the proposal for cash payment of the soldiers' bonus, safeguards for bank depositors, the monetization of silver, home rule for Hawaii and Alaska, Congressional representation for the District of Columbia, and a moratorium on home loans. On the banking amendment, two former secretaries of the Treasury, William G. McAdoo and Carter Glass were opposed, the former demanding safeguards for depositors and the latter defending the majority report. Mrs. Daniel O'Day's child welfare plank was adopted, with only a few dissenters. Chairman Walsh then announced that nominations for the party's candidate for President of the United States were in order and at 1:55 P.M. the convention began the long session of nominating and seconding speeches and demonstrations which were to preface the roll-call. On the roll-call for nominations Alabama yielded to John E. Mack, of Poughkeepsie, New York, who placed in nomination Governor Franklin D. Roosevelt, of New York. The demonstration that followed his speech lasted 45 minutes. The nomination was seconded by Mrs. John C. Greenway, of Arizona. Arkansas yielded to Connecticut and Homer Cummings of the latter state seconded Mr. Roosevelt's nomination. California yielded to Texas and Senator Tom Connally took the platform to nominate John N. Garner of that State. A demonstration lasting 33 minutes followed in which the leading participants were the Texas and California delegations, which had been pledged to Garner. Colorado, through Thomas J. Morrissey, seconded the nomination of Roosevelt. Connecticut yielded to Massachusetts, whose Governor, Joseph B. Ely, went to the platform to nominate Alfred E. Smith. A demonstration followed which lasted one hour. Wild enthusiasm reigned as the Smith partisans paraded the floor of the convention hall. Delaware seconded the Roosevelt nomination as did Florida through Mrs. Beulah Hooks Hannah. At 5:55 P.M. the convention recessed to 9 P.M. the same evening.

Fourth Day: Evening Session.—The evening session got under way at 9:15 P.M. The chairman recognized Governor Richard B. Russell, of Georgia, who seconded the nomination of Governor Roosevelt. Idaho yielded to Virginia and the chair recognized Senator Carter Glass, who nominated former Governor Harry Flood Byrd, of Virginia. A twenty-minute demonstration followed. When Illinois was called, Michael J. Igoe nominated Melvin A. Traylor, Chicago banker. W. Emery Lancaster, of Illinois, seconded the nomination of Mr. Traylor. Edward F. Dunne, of Illinois, was next recognized. He occasioned surprise, applause and boos when he seconded the nomination of Governor Roosevelt. Maryland placed in nomination her favorite son, Governor Albert C. Ritchie and Missouri nominated former Senator James A. Reed, of that state. Governor William Murray of Oklahoma and Governor George White of Ohio completed the list of Presidential nominees and the convention grew tense as the moment arrived for the balloting on the nominees. The first roll-call came at 4:27 A.M., Friday, July 1, after eight candidates had been placed in nomination with speeches and floor demonstrations. On the first ballot, Governor Roosevelt received 666¼ to 201¾ for Smith; Garner, 99¼; Ritchie, 21; Murray, 23; Traylor, 42¼; Byrd, 25; Reed, 24; Baker, 8½; and White, 52. Polls of the Iowa, Minnesota, New York and other delegations were called for on the first ballot. On the second ballot the votes were: Roosevelt, 677¾; Smith, 194¼; Garner, 90¼; Traylor, 40¼; Ritchie, 23½; Byrd, 24; White, 50½; Baker, 8; Reed, 18; and Will Rogers, Oklahoma, 22.

On the second ballot the Oklahoma delegation voted for Will Rogers. On the third ballot there were more switches, but, as on the first and second ballots, no candidate received the two-thirds vote necessary to a nomination. The result of the third ballot was: Roosevelt, 682.79; Smith, 190¼; Garner, 101¼; Ritchie, 23½; White, 52½; Traylor, 40¼; Baker, 8½; Byrd, 24.96; Reed, 27½. Weary after their terrific grind from sunset to past sunrise, the delegates adjourned at 9 A.M., Friday, July 1, to 8:30 P.M.

Fifth Day: Evening Session.—The convention was called to order by Chairman Walsh at 9 P.M. The invocation was pronounced by Rev. John Thompson, of the Methodist Episcopal Chicago Home Missionary and Extension Society. At 9:22 P.M. the roll of States began. When California was reached, William Gibbs McAdoo asked to be recognized. The crowd anticipated the release of the delegates. In a brief speech, frequently interrupted from the gallery, Mr. McAdoo announced the release of the Garner delegates to Roosevelt. The California delegation of 44 votes was then cast for Roosevelt. When Illinois was reached, the withdrawal of Mr. Traylor was announced and the Illinois votes were cast for Roosevelt. Governor Ritchie announced his withdrawal when his state was reached and cast the vote of the Maryland delegation for Roosevelt. Missouri announced that Mr. Reed had released the delegation to Governor Roosevelt. Other favorite sons released their delegations, which went to Roosevelt. The exception was the delegates pledged to former Governor Smith, who stood fast. The result of the fourth ballot was as follows: Roosevelt, 945; Smith, 190½; Ritchie, 3½; White, 3; Baker, 5½; Cox, 1. The total votes cast on the fourth ballot was 1,148½; necessary to a choice, 766. The Smith votes on the fourth ballot came from: Connecticut, 16; Massachusetts, 36; New Jersey, 32; New York, 63; Ohio, 17; Pennsylvania, 14½; Rhode Island, 10; and Wisconsin, 2. Mr. Roosevelt was declared the nominee and the convention adjourned at 9:55 P.M.

Sixth Day: Chairman Walsh called the convention to order at 1:55 P.M. Rev. Roland W. Schloerb, Pastor Hyde Park Baptist Church, Chicago, led in prayer. Mrs. Walter Brower sang 'Swanee River' and then the convention proceeded to the business of nominating the candidate for Vice-President of the United States. As the roll of States began, Alabama yielded to Texas. Representative Sam Rayburn took the stand and introduced Alabama's own son, Representative John McDuffie, Democratic whip of the House, who placed in nomination the name of John Nance Garner, of Texas. State after State as the roll-call proceeded seconded the Garner nomination until Iowa was reached. Richard F. Mitchell, of Iowa, nominated General Matt A. Tinsley, of Iowa, who commanded the Rainbow Division in the World War. Ed. Dunn, also of Iowa, seconded the nomination of General Tinsley. Other States continued to second the Garner nomination. A demonstration for Garner followed the seconding of his candidacy by the Virgin Islands, the last delegation on the list. As the demonstration died down General Tinsley, the Iowa candidate, advanced to the platform and moved to make the nomination of Mr. Garner unanimous. The vote was a resounding chorus of 'Aye.' At 3:37 P.M., Senator Connally, acting chairman, proclaimed the nomination of John Nance Garner, of Texas, as the Democratic candidate for Vice-President.

At the opening of the session, it was announced that Governor Roosevelt was proceeding to the convention by airplane and that he would make his speech of acceptance to the assembled delegates before the close of the convention. During the session, the progress of the Governor's plane was reported from time to time. While awaiting the arrival of the Presidential nominee, the convention proceeded with the usual closing business, adopting resolutions thanking the Chicago police and adopting the rules fixing the membership and powers of the National Committee. John F. Curry, leader of Tammany, offered a resolution thanking Senator Walsh for the ability and fairness with which he had filled the post of permanent chairman. Senator Walsh responded with a brief speech of thanks. John H. McCooey, Brooklyn leader, introduced a resolution, which was adopted, thanking Clarence Cannon, of Missouri, for his able service as parliamentarian. Senator William H. King, of Utah, presented a resolution thanking John J. Raskob, the retiring chairman of the national committee. The only surviving delegate of the 1884 convention, which nominated Grover Cleveland, made a brief address. A news dispatch was read that Senator Norris, Republican, of Nebraska, would support Governor Roosevelt and was received with cheers. Later, on motion of Senator Gore, of Oklahoma, the convention thanked Senator Norris.

Senator Walsh brought the routine business to a halt with the announcement that an account of the arrival of Governor Roosevelt at the Chicago airport would be brought to the convention hall by radio. The convention crowd could hear the Governor's plane as it taxied across the field and heard the greetings of Mayor Cermak and the Governor's reply. When the connection was transferred back to the Stadium, Chairman Walsh disclosed that Mrs. Woodrow Wilson, widow of the last Democratic President, and Mrs. Thomas R. Marshall, widow of the wartime Vice-President, were in the audience. The crowd gave them an ovation. A committee to greet Governor Roosevelt as he reached the hall was named on motion of Daniel C. Roper, of the District of Columbia. Senator Walsh appointed John F. Curry, New York, Senator Tom Connally, Texas, Senator David I. Walsh, Massachusetts, former Governor Harry Flood Byrd, Virginia, and Governor George Dern, Utah. Mr. Roosevelt was conducted to the platform and received a tremendous ovation. Senator Walsh notified him of his nomination and introduced him to the assembled delegates in a brief and felicitous speech. Governor Roosevelt thereupon made his speech of acceptance before the convention and at its close received another outburst of applause. At 6:50 P.M. Senator Walsh expressed the thanks of the convention to Mayor Cermak and the people of Chicago and the convention adjourned *sine die*.

The Democratic Platform of 1932.—In a preamble, the platform decries the social and economic ills and places the chief causes of these conditions on the disastrous policies pursued by the Republican administrations since the World War. 'Believing that a party platform is a covenant with the people to be faithfully kept by the party when entrusted with power . . . we hereby declare this to be the Platform of the Democratic Party. The Democratic Party solemnly promises by appropriate action to put into effect the principles, policies and reforms herein advocated, and to eradicate the policies, methods and practices herein condemned. We advocate: *Economy.*—1.—An immediate and drastic reduction of governmental expenditures by abolishing useless commissions and offices, consolidating departments and bureaus, . . . to accomplish a saving of not less than 25 per cent. in the cost of Federal Government. . . .' *National Credit.*—2.—'Maintenance of the national credit by a Federal budget annually balanced on the basis of accurate executive estimates within revenues, raised by a system of taxation levied on the principle of ability to pay.' *Sound Currency.*—3.—'A sound currency to be preserved at all hazards, and an International Monetary Conference called . . . to consider the rehabilitation of silver and related questions.' *Unemployment Relief.*—5.—'Extension of Federal credit to the States to provide unemployment relief wherever the diminishing resources of the States make it impossible for them to provide for the needy. . . .'

Tariff.—'A competitive tariff for revenue, with a fact-finding Tariff Commission free from executive interference; reciprocal tariff agreements with other nations; and an international economic conference designed to restore international trade and facilitate exchange.'

Old Age Insurance.—'Unemployment old age insurance, under state laws.'

Agriculture.—'. . . Better financing of farm mortgages through reorganized farm bank agencies at low rates of interest, on an amortization plan . . . extension and development of the farm coöperative movement, and effective control of crop surpluses. . . . Enactment of every constitutional measure that will aid the farmers to receive for basic farm commodities, prices in excess of cost.'

National Defense.—'A navy and an army adequate for national defense.'

Anti-Trust Laws.—'Strict and impartial enforcement of the anti-trust laws to prevent monopoly and unfair trade practices, and revision thereof for the better protection of labor and the small producer and distributor.'

Eighteenth Amendment.—'We favor the repeal of the Eighteenth Amendment. To effect such repeal, we demand that the Congress immediately propose a constitutional amendment to purely representative conventions in the States called to act solely on that proposal. We urge the enactment of such measures by the several States as will actually promote temperance, effectively prevent the return of the saloon and bring the liquor traffic into the open under complete supervision and control by the States. We demand that the Federal Government effectively exercise its power to enable the States to effectually protect themselves against importation of intoxicating liquors in violation of their laws. Pending repeal, we favor immediately modification of the Volstead Act to legalize the manufacture and sale of beer and other beverages of such alcoholic content as is permissible under the Constitution and to provide therefrom a proper and needed revenue.'

Stock Market.—'Protection of the investing public by requiring to be filed with the government and carried in advertisements of all offerings of foreign and domestic stocks and bonds true information as to bonuses, commissions, principal invested and interests of sellers.'

Public Utilities.—'Regulation to the full extent of the Federal power of: (a) Holding companies which sell securities in interstate commerce. (b) Rates of utility companies operating across state lines. (c) Exchange trading in securities and commodities.'

Bank Supervision.—'Quicker methods of realizing on assets for the relief of depositors of suspended banks and a more rigid supervision of national banks . . . the severance of affiliated securities companies and the divorce of investment banking from commercial banks. . . .'

War Veterans' Aid.—'The full measure of justice and generosity for all war veterans who have suffered disability or disease caused by or resulting from actual service in time of war, and for their dependents.'

Foreign Relations.—'A firm foreign policy . . . the settlement of international disputes by arbitration . . . adherence to the World Court, with the pending reservations. . . .'

Philippines.—'Independence for the Philippines; ultimate statehood for Porto Rico; the employment of American citizens in the operation of the Panama Canal.'

Judicial Reform.—'Simplification of legal procedure and reorganization of the judicial system to make the attainment of justice speedy, certain and at less cost.'

Corrupt Practices.—'Continuous publicity of political contributions and expenditures . . . and severe penalties for misappropriation of campaign funds. . . .'

We condemn 'the Hawley-Smoot tariff law, the prohibitive rates of which have resulted in retaliatory action by more than forty countries. . . .'

CONCLUSION: 'To accomplish these purposes and to recover economic liberty we pledge the nominees of this convention and the best effort of a great party whose founder announced the doctrine which guides us now, in the hour of our country's need, equal rights to all, special privileges to none.'

Insert in Vol. **III**, following page **604**
(Discard **1932** Temporary Pages)

Democratic National Convention of 1936

The Twenty-Sixth National Convention of the Democratic party, meeting in the Municipal Auditorium, Philadelphia, Pennsylvania, June 23–27, 1936, renominated President Franklin Delano Roosevelt and Vice-President John Nance Garner by acclamation. It adopted a platform vigorously endorsing and promising a continuance of the New Deal, while at the same time leaving the President free to evolve the details of his program. Bearing the earmarks of Roosevelt's literary style and political thinking, the document pledged the Democratic party to continue to seek remedies to social and economic problems within the framework of the Constitution, but if this proved impossible, to seek such clarifying amendments as would enable Congress and the State legislatures, each within its proper sphere, to enact laws adequately regulating commerce, protecting public health and safety, and safeguarding economic security. The party expressed its 'firm determination to achieve a balanced budget and the reduction of the national debt at the earliest possible moment.' The Democratic position, as remodeled by President Roosevelt, was defined as that of a liberal party avoiding on the one hand 'the despotism of Communism, and on the other, the menace of concealed Fascism.' No mention was made of the NRA, the AAA, the Supreme Court, the Silver Purchase Act, the League of Nations, the World Court, or the 'holding company death sentence.' The preamble, like that of the Republican platform, paraphrased parts of the Declaration of Independence. The preliminary draft had been directed by Roosevelt and Senator Robert F. Wagner of New York, Subsequent editions of the platform were supervised by the President with the aid of the telephone and the airplane.

Two days before the convention was to open, Alfred E. Smith, the party's standard bearer in 1928, and four other Democrats—former Secretary of State Bainbridge Colby, former Senator James A. Reed of Missouri, former Governor Joseph B. Ely of Massachusetts, and Daniel F. Cohalan—sent a message to the delegates urging them to repudiate President Roosevelt and the New Deal and to nominate a 'genuine Democrat,' implying that otherwise they would bolt the party. The strongly pro-Roosevelt Democrats present at the convention, however, appeared little dismayed either by this defection on their Right or by imminent attacks from the Left to be launched by the new Union party. Reveling in their unwonted status of the 'ins,' the 1,100 Democratic delegates and their friends at the convention were much gayer, noisier—and seemingly more affluent—than the Republicans who had met in Cleveland.

First Day.—The convention was called to order at 1:02 P.M. (Eastern daylight time), Tuesday, June 23, by James A. Farley, Postmaster-General of the United States and chairman of the Democratic National Committee. The Most Rev. Hugh L. Lamb, Auxiliary Bishop of the Roman Catholic Diocese of Philadelphia, delivered the opening prayer; Chairman Farley asked the delegates to stand for one minute in memory of Will Rogers, late humorist and cracker-barrel philosopher, who had graced previous Democratic conventions; Frederick Yagle, of the Metropolitan Opera Company, sang 'The Star-Spangled Banner' and a Philadelphia glee club sang 'America the Beautiful'; Mayor S. Davis Wilson gave an address of welcome; and then Chairman Farley made a speech which promptly set the Democrats on their way. 'The question before the American people,' he said, 'is clear-cut and cannot be disguised. The question is: Shall we continue the New Deal which has rescued our country from disaster and despair or shall the government be turned back to the old dealers who wrecked it?' After a demonstration for President Roosevelt and some further convention business, a recess was called until 8 P.M.

At the evening session the delegates gathered to listen to three hours of oratory, to cheer every mention of the name of President Roosevelt, and to march and make noise until midnight. Governor George H. Earle of Pennsylvania, greeting his fellow Democrats and explaining why he had left the Republican ranks four years earlier, won applause and the assurance from his friends that he was presidential timber for 1940. Senator Alben W. Barkley of Kentucky, the temporary chairman, as in 1932, launched into a well-phrased keynote address. The Supreme Court he assailed for a 'tortured interpretation' of the Constitution; former President Hoover he referred to as 'the voice from the grave at Palo Alto;' the 'three long years' of Roosevelt's administration, assailed by Senator Steiwer, the Republican keynoter and made much of at Cleveland, he contrasted with the 'twelve long years' of Harding, Coolidge, and Hoover. 'Three long years of Republican superiority,' he charged, 'found local charity and relief everywhere collapsing, and millions of human beings were begging for bread, raiment and shelter, and countless numbers of them found sleep only by the roadside, or upon park benches from which they crawled with the rising sun like dogs from a kennel. In 1929 the debauch of the Coolidge-Hoover revelry and the "twelve long years" of Hamiltonian exploitation were over. Then came Franklin Roosevelt and assumed the heaviest burden that ever descended upon any man since Washington knelt in the snow and Lincoln watched the Confederate flags across the Potomac. . . . Faith returned. Confidence revived. National courage rose like the sun at dawn. . . . Americanism returned to America.'

Second Day.—At a short afternoon session—important proceedings were reserved for the best radio time—the delegates were entertained by a number of vaudevillians and radio celebrities, with Eddy Dowling serving as master of ceremonies. In the evening the scheduled election of Senator Joseph T. Robinson of Arkansas as permanent chairman was held up by a deadlock in the credentials committee over a contest among Minnesota delegates (permanent officers not being able to be elected until the permanent roll was made up). The convention entertained itself with singing, marching, and other demonstrations until finally at 10:20 Temporary Chairman Barkley solved the problem by recognizing Senator Robinson (who assumed the permanent chairmanship the following day) simply as a delegate. In this capacity, then, the veteran Democratic leader, who had been 'Al' Smith's running mate in 1928, delivered his address. He dissected the Republican platform and Governor Landon's views and found them unhealthy, denounced Senator Steiwer, who had attacked the New Deal in Cleveland but had voted for most of its legislation in Washington, and charged the Supreme Court with slowing up national recovery by invalidating such major New Deal measures as the NRA, the AAA, and the Guffey Coal Act. 'We recognize that the decisions of the Supreme Court until reversed are final,' he said, 'and we abide by them. Nevertheless, we do not regard the court as above and beyond those factors and causes which naturally influence the minds of human beings.' With regard to the minimum wage law of New York State, upset by a five-to-four decision, he averred that 'the bar of the United States overwhelmingly repudiates the denial by the Supreme Court of the power to regulate maximum hours and minimum wages. By the decision the right of private contract is not fortified and strengthened. In a practical sense it is weakened and destroyed.' He went on to assert that everyone, even the strongest opponents of the Democratic party, 'now seeks concurrence in a plan to overcome a decision which . . . if permitted to stand will prove oppressive.'

Third Day.—At the Democratic convention of 1912, J. B. (Champ) Clark, speaker of the House of Representatives, failed to receive the party's nomination for the nation's presidency because, though he did receive a majority of the delegates' votes, he failed to marshal the necessary two-thirds. At the 1936 convention the abrogation of this two-thirds rule, which had stood for 104 years as a creator of discord, deadlocks, and confusion, was proposed by Champ Clark's son, Senator Bennett Champ Clark of Missouri, chairman of the rules committee, with the backing of President Roosevelt and the administration leaders in control of the convention. In its place was offered a rule providing for a majority vote on all questions, including the nomination of the president and vice-president. To appease the Southern Democrats for this lessening of the power in the convention of the Solid South, a rider was added instructing the Democratic National Committee to evolve a system whereby representation in the party convention would take due account of the Democratic strength of each State. The new rule—which Senator Clark pointed out would have no practical effect at the present convention, but was desired rather as a precedent for the 1940 and subsequent conventions—was approved by *viva voce* vote.

The next order of business was a reading of the platform by Senator Wagner, chairman of the committee on resolutions. The delegates then adopted it by acclamation, without any minority dissenting report's having been presented.

A feature of Thursday's proceedings was a disturbance caused by about thirty young 'Al Smith Democrats,' bearing banners, in the second gallery of the hall. After some verbal and fistic clashes the demonstrators were chased out by the police. According to one report they were in reality registered Republicans from South Philadelphia.

Fourth Day.—At 1:25 P.M., Friday, Judge John E. Mack, a boyhood friend of the President, who had nominated him in 1932, again placed Roosevelt in nomination. As he closed with the words: 'I give you as your candidate for president, no longer a citizen merely of one State, but a son of all forty-eight States, Franklin D. Roosevelt,' those present threw off all restraint—a quality easily dismissed at party conventions—in a tumultuous demonstration lasting sixty-nine minutes. The demonstrometer which the Columbia Broadcasting System had installed to measure noise, reached 100 (many points above the best Republican record). Enthusiasm, however, became an ordeal that night as hours went by in seconding speeches—one from a representative from each of the forty-eight States and each of the territorial and insular possessions of the union. Governor Herbert H. Lehman of New York, one of the seconders, was himself accorded a great ovation in an attempt to stampede him into abandoning his announced intention of not standing for reelection. The presence of his name on the ticket was considered invaluable in carrying New York for the Democrats. (Subsequently, in response to further pressure from party leaders and a letter from President Roosevelt, Mr. Lehman consented to run again.)

Fifth Day.—At last, at 12:42 A.M., June 27, the seconding over and no other nomination having been made, and on a motion to suspend the rules, Roosevelt was renominated by acclamation. The convention then recessed until later in the day and when it met for this, its final session, Vice-President Garner was also renominated by acclamation. His name was presented by Governor James A. Allred of Texas, and the weary delegates were subjected this time to only seventeen seconding speeches. The convention adjourned at 2:20 P.M. Later that afternoon James A. Farley was re-elected chairman of the Democratic National Committee.

In a sense, however, the week's proceedings had been merely a build-up for the big event of Saturday evening—President Roosevelt's speech of acceptance. More than a hundred thousand persons packed into the stadium of the University of Pennsylvania to witness the event, while millions listened over the radio. Chairman Farley first introduced Senator Harrison of Mississippi, who acted for Senator Barkley (who had already sailed for Europe) in notifying Garner of his renomination. The Vice-President accepted in a brief speech and renewed his pledge of loyalty to President Roosevelt and the New Deal. Senator Robinson was next introduced, to notify President Roosevelt. At exactly 10 o'clock the President began his speech of acceptance, which was more in the nature of a re-dedication to the New Deal than an outline of a definite program. Just as the fathers of the Republic had achieved political freedom from the eighteenth century royalists, he averred, so was it the function of those who stood with him in the present campaign to establish the economic freedom which also the founding fathers had desired but which had been lost in the industrial and corporate growth of the nineteenth and twentieth centuries. 'The economic royalists complain that we seek to overthrow the institutions of America,' the President further explained. 'What they really complain of is that we seek to take away their power. . . . In vain they seek to hide behind the flag and the Constitution. . . . Now, as always, the flag and the Constitution stand for democracy, not tyranny; for freedom, not subjection, and against a dictatorship by mob rule and the overprivileged alike.'

Text of 1936 Democratic Platform.—'We hold this truth to be self-evident—that the test of a representative government is its ability to promote the safety and happiness of the people.

'We hold this truth to be self-evident—that twelve years of Republican leadership left our nation sorely stricken in body, mind and spirit; and that three years of Democratic leadership have put it back on the road to restored health and prosperity.

'We hold this truth to be self-evident—that twelve years of Republican surrender to the dictatorship of a privileged few have been supplanted by a Democratic leadership which has returned the people themselves to the places of authority, and has revived in them new faith and restored the hope which they had almost lost.

'We hold this truth to be self-evident—that this three-year recovery in all the basic values of life and the re-establishment of the American way of living has been brought about by humanizing the policies of the Federal Government as they affect the personal, financial, industrial and agricultural well-being of the American people.

'We hold this truth to be self-evident—that government in a modern civilization has certain inescapable obligations to its citizens, among which are: (1) Protection of the family and the home. (2) Establishment of a democracy of opportunity for all the people. (3) Aid to those overtaken by disaster.

'These obligations, neglected through twelve years of the old leadership, have once more been recognized by American government. Under the new leadership they will never be neglected.

'For the protection of the family and the home:

'(1) We have begun and shall continue the successful drive to rid our land of kidnappers and bandits. We shall continue to use the powers of government to end the activities of the malefactors of great wealth who defraud and exploit the people.'

Savings and Investment.—'(2) We have safeguarded the thrift of our citizens by restraining those who would gamble with other people's savings, by requiring truth in the sale of securities; by putting the brakes upon the use of credit for speculation; by outlawing the manipulation of prices in stock and commodity markets; by curbing the overweening power and unholy practices of utility holding companies; by insuring 50,000,000 bank accounts.'

Old Age and Social Security.—'(3) We have built foundations for the security of those who are faced with the hazards of unemployment and old age; for the orphaned, the crippled and the blind. On the foundation of the Social Security Act we are determined to erect a structure of economic security for all our people, making sure that this benefit shall keep step with the ever-increasing capacity of America to provide a high standard of living for all its citizens.'

Consumer.—'(4) We will act to secure to the consumer fair value, honest sales and a decreased spread between the price he pays and the price the producer receives.'

Rural Electrification.—'(5) This administration has fostered power rate yardsticks in the Tennessee Valley and in several other parts of the nation. As a result electricity has been made available to the people at a lower rate. We will continue to promote plans for rural electrification and for cheap power by means of the yardstick method.'

Housing.—'(6) We maintain that our people are entitled to decent, adequate housing at a price which they can afford. In the last three years the Federal Government, having saved more than 2,000,000 homes from foreclosure, has taken the first steps in our history to provide decent housing for people of meagre incomes. We believe every encouragement should be given to the building of new homes by private enterprise; and that the government should steadily extend its housing program toward the goal of adequate housing for those forced through economic necessities to live in unhealthy and slum conditions.'

Veterans.—'(7) We shall continue just treatment to our war veterans and their dependents.

'For the establishment of a democracy of opportunity:

Agriculture.—'We have taken the farmers off the road to ruin.

'We have kept our pledge to agriculture to use all available means to raise farm income toward its pre-war purchasing power. The farmer is no longer suffering from 15-cent corn, 3-cent hogs, 2½-cent beef at the farm, 5-cent wool, 30-cent wheat, 5-cent cotton and 3-cent sugar.

'By Federal legislation we have reduced the farmers' indebtedness and doubled his net income. In co-operation with the States and through the farmers' own committees we are restoring the fertility of his land and checking the erosion of his soil. We are bringing electricity and good roads to his home.

'We will continue to improve the soil conservation and domestic allotment program with payments to farmers.

'We will continue a fair-minded administration of agricultural laws, quick to recognize and meet new problems and conditions. We recognize the gravity of the evils of farm tenancy, and we pledge the full co-operation of the government in the refinancing of farm indebtedness at the lowest possible rates of interest and over a long term of years.

'We favor the production of all the market will absorb, both at home and abroad, plus a reserve supply sufficient to insure fair prices to consumers; we favor judicious commodity loans of seasonal surpluses; and we favor assistance within Federal authority to enable farmers to adjust and balance production with demand, at a fair profit to the farmers.

'We favor encouragement of sound, practical farm co-operatives.

'By the purchase and retirement of 10,000,000 acres of submarginal land, and assistance to those attempting to eke out an existence upon it, we have made a good beginning toward proper land use and rural rehabilitation.

'The farmer has been returned to the road to freedom and prosperity. We will keep him on that road.'

Labor.—'We have given the army of America's industrial workers something more substantial than the Republicans' dinner pail full of promises. We have increased the worker's pay and shortened his hours; we have undertaken to put an end to the sweated labor of his wife and children; we have written into the law of the land his right to collective bargaining and self-organization free from the interference of employers; we have provided Federal machinery for the peaceful settlement of labor disputes.

'We will continue to protect the worker and we will guard his rights, both as wage-earner and consumer, in the production and consumption of all commodities, including coal and water power and other natural-resource products.

'The worker has been returned to the road to freedom and prosperity. We will keep him on that road.'

Business.—'We have taken the American business man out of the red. We have saved his bank and given it a sounder foundation; we have extended credit; we have lowered interest rates; we have undertaken to free him from the ravages of cut-throat competition.

'The American business man has been returned to the road to freedom and prosperity. We will keep him on that road.'

Youth.—'We have aided youth to stay in school; given them constructive occupation; opened the door to opportunity which twelve years of Republican neglect had closed.

'Our youth have been returned to the road to freedom and prosperity. We will keep them on that road.'

Monopoly and Concentration of Economic Power.—'Monopolies and the concentration of economic power, the creation of Republican rule and privilege, continue to be the master of the producer, the exploiter of the consumer, and the enemy of the independent operator. This is a problem challenging the unceasing effort of untrammeled public officials in every branch of the government. We pledge vigorously and fearlessly to enforce the criminal and civil provisions of the existing anti-trust laws, and to the extent that their effectiveness has been weakened by new corporate devices or judicial construction, we propose by law to restore their efficacy in stamping out monopolistic practices and the concentration of economic power.'

Aid to Those Overtaken by Disaster.—'We have aided and will continue to aid those who have been visited by widespread drought and floods and have adopted a nation-wide flood control policy.'

Unemployment.—'We believe that unemployment is a national problem, and that it is an inescapable obligation of our government to meet it in a national manner. Due to our stimulation of private business more than five million people have been re-employed, and we shall continue to maintain that the first objective of a program of economic security is maximum employment in private industry at adequate wages. Where business fails to supply such employment we believe that work at prevailing wages should be provided in co-operation with State and local governments on useful public projects, to the end that the national wealth may be increased, the skill and energy of the worker may be utilized, his morale maintained and the unemployed assured the opportunity to earn the necessities of life.'

The Constitution.—'The Republican platform proposes to meet many pressing national problems solely by action of the separate States. We know that drought, dust storms, floods, minimum wages, maximum hours, child labor and working conditions in industry, monopolistic and unfair business practices cannot be adequately handled exclusively by forty-eight separate State legislatures, forty-eight separate State administrations and forty-eight separate State courts. Transactions and activities which inevitably overflow State boundaries call for both State and Federal treatment.

'We have sought and will continue to seek to meet these problems through legislation within the Constitution.

'If these problems cannot be effectively solved by legislation within the Constitution, we shall seek such clarifying amendment as will assure to the legislatures of the several States and to the Congress of the United States, each within its proper jurisdiction, the power to enact those laws which the State and Federal legislatures, within their respective spheres, shall find necessary, in order adequately to regulate commerce, protect public health and safety and safeguard economic security. Thus we propose to maintain the letter and spirit of the Constitution.'

The Merit System in Government.—'For the protection of government itself and promotion of its efficiency we pledge the immediate extension of the merit system through the classified civil service—which was first established and fostered under Democratic auspices—to all non-policy-making positions in the Federal service.

'We shall subject to the civil service law all continuing positions which, because of the emergency, have been exempt from its operation.'

Civil Liberties.—'We shall continue to guard the freedom of speech, press, radio, religion and assembly which our Constitution guarantees; with equal rights to all and special privileges to none.'

Government Finance.—'The administration has stopped deflation, restored values and enabled business to go ahead with confidence.

'When national income shrinks, government income is imperiled. In reviving national income, we have fortified government finance. We have raised the public credit to a position of unsurpassed security. The interest rate on government bonds has been reduced to the lowest point in twenty-eight years. The same government bonds which in 1932 sold under 83 are now selling over 104.

'We approve the objective of a permanently sound currency so stabilized as to prevent the former wide fluctuations in value which injured in turn producers, debtors, and property owners on the one hand, and wage earners and creditors on the other, a currency which will permit full utilization of the country's resources. We assert that today we have the soundest currency in the world.

'We are determined to reduce the expenses of government. We are being aided therein by the recession of unemployment. As the requirements of relief decline and national income advances, an increasing percentage of Federal expenditures can and will be met from current revenues, secured from taxes levied in accordance with ability to pay.'

Foreign Policy.—'In our relationship with other nations, this government will continue to extend the policy of the good neighbor. We reaffirm our opposition to war as an instrument of national policy, and declare that disputes between nations should be settled by peaceful means. We shall continue to observe a true neutrality in the disputes of others; to be prepared resolutely to resist aggression against ourselves; to work for peace and to take the profits out of war; to guard against being drawn, by political commitments, international banking or private trading, into any war which may develop anywhere.

'We shall continue to foster the increase in our foreign trade which has been achieved by this administration; to seek by mutual agreement the lowering of those tariff barriers, quotas and embargoes which have been raised against our exports of agricultural and industrial products; but continue as in the past to give adequate protection to our farmers and manufacturers against unfair competition or the dumping on our shores of commodities and goods produced abroad by cheap labor or subsidized by foreign governments.'

The Issue.—'The issue in this election is plain. The American people are called upon to choose between a Republican administration that has and would again regiment them in the service of privileged groups and a Democratic administration dedicated to the establishment of equal economic opportunity for all our people.

'We have faith in the destiny of our nation. We are sufficiently endowed with natural resources and with productive capacity to provide for all a quality of life that meets the standards of real Americanism.

'Dedicated to a government of liberal American principles, we are determined to oppose equally the despotism of Communism and the menace of concealed Fascism.

'We hold this final truth to be self-evident—that the interests, the security and the happiness of the people of the United States of America can be perpetuated only under Democratic government as conceived by the founders of our nation.'

NOV [illegible] 1940

TEMPORARY PAGES FOR NELSON'S L. L. ENCYCLOPEDIA

Insert in Vol. **III,** following page **604**
(Discard **1936** Temporary Pages)

Democratic National Convention of 1940 CFJ

The Twenty-seventh National Convention of the Democratic party, meeting in the Stadium, Chicago, July 15–19, 1940, renominated President Franklin D. Roosevelt and nominated Secretary of Agriculture Henry A. Wallace for the vice-presidency. When the convention met, the nomination of Roosevelt for a tradition-breaking third term was assured. The question—on which he had steadfastly maintained silence—of whether he would run for re-election had long been a matter of interest and political importance. When, on the convention's second day, he finally declared, through Senator Barkley, that he was not a candidate, it was generally understood that he would accept the nomination if it were tendered him. Had he made such a statement earlier, the candidacy of other Democrats might have been developed. As it was, there was little opposition to the convention's 'drafting' him. Despite some Democratic disapproval of the unprecedented third term, which the Republicans were expected to make a campaign issue, the delegates obviously considered that the serious state of affairs confronting America, and the experience, ability, and popularity of Mr. Roosevelt warranted a departure from precedent. In his radio address to the convention just before it adjourned, the President explained both why he had so long been silent concerning his candidacy and why he felt impelled to accede to the convention's 'draft.'

Since Vice-President Garner had come to oppose several aspects of the New Deal it was accepted that he would not again be Roosevelt's running-mate, and Secretary Wallace, the President's personal selection, was given second place on the ticket. The party platform eulogized the New Deal, promised its continuance and extension, stressed national defense, and proclaimed allegiance to political democracy. A strong statement against involvement in war was included, representing compromise between 'isolationists,' led by Senators Burton K. Wheeler of Montana and David I. Walsh of Massachusetts, and 'interventionists,' speaking for the administration, who favored a specific pledge of aid to Great Britain and a statement in favor of compulsory military training (the latter subject was not mentioned in the platform). A plank expected to furnish considerable campaign material was that on power.

Monday. — Postmaster-General James A. Farley, as chairman of the Democratic National Committee, called the first session of the convention to order precisely at noon on Monday, July 15. After the most Rev. Samuel H. Stritch, archbishop of Chicago, had delivered the invocation, Phil Reagan sang 'The Star-Spangled Banner,' then Lawrence W. Robert, Jr., secretary of the National Committee, read the formal call for the convention. In the speech of Mayor Edward J. Kelly of Chicago welcoming the delegates to the city, the mention of the name of President Roosevelt elicited a long round of applause. Acting for Governor Horner, who was too ill to attend, Senator Scott W. Lucas of Illinois welcomed the convention in behalf of the State. Chairman Farley called for a rising tribute in memory of two Democratic leaders who had died since the previous convention, Senator Joseph T. Robinson of Arkansas and W. Forbes Morgan, of New York, treasurer of the National Committee; he then presented Mrs. J. Hamilton Lewis, widow of the former Illinois senator. At 12:50 P.M. the convention recessed until evening.

The evening session, like that earlier in the day, proved rather listless. Mr. Farley lauded the party record, spoke of the need for strong national defense, and declared that Democrats were agreed that 'no American boy will be sent to die on the battlefields of Europe.' William B. Bankhead, speaker of the House of Representatives, accepted the gavel from Farley and, as temporary chairman of the convention, delivered the customary keynote address. In this he eulogized the New Deal legislative reforms, attacked the Republican platform as a 'document filled with equivocation and political subterfuge,' denied that the Democrats had neglected national defense, and denounced Hitler, Mussolini, and dictatorships in general. Assailing Republican attempts to pin upon the Democrats the label of the 'war party,' he praised the Democratic administration for its precautions 'to keep us out of involvement in a foreign war.'

Tuesday.—The convention continued in relative apathy on its second day. Much of the excitement and fun, not to mention the fight, generally characterizing such Democratic gatherings was lacking, chiefly because the renomination of President Roosevelt was regarded as a certainty. Polls on Tuesday indicated that 900 of the 1,100 votes would be cast for Roosevelt. Nevertheless there was some resentment apparent against the expected endorsement of a third term; over the fact that the President had not yet stated his exact position with regard to the nomination; and because many delegates chafed at their puppet-like role under administration leadership. Secretary of Commerce Harry L. Hopkins, quartered at the Blackstone Hotel—not far from the Stevens Hotel headquarters of the convention and of the Democratic National Committee—was in contact with the White House by a private telephone line. He and Senator James F. Byrnes of South Carolina were in charge of the New Deal reliables whose strategy, apparently, was to bring about the 'drafting' of Mr. Roosevelt for the nomination, preferably by actual acclamation, without the latter's appearing in any way to have sought it. There was some interest in what course would be taken by Mr. Farley, who had considerable influence with the convention and apparently did not intend to release his pledged delegates on the first ballot, and conjectures as to who would receive the vice-presidential nomination.

The highlight of the day's events was the speech, during the evening session, of Senator Alben W. Barkley of Kentucky, Senate majority leader, accepting the permanent chairmanship of the convention and closing with a message—at long last—from President Roosevelt. Praising the record of the New Deal administration, Senator Barkley declared that the Democratic party 'has been tested in the crucible of faith and achievement.' In contrast he attacked the Republican platform, which, he asserted, 'appeared to have been written in mud by the migratory feet of a weasel,' and he termed

Wendell Willkie, the Republican nominee, a 'political chameleon' because he had left the Democratic ranks only two years before. Likewise, he reviewed the New Deal preparedness record and lauded the administration's efforts to avoid involvement in war. Half-way through his address the mention of the name of President Roosevelt touched off a spontaneous twenty-five-minute demonstration. At the close of his speech he stated:

'I and other close friends of the President have long known that he has no wish to be a candidate again. We know, too, that in no way whatsoever has he exerted any influence in the selection of delegates, or upon the opinions of delegates, to the convention. Tonight, at the specific request and authorization of the President, I am making this simple fact clear to this convention. The President has never had, and has not today, any desire or purpose to continue in the office of president, to be a candidate for that office, or to be nominated by the convention for that office. He wishes in all earnestness and sincerity to make it clear that all of the delegates to this convention are free to vote for any candidate. That is the message I bear to you from the President of the United States.'

As Barkley concluded, another demonstration began, the delegates shouting 'We want Roosevelt,' and the third term draft movement was vigorously under way.

Wednesday.—On Wednesday evening the Democratic platform was read to the convention by Senator Robert F. Wagner of New York, chairman of the resolutions committee. Representative Elmer J. Ryan, a delegate from Minnesota and former law partner of Governor Harold Stassen, who had been Wendell Willkie's floor manager at Philadelphia, thereupon proposed an amendment, to the effect that the party maintain its 'historic position,' written into the platform of 1896, that no man be eligible for a third presidential term. Despite some approval, the amendment was voted down with a chorus of boos, and the entire platform was then adopted, with only scattering votes in opposition, at 9:30 P.M.

When, next, 'Alabama' was called on the roll, Senator Lister Hill of that State placed President Roosevelt in nomination for a third term. 'This is no time,' declared Senator Hill, 'for untried hands to pilot the ship of state.' Pandemonium quickly broke out as the convention indicated its intention of ratifying the renomination. Hats were thrown into the air, torn paper fluttered over the delegates' heads, huge banners with pictures of Roosevelt and demands for his nomination appeared in the aisles, and the great pipe organ thundered out 'Franklin D. Roosevelt Jones.' After the demonstration had lasted about half an hour the roll call was resumed and Arizona joined Alabama in the Roosevelt renomination. When, however, Arkansas yielded to Virginia, Senator Carter Glass, 82-year-old conservative Democrat, placed in nomination James A. Farley, terming him 'an incomparable Democrat.' The venerable Virginia statesman, whom President Roosevelt had often called an 'unreconstructed rebel,' provoked a roar of booing by quoting Thomas Jefferson in opposition to a third term, but both he and Farley received a genuine, though short, ovation. A Baltimore delegate, Edward J. Colgan, Jr., nominated Senator Millard R. Tydings of Maryland, and Wright Morrow, of Texas, nominated John Nance Garner—both names being received with boos from the convention.

Thursday-Friday.—At 12:14 A.M., Thursday, the voting began. The first ballot resulted in 946 13/30 votes for Roosevelt, 72 27/30 for Farley, 61 for Garner, 9½ for Tydings, and 5⅔ for Cordell Hull. Garner's and Tydings' names had been withdrawn when Farley stepped forward to move that the rules be suspended and Roosevelt nominated 'by acclamation.' The nomination was thereupon made unanimous, at 1:38 A.M., July 18.

When, at the evening session, the convention proceeded to nominate a vice-president, the delegates proved restive under further dictation by the administration. Roosevelt's choice for a running-mate was Secretary of Agriculture Henry A. Wallace. Previously nearly a score of other men had been considered for the vice-presidency, but now Secretary Hopkins transmitted instructions to the party machine leaders that Wallace was to be named on the first ballot. If that were not effected, there was the unwelcome possibility that President Roosevelt, who had postponed his speech accepting renomination until after a vice-president had been nominated, might further postpone or even cancel his speech.

On the convention floor, however, mention of Wallace's name was greeted with hearty boos. Since other candidates had withdrawn, only he, Speaker Bankhead, and Paul McNutt were left in the race. The latter two were cheered vociferously—McNutt receiving the greatest ovation of the convention before he was permitted to withdraw. Nevertheless the steamroller prevailed and Wallace was nominated on the first ballot. His receiving only 627 of the 1,100 votes, however, indicated the strength of the rebellion against the President's expressed will.

A feature of the evening's events was a speech by Mrs. Franklin D. Roosevelt, who had flown to Chicago by plane. The first lady, enthusiastically welcomed by the convention, told the delegates that the press of duties would prevent her husband from making an active campaign, and urged united action by all Americans in view of the grave state of world affairs.

Secretary Wallace had received the vice-presidential nomination shortly after midnight, and at 12:20, Friday morning, July 19, President Roosevelt began his speech to the convention, broadcast by radio from the White House. Accepting nomination for a third term as a call to national service, he announced, at the same time, that he would not campaign or engage in strictly political debate. He disclosed that in 1936, when re-elected, he had intended to retire to private life at the end of his second term. Although in the spring of 1939, he said, a great war in Europe had become a probability, 'When the conflict first broke out last September it was still my intention to announce clearly and simply . . . that under no conditions would I accept re-election. . . . It soon became evident, however, that such a public statement on my part would be unwise from the point of view of sheer public interest. . . . Thinking solely of the national good and of the international scene, I came to the reluctant conclusion that such declaration should not be made before the national convention. It was accordingly made to you within an hour after the permanent organization of the convention.'

The real reason for his acceptance of the nomination, he explained, was that the country needed every citizen. 'Some form of selection by draft is as necessary and as fair today as it was in 1917 and 1918. . . . Lying awake, as I have on many nights, I have asked myself whether I have the right, as commander in chief of the army and navy, to call on men and women to serve their country or to train themselves to serve and, at the same time, decline to serve my country in my own personal capacity if I am called upon to do so by the people of my country.' Only the people, he said, can draft a president. 'If such a draft should be made upon me, I say in the utmost simplicity, I will, with God's help, continue to serve with the best of my ability and with the fullness of my strength.'

After a demonstration following the President's speech, the convention adjourned at 1 A.M. with the singing of 'The Star-Spangled Banner.' Later in the day Mr. Farley, re-elected as Democratic national chairman, announced that he would serve only until August 17, when he expected to become president of a syndicate formed to purchase the New York Yankees baseball club.

Democratic Platform of 1940.—'. . . Toward the modern fulfillment of the American ideal, the Democratic party, during the last seven years, has labored successfully—

'1: To strengthen democracy by defensive preparedness against aggression, whether by open attack or secret infiltration;

'2: To strengthen democracy by increasing our economic efficiency; and

'3: To strengthen democracy by improving the welfare of the people. These three objectives are one and inseparable. No nation can be strong by armaments alone. . . .

'We are proud of our record. Therefore the party in convention assembled indorses wholeheartedly the brilliant and courageous leadership of President Franklin D. Roosevelt and his statesmanship and that of the Congress for the past seven trying years. . . .'

Foreign Policy.—'The American people are determined that war, raging in Europe, Asia and Africa, shall not come to America. We will not participate in foreign wars, and we will not send our army, naval or air forces to fight in foreign lands outside of the Americas except in case of attack. We favor and shall rigidly enforce and defend the Monroe Doctrine.

'The direction and aim of our foreign policy has been and will continue to be the security and defense of our own land and the maintenance of its peace. . . . It is a tribute to the President's foresight and action that our defense forces are today at the peak of their peacetime effectiveness.

'Weakness and unpreparedness invite aggression. We must be so strong that no possible combination of powers would dare to attack us. We propose to provide America with an invincible air force, a navy strong enough to protect all our sea coasts and our national interests and a fully equipped and mechanized army. We shall continue to co-ordinate these implements of defense with the necessary expansion of industrial productive capacity and with the training of appropriate personnel. . . .

'We denounce and will do all in our power to destroy the treasonable activities of disguised anti-democratic and un-American agencies. . . .

'To insure that our armaments shall be implements of peace rather than war, we shall continue our traditional policies of the good neighbor; observe and advocate international respect for the rights of others and for treaty obligations; cultivate foreign trade through desirable trade agreements; and foster economic collaboration with the republics of the Western Hemisphere.

'In self-defense and in good conscience, the world's greatest democracy cannot afford heartlessly or in a spirit of appeasement to ignore the peace-loving and liberty-loving peoples wantonly attacked by ruthless aggressors. We pledge to extend to these peoples all the material aid at our command, consistent with law and not inconsistent with the interests of our own national self-defense—all to the end that peace and international good faith may yet emerge triumphant.

'We do not regard the need for preparedness a warrant for infringement upon our civil liberties, but on the contrary we shall continue to protect them. . . .'

The Land and the Farmer.—'. . . We pledge ourselves: To make parity as well as soil conservation payments until such time as the goal of parity income for agriculture is realized. To extend and enlarge the tenant purchase program until every deserving tenant farmer has a real opportunity to have a farm of his own. To refinance existing farm debts at lower interest rates and on longer and more flexible terms. To continue to provide for adjustment of production through democratic processes to the extent that excess surpluses are capable of control. To continue the program of rehabilitation of farmers who need and merit aid. To preserve and strengthen the ever-normal granary. . . . To expand the domestic consumption of our surpluses by the food and cotton stamp plan, the free school lunch, low-cost milk and other plans for bringing surplus farm commodities to needy consumers. To continue our substantially increased appropriations for research and extension work. . . . To conserve the soil and water resources for the benefit of farmers and the nation. . . . To safeguard the farmer's foreign markets and expand his domestic market for all domestic crops. To enlarge the rural electrification program. To encourage farmer-owned and controlled co-operatives. To continue the broad program launched by this administration for the co-ordinated development of our river basins through reclamation and irrigation, flood control, reforestation and soil conservation, stream purification, recreation, fish and game protection, low-cost power and rural industry. To encourage marketing agreements in aid of producers of dairy products, vegetables, fruits and specialty crops. . . . To extend crop insurance from wheat to other crops as rapidly as experience justifies such extension. To safeguard the family-sized farm in all our programs. To finance these programs adequately in order that they may be effective. In settling new lands reclaimed from desert by projects like Grand Coulee, we shall give priority to homeless families who have lost their farms. . . .'

Industry and the Worker.—'Under Democratic auspices more has been done in the last seven years to foster the essential freedom, dignity and opportunity of the American worker than in any other administration in the nation's history. . . . We pledge to continue to enforce fair labor standards; to maintain the principles of the National Labor Relations Act; to expand employment training and opportunity for our youth, older workers and workers displaced by technological changes; to strengthen the orderly processes of collective bargaining and peaceful settlement of labor disputes; to work always for a just distribution of our national income among those who labor.

'We will continue our efforts to achieve equality of opportunity for men and women. . . . We pledge continuation of the Federal Bituminous Coal Stabilization Act, and sympathetic consideration of the application of similar legislation to the anthracite coal industry, in order to provide additional protection for the owners, miners and consumers of hard coal. . . .'

Capital and Business Man.—'. . . We have defended and will continue to defend all legitimate business. . . . We have attacked the kind of business which levied tribute on all the rest of

American business by the extortionate methods of monopoly. . . . We . . . favor the enactment of constructive legislation to safeguard the welfare of small business. Independent small-scale enterprise, no less than big business, should be adequately represented on appropriate governmental boards and commissions, and its interests should be examined and fostered by a continuous research program.

'We have provided an important outlet for private capital by stimulating home building and low-rent housing projects. . . . We have fostered a well-balanced American merchant marine and the world's finest system of civil aeronautics. . . . We have steered a steady course between a bankruptcy-producing deflation and a thrift-destroying inflation, so that today the dollar is the most stable and sought-after currency in the world. . . . We shall continue to oppose barriers which impede trade among the several States. We . . . favor the adjustment of freight rates so that no section or State will have undue advantage over any other.

'To encourage investment in productive enterprise the tax-exempt privileges of future Federal, State and local bonds should be removed. We have enforced the anti-trust laws more vigorously than at any time in our history, thus affording the maximum protection to the competitive system. We favor strict supervision of all forms of the insurance business by the several States for the protection of policy holders and the public. . . .'

Electric Power.—'During the past seven years the Democratic party has won the first major victories for the people of the nation in their generation-old contest with the power monopoly. These victories have resulted in the recognition of certain self-evident principles and the realization of vast benefits by the people. These principles, long opposed by the Republican party, are: That the power of falling water is a gift from God, and consequently belongs not to a privileged few, but to all the people, who are entitled to enjoy its benefits. That the people have the right through their government to develop their own power sites and bring low-cost electricity to their homes, farms and factories. That public utility holding companies must not be permitted to serve as the means by which a few men can pyramid stocks upon stocks for the sole purpose of controlling vast power empires. . . .

'The successful power developments in the Tennessee and Columbia River basins show the wisdom of the Democratic party in establishing government-owned and operated hydro-electric plants in the interests of power and light consumers. Through these Democratic victories, whole regions have been revived and restored to prosperous habitation. Production costs have been reduced. Industries have been established which employ men and capital. Cheaper electricity has brought vast economic benefits to thousands of homes and communities. These victories of the people must be safeguarded. They will be turned to defeat if the Republican party should return to power. . . . The nomination of an utility executive by the Republican party as its presidential candidate raises squarely the issue, whether the nation's water power shall be used for all the people or for the selfish interests of a few. We accept that issue.'

Development of Western Resources; Radio.—'We take satisfaction in pointing out the incomparable development of the public land States under the wise and constructive legislation of this administration. Mining has been revived, agriculture fostered, reclamation extended and natural resources developed as never before in a similar period. We pledge the continuation of such policies. . . .

'Radio has become an integral part of the democratically accepted doctrine of freedom of speech, press, assembly and religion. We urge such legislative steps as may be required to afford the same protection from censorship that is now afforded the press under the constitution of the United States. . . .'

Unemployment; Social Security; Health.—'. . . We shall continue to recognize the obligation of government to provide work for deserving workers who cannot be absorbed by private industry. We are opposed to vesting in the States and local authorities the control of Federally-financed work relief. We believe that this Republican proposal is a thinly disguised plan to put the unemployed back on the dole. We will continue energetically to direct our efforts toward the employment in private industry of all those willing to work, as well as the fullest employment of money and machines. This we pledge as our primary objective. To further implement this objective, we favor calling, under the direction of the president, a national unemployment conference of leaders of government, industry and farm groups. . . .

'We pledge to make the Social Security Act increasingly effective, by covering millions of persons not now protected under its terms. . . .

'We have advanced public health, industrial hygiene, and maternal and child care. We are co-ordinating the health functions of the Federal Government. We pledge to expand these efforts, and to provide more hospitals and health centers and better health protection wherever the need exists. . . .'

Youth and Education; Slum-Clearance.—'Today, when the youth of other lands is being sacrificed in war, this nation recognizes the full value of the sound youth program established by the administration. The National Youth Administration and Civilian Conservation Corps have enabled our youths to complete their education, have maintained their health, trained them for useful citizenship, and aided them to secure employment. Our public works have modernized and greatly expanded the nation's schools. We have increased Federal aid for vocational education and rehabilitation, and undertaken a comprehensive program of defense-industry training. . . .

'We have launched a soundly conceived plan of loans and contributions to rid America of overcrowded slum dwellings that breed disease and crime, and to replace them by low-cost housing projects within the means of low-income families. We will extend and accelerate this plan. . . .'

Consumers; Negroes; Veterans; Indians.—'We are taking effective steps to insure that, in this period of stress, the cost of living shall not be increased by speculation and price rises.

'Our Negro citizens have participated actively in the economic and social advances launched by this administration. . . . We shall continue to strive for complete legislative safeguards against discrimination in government service and benefits, and in the national defense forces. We pledge to uphold due process and the equal protection of the laws for every citizen, regardless of race, creed, or color.

'We pledge to continue our policy of fair treatment of America's war veterans and their dependents. . . .

'We favor and pledge the enactment of legislation creating an Indian claims commission . . . in order that our Indian citizens may have their claims against the government considered, adjusted, and finally settled at the earliest possible date.'

party. To this moderate party was given the name of Republicans, about 1792. During the French Revolution extreme sympathizers with the new French Republic formed so-called 'democratic clubs,' the fundamental principles advocated by these clubs being equalitarianism and the extreme of liberty for the individual. Though not in complete accord with the Republicans, adherents of these views were forced to act in harmony with the Republicans in opposition to the Federalist measures, and were eventually absorbed by that party, which came to be known as the Democratic-Republican party. In 1798 the fundamental Democratic principles were first clearly formulated by Jefferson and Madison in the Kentucky and Virginia Resolutions (qq. v.). The State governments were declared to be the basis of our system; the Federal Government, it was declared, had only those powers which were conferred upon it by the Constitution. Wherever any doubt existed as to whether a specific power belonged to the Federal Government or to the States, the presumption should always be in favor of the States.

In 1801 the Democratic party succeeded in carrying the presidency, and it remained in power for twenty-four years. True to its principles, it proceeded to pay off the national debt as rapidly as possible, and, though outrages upon American commerce were of almost daily occurrence, Jefferson's administration refused to take any serious measures for strengthening the military power of the country. In 1811 it allowed the charter of the national bank to expire. At length the intolerable treatment accorded by Great Britain to American shipping forced the Democratic administration of Madison to declare war. The exigencies of administering the government in time of war caused the party to swerve somewhat from its fundamental principles, as is evidenced by the protective tariffs of 1816 and following years, and by the chartering of the second Bank of the United States (1816). The centralizing branch of the party, later known as the 'Whigs,' split off in 1824 and elected John Quincy Adams President. In the following election the particularist branch, from about this time called the Democratic party, returned to power with Jackson as President. Under his able leadership a party organization was perfected by 1832 which has since remained intact.

With the exception of the years 1840–44 and 1848–52, the Democratic party remained in power until 1860. The party was composed of two main branches: the southern, which from the earliest time had been particularistic, and which had become more so with lapse of time, since limitation of Federal power alone could give assurance that slavery would not be subjected to outside interference; and the western, whose chief political tenet was popular control of government. The two branches were united in their hostility to protection and to a national bank.

In 1860, the ill-advised attempt of the southern branch to force the party to commit itself to the extension of slavery resulted in its disruption and in the nomination of two presidential candidates, one representing each branch. During the Civil War the northern Democratic leaders persistently but ineffectively opposed the extension of the war power of the President, and upon the close of the war placed themselves in equally ineffective opposition to the Republican policy of reconstruction. The partial identification of their interests with those of the secessionist States alienated from them a large part of their following in the Western States. The influx of alien immigrants after the war further weakened the Democratic party, since most of the immigrants allied themselves with the Republicans as the party of freedom.

In an attempt to repair their fortunes the Democrats in 1872 endorsed the candidacy of Horace Greeley, Liberal Republican, and adopted the platform of the Liberal Republican party. They were defeated by an overwhelming majority, but the party had at last been disentangled from the slavery issue. In the election of 1876 the Democratic candidate, Samuel J. Tilden, received a popular majority of 250,000, and an apparent majority in the electoral college. His opponent was seated only through the throwing out of electoral votes on account of alleged frauds. In 1884, and again in 1892, Grover Cleveland was elected President upon a platform embodying the traditional Democratic principles, tariff reform being the principal issue.

The agricultural and industrial distress of the late eighties and the early nineties, popularly attributed to the existing monetary system, resulted in great political discontent, the outcome of which was the formation of a radical wing of the Democratic party, which in 1896 secured control of the party organization, and nominated W. J. Bryan, upon a platform advocating free coinage of silver and the issue of paper money by the government, denouncing 'government by injunction,' and attacking the decision of the Supreme Court declaring a Federal income tax unconstitutional. The conservative wing of the party held a separate convention and nominated J. M. Palmer for President upon a platform drawn on traditional lines. In spite of large accessions from the People's party (see that article) the regular Democratic party was severely defeated at the polls, receiving 176 out of 447 electoral votes. In 1900, with the same presidential candidate and the same platform expanded to include an attack upon 'imperialism,' the party was even more severely defeated, receiving 155 electoral votes.

In 1904 the conservative wing regained control, and nominated Judge Alton B. Parker for President. The result was a decided defeat, the Democrats securing 140 electoral votes out of 476. In 1908 W. J. Bryan was for the third time the Democratic nominee, on a platform whose principal planks called for immediate downward revision of the tariff and vigorous enforcement of the law against guilty trust magnates. He was again defeated, receiving 162 electoral votes to W. H. Taft's 321.

In 1912 the Democrats nominated Woodrow Wilson of New Jersey. The regular Republican candidate was W. H. Taft, the party having at this time been disrupted by the formation of the Progressive Party (q. v.), which nominated Theodore Roosevelt. Wilson was elected with 435 votes, and was renominated in 1916, one of the slogans of the campaign being, 'He kept us out of war.' His Republican opponent was Charles E. Hughes of New York, whose candidacy was endorsed by the Progressives. The election was extremely close; Wilson received the narrowest margin of electoral votes since the campaign of 1876, and it was more than a week before the result, 276 votes for Wilson and 255 for Hughes, was known. The Democratic candidate in 1920 was James M. Cox of Ohio, who was overwhelmingly defeated by Warren G. Harding also of Ohio, Cox failing to win a single State outside of the always Democratic South, and Harding invading the ranks of the 'Solid South' by winning Tennessee.

The defeat of the Democratic party in 1924, while less decisive than in 1920, was emphatic, President Coolidge polling nearly twice the popular vote over his Democratic opponent, John W. Davis. Governor Alfred E. Smith of New York was the Democratic standard-bearer in 1928. He was defeated by Herbert C. Hoover who, out of the largest popular vote ever cast up to that time (36,798,669), polled 21,429,109 votes to Smith's 15,005,497 votes. In 1933 the Democrats were returned to power by the overwhelming election in 1932 of Franklin D. Roosevelt of New York. Roosevelt carried 42 States against President Hoover's six. The issues of the campaign were almost wholly governed by the country's economic collapse as the cumulative effect of the the boom conditions following the World War. President Roosevelt was reëlected in 1936 over Governor Alfred M. Landon of Kansas, carrying all but two States, the electoral vote being 523 to 8. The Democratic issue involving social justice, popularly known as the New Deal, was thus emphatically endorsed by the country. On the eve of the 1940 elections, this issue was still very much to the forefront although it bade fair to be overshadowed by questions of defense and armament which the war in Europe raised.

Democritus, dē-mok'ri-tus, (460–370 B.C.), one of the great Greek philosophers, was born in Abdera, in Thrace. He propounded the theory, known as the atomic system, that nothing existed but atoms and empty space; that the atoms were in a state of perpetual motion, and by combining formed objects, which their separation destroyed; that differences of arrangement and position of the atoms accounted for all varieties of substance and form. All things being in reality composed of exactly similar atoms, it followed that their apparent diversity is due to our sensations, which, therefore, do not correspond to anything real. In ethics Democritus anticipated Epicurus in holding that the end of life is a calm, unruffled cheerfulness. Hence, perhaps, he was known as the 'laughing philosopher.' The fragments of his works are found in Mullach's *Philosophorum Græcorum Fragmenta.*

De Moivre, d*e* mwä'vr', Abraham (1667–1754), French mathematician, was born in Vitry, in Champagne. He was among the Huguenots who fled to England after the revocation of the Edict of Nantes (1685). In his chief work, *Miscellanea Analytica* (1730), he set forth the theorem known by his name —*i.e.* that $\cos n\theta + \sqrt{(-1)}$ sin nn is one of the values of $(\cos \theta + \sqrt{-1} \sin \theta)^n$, whether n be positive or negative, integral or fractional. He also wrote *The Doctrine of Chances* (1718).

Demonetization, dē-mun'i-ti-zā'shun, a term applied to the official withdrawal of a coin from circulation, and also to the abandonment of a metal as a standard of value. In the latter sense silver was demonetized in England in 1816. In the literature of the bimetallic controversy, the term demonetization is often used to describe the closing of the mints to the free coinage of a metal. Thus it is said that silver was demonetized by the United States in 1873. See Bimetallism.

De'monol'ogy, is that branch of the science of religion which deals with the existence and nature of a supposed realm of spirits possessing powers for evil over men.

The first stage in the development of the idea of demons or spirits of evil (*cacodæmons*) is that known as *animism,* which is exemplified among Negroes, Polynesians, and others, and which gives birth to the magician, the sorcerer, and the witch-doctor. The demons are not worshipped; they are feared and hated by reason of their evil deeds, and various means (spells, incantations, offerings) are resorted to, in order to avert their malevolence. The power to accomplish this comes to be associated with certain persons; and these, communicating their arts to a restricted few, succeed in perpetuating themselves as a distinct class or guild. (See Animism).

In a further stage of development a process of differentiation sets in, the result of which is that instead of an innumerable host of spirits all more or less alike, there appear a small number of outstanding spirits, each with a distinct individuality, religion thus making its way toward polytheism and polydemonism. Among the most familiar of the great arch-demons, or of the beings that have survived to represent them, may be mentioned Set, Tebha, Apepi of Egypt; Vritra, Ahi, Pani of India; the Seven Spirits of Evil in Assyrian mythology; Tiamat of Babylonia; Azazel, Asaël, Samaël, Maccathiel of Jewish apocalyptic literature. In classical legend the endless tales of struggle, such as those of Zeus with Typhon, Apollo and the Python, Bellerophon and the Chimæra, Hercules and Cacus, and others are typical of this stage.

At a still later stage the demon begins to assume the features of the devil—*i.e.* he appears as not merely physical but as moral evil. The completion of the process is monotheism coupled with monodemonism; the best examples being found in Zoroastrianism, which opposes Ahriman to Ahura Mazda or Ormuzd; in Judaism and Christianity, which set up Jahveh or God and Satan in almighty antagonism.

For its doctrine of evil spirits Christianity was at the outset indebted to the Jews. It began with the monodemonistic Satan, having under him an indefinite multitude of lesser spirits. These inferior spirits were the agents by whom diseases of several kinds were caused. They 'possessed' their victims and, according to both Jewish and Christian belief, there were certain names to which was attached in a peculiar degree the power of exorcising them. This magical or miraculous power of exorcism was long cherished in the Christian church, and is still formally recognized by the Church of Rome.

A special character was given to Christian demonology from the fact that Christian teachers insisted on the idea that the gods of their neighbors were demons who had usurped the place of the true God (*cf.* 1 Cor. x. 20). Later, when the pagans were evangelized, it was a common practice to turn their beneficent deities into saints of the church, and the malevolent ones intò demons. Towards the close of the middle ages the demons all became devils, carrying out the will of Satan for his satanical purpose—*i.e.* the ruin of souls and the overthrow of the church or kingdom of God. The marvellous tales of witches' Sabbaths, of incubi and succuæ, of men, women, and children possessed wholly or in part by the emissaries of Satan, help to show up the serious side of this picture. It has, however, its lighter, even grotesque elements, absorbed from pagan religions, and including stories which depict Satan as a stupid character, and recount many jokes at his expense (*cf.* the English mystery and miracle plays); stories which speak of him as lame, cloven-footed, possessed of horns and a tail; and folklore stories in which his followers appear more for amusement and human interest than for terror.

Consult M. D. Conway, *Demonology and Devil-Lore;* P. Carus, *History of the Devil;* J. G. Frazer, *Golden Bough;* M. Summers, *History of Witchcraft and Demonology.*

De Morgan, dē môr'gan, Augustus (1806–71), English mathematician, was born in Madura, India. He contended for

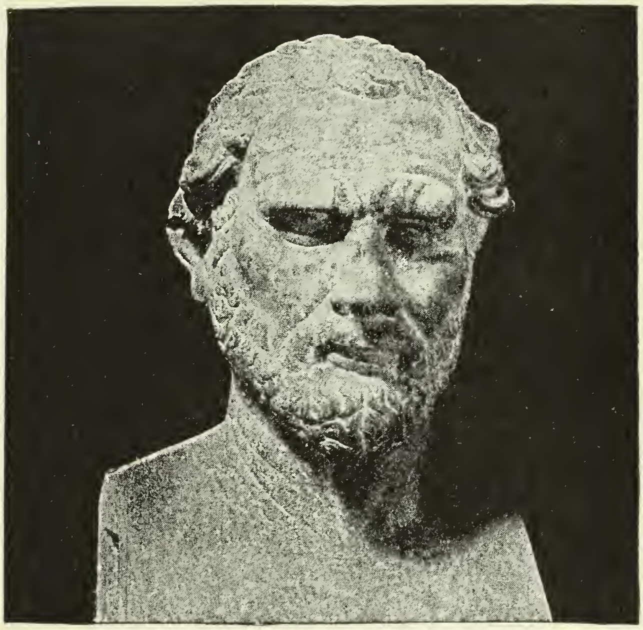
NOV [illegible] 1948

the principle of the union of logic and mathematics. He wrote in favor of decimal coinage, and also on points connected with the profession of actuary. His chief works were, *Elements of Algebra* (1835); *Trigonometry* (1837); *Essay on Probabilities* (1838); *Formal Logic* (1847); *Book of Almanacs* (1851); and *A Budget of Paradoxes* (1872).

De Morgan, WILLIAM FREND (1839–1917), English novelist, was born in London and educated at University College, London. He attended the Royal Academy Schools and started life as a painter, but after five years gave up painting to make designs for stained glass. This he in turn abandoned for ceramics, to which he devoted himself until he was sixty-five. In 1904 he began his first novel, *Joseph Vance,* which was published in 1906 and met with extraordinary success. This was followed by *Alice-for-Short* (1907); *Somehow Good* (1908); *It Never Can Happen Again* (1909); *An Affair of Dishonor* (1910), an historical romance; *A Likely Story* (1912); *When Ghost Meets Ghost* (1914); *The Old Man's Youth,* published posthumously.

Demosthenes, d*e*-mos'th*e*nēz, Athenian general during the Peloponnesian War. In 425 B.C., along with Cleon, he captured the Spartan detachment on the island of Sphacteria, having previously occupied Pylos, and held it against the Spartan attack. In 413 Demosthenes commanded the reinforcements sent to Syracuse, but was defeated in his attempt to capture the Syracusan forts, and was executed by the Syracusans (413 B.C.).

Demosthenes, Athenian orator and statesman, was born in or about 384 B.C. He studied rhetoric with the orator Isæus, struggling to overcome defects of speech and manner by practising before a mirror and by speaking with pebbles in his mouth. He also strengthened his voice by reciting on the seashore, and perfected his style by a prolonged study of the historian Thucydides. In 354 he made his first public speech, on the Symmories, discouraging premature action against Persia. In 353, coming forward as an opponent of Eubulus, whose policy was one of peace and retrenchment, he delivered the speeches called, 'For the Megalopolitans,' and 'For the Freedom of the Rhodians.' In 351 he began his denunciation of the aggressive policy of Philip of Macedon in his *First Philippic,* and in 349 urged the Athenians to save the city of Olynthus from that king in his *Olynthiacs.* In 347 and in 346 Demosthenes was one of the ten ambassadors sent to Philip, who in the second year negotiated the peace known as that of Philocrates, which Demosthenes held to have been secured by the corruption of his colleagues, particularly of Æschines, whom he impeached for his action in 345.



Bust of Demosthenes, the great Athenian Orator.

In 344 he delivered his *Second Philippic* at Athens, followed in 341 by speeches *On the Chersonese* and the *Third Philippic,* in which he urged that the king was talking peace but acting war, and called on Athens to form a league against Philip. He himself went to Byzantium and Perinthus, and caused them to desert the Macedonian alliance. At this time Demosthenes carried a naval reform, which laid heavier burdens on the richer classes, and diverted to war purposes the Theoric fund, which supplied the poorer citizens with their expenses for the festivals which they loved. In the war that ensued the combined armies of Athens and Thebes were defeated by Philip at Chæronea, in which battle Demosthenes fought as a soldier, and whence he fled with the rout of his countrymen.

In 330 came Demosthenes' chief triumph as an orator, and perhaps also as a statesman in the eyes of his countrymen. Seven years before, one Ctesiphon had proposed that his services to the State should be rewarded by the presentation of a golden crown. Æschines prosecuted Ctesiphon for certain illegalities in the proposal, and chiefly for describing Demosthenes as a public benefactor. For various reasons the trial only came on in 330, when Alexander's conquest of Asia made his supporters confident. But Demosthenes' oratory in his *chef d'œuvre,* the *De Corona,* won the day, and Æschines was banished. In 324 Demosthenes was implicated in the serious charge of having appropriated 20 talents, and confessed the act. He was fined 50 talents; and being unable to pay, he was imprisoned, but afterwards escaped. A year or so later he was recalled because of his services in obtaining support for the league under Athens, which fought the Lamian war against Antipater; but the confederates were beaten at Crannon, and Antipater demanded the surrender of Demosthenes. He fled to the temple of Poseidon in the island of Calauria, off the Argolic coast, where, to avoid execution, he poisoned himself.

Demosthenes' energy and force of denunciation, even of his own countrymen, astonishes us when we remember how readily the Athenians resented attacks from orators, even punishing them with death. He has every rhetorical artifice at his command, and his speeches are the outcome of the most elaborate study and care. In them we find an almost unvarying observance of laws of rhythm and harmony. He does not disdain a familiar or vulgar word when it is the right word; at the same time his metaphors are most brilliant, and his tone elevated to the point of sublimity. The moral earnestness of all his writings is particularly noticeable. He scorns the expedient, and points only to the path of glory and duty. Consult Plutarch's *Life;* also R. C. Jebb's *Attic Orators;* Schaefer's *Demosthenes und seine Zeit;* Blass' *Demosthenes;* Butcher's *Demosthenes.* The best editions of his orations are those by Blass and by Butcher (text only). There is an annotated edition of the political speeches and of speeches in public cases by Weils and of most of the speeches by Westermann-Rosenberg. The best English translation is that in Bohn's edition.

Demotic Alphabet. See Hieroglyphics.

Dempster, demp'st*e*r, Thomas (?1579–1625), Scottish Roman Catholic historian, was born in Aberdeenshire. He was educated at Cambridge and held appointments as professor in Paris, Toulouse, Nimes, Pisa (1616), and Bologna, where he died. His most important work was *Historia Ecclesiastica Gentis Scotorum* (1627), a scholarly production, but untrustworthy in the main facts.

Demulcent, dē-mul'sent, a term applied to medicines used to soothe irritated parts, particularly the mucous membranes of the mouth and throat. They act by forming a protective coating to the irritated part through their oily or mucilaginous nature. Olive oil, tragacanth, syrup, honey, flaxseed tea, glycerine, and starch are examples.

Demur'rage. The compensation paid to the owner of a ship for its detention by the charterer beyond the number of days allowed for loading and unloading, or, if no time is specified, beyond a reasonable time. The amount payable as demurrage is generally fixed by the charter-party at so much per day. It is payable by the shipper if he has engaged to load or unload within a certain number of days, and has made default, even though the delay has been unavoidable; but not if the delay has arisen through fault of the shipowner or his representative.

Demurrer, is an objection that the pleading against which it is directed is insufficient in law to support the action or defense, and that the demurrant should not, therefore, be required further to plead. It is not the office of the demurrer to set out facts; but it must stand or fall by the facts as alleged in the opposing pleading, and it can raise only questions of law as to their sufficiency. The demurrer is, in effect, an allegation that, admitting the facts of the preceding pleading to be true as stated by the party making it, he has yet shown no cause why the party demurring should be compelled by the court to proceed further. The import of the demurrer is that the objecting party will not proceed, but will await the judgment of the court whether he is bound so to do. It is a fundamental rule of law that a demurrer will only lie for defects which appear on the face of the alleged defective pleading, and extraneous or collateral facts, stated in the demurrer cannot be considered in deciding upon its validity.

Under the revised procedure as adopted by various States, demurrer is abolished, and the office is now fulfilled by motion for judgment as the rules provide. Thus, objections formerly taken by demurrer may now be taken by the much simpler procedure of a motion for judgment dismissing or striking out a pleading or a cause of action, defense or counterclaim. However, three objections, which were formerly grounds for demurrer are now grounds only for a corrective motion to amend and not for the more drastic remedy of motion for judgment, namely, misjoinder of parties plaintiff, defect of parties plaintiff or defendant and misjoinder of causes of action.

Denain, d*e*-naṅ, town, department of Nord, France, on the river Scheldt; 6 miles s.w. of Valenciennes. It has large coal and iron mines, and manufactures beer, beet-sugar, candy, and ships. It was the scene of the victory of Marshal Villars over the allies under Prince Eugene, July 27, 1712. Pop. 26,800.

Den'ary Scale, the common scale of notation or number-naming. See Decimal System.

Denatured Alcohol, a compound of alcohol (q. v.) manufactured for household uses, such as heating and lighting; for running internal combustion engines; for use, after being vaporized, in connection with mantles for automobile and locomotive headlights; and for many other industrial purposes. It must by law contain ten parts of wood or methyl alcohol and one-half of one part of benzine for every one hundred parts of alcohol. Since these ingredients are not suited to all industrial purposes, the government permits, when requested, the use of other substances, such as shellac, resins, acetic acid, pyridin, acetone, methyl acetate, analine dyes, naphthaline, castor oil, carbon bisulphide and carbolic acid. See Methyl Alcohol; Methylated Spirit.

Denbigh, den'bi, municipal borough and county town, Denbighshire, North Wales. It has a ruined thirteenth-century castle, slate, flagstone and lime quarries, and manufactures of timber and shoes. Pop. (1931) 7,249.

Denbighshire, den'bi-sh*e*r *or* shir, maritime county, North Wales, fronting the Irish Sea for 18 miles. It has an area of 665 square miles, partly mountainous but with several fertile valleys. Coal, lead, slate, limestone and freestone are produced; cattle are pastured on the uplands; and oats, barley, and turnips are produced. The county is famous for its dairy products. It has also collieries, iron works, and woolen manufactures. Pop. (1931) 157,645.

Denby, Edwin (1870–1929), American lawyer and cabinet official, was born in Evansville, Ind. After a public school education, he went with his father, then U. S. Minister, to China, and was employed in the Chinese Imperial Maritime Customs Service from 1887 to 1896. He studied law in the University of Michigan, was admitted to the bar in 1896, and practiced law in Detroit. During the Spanish-American War he served as a gunner's mate; in the World War he enlisted as a private in the U. S. Marine Corps, was promoted through the various grades to major, and in 1919 was transferred with this rank to the reserve. He was a member of the Michigan legislature, 1902–3, and Congressman from the 1st Michigan district, 1905–11. In 1921 he was appointed Secretary of the Navy in President Harding's cabinet.

Dendera, den'd*e*r-*a*, village of Upper Egypt, on the left bank of the Nile, celebrated for its ruined temple of Hathor, which is one of the most magnificent and best preserved of the antiquities of Egypt. It was begun under Ptolemy xii and finished under Tiberius. It measures 220 feet in length by about 50 feet in breadth, and has a noble portico or hypostyle hall supported on twenty-four columns. Hieroglyphics and figures cover the columns and walls. The tombs of the ancient princes of Dendera were discovered by Flinders Petrie in 1898. A famous table of zodiacal signs, discovered here in 1822, was removed to the Paris Museum.

APPENDIX OF PRONUNCIATION TO NELSON'S ENCYCLOPÆDIA.

I. EXPLANATORY NOTE.

In the vocabulary of this Appendix the correct pronunciation is indicated of all titles which present any difficulty in that respect. Titles are omitted when the pronunciation is indicated by the spelling (as abatement, Adams, Aiken, Bates, etc.), or by connection with titles given in the Appendix.

A simple system of respelling is adopted based upon the usual values of the vowels and consonants in English; and such diacritical marks as are used are those in general use in school text-books. The values of the symbols used are given in the accompanying Key, with explanations of the way to pronounce correctly the few foreign sounds which are not fairly well represented by English sounds. Except as otherwise noted in the Key, the letters used in respelling are to be given their ordinary English values. Further information as to the values of the letters in the alphabets of foreign languages will be found in the article on PRONUNCIATION in the Encyclopædia.

II. KEY.

ā as in fate, rebate.
â as in care, mare, or as *ai* in fair, or as *e* in there.
a (unmarked) as in fat, am.
ä as in arm, father.
ȧ as in ask.
a as in America.
ē as in me, evade.
e (unmarked) as in met, end.
e as in moment, maker.
ī as in ice, mine.
i (unmarked) as in fit, it.
ō as in old, over, obey.
o (unmarked) as in odd, not.
ô as in nor, or as *a* in fall.
oi as in boil, noise.
o͞o as in boot, fool, or as *u* in rude.
o͝o as in book, or as *u* in full, put.
ū as in mule, unite.
u (unmarked) as in but, up.
û as in turn, burn, or as *e* in her, or as *i* in fir; also for French *eu* and for German ö.
ü for French *u* and German ü. This sound may be imitated by pronouncing *e* as in English me and at the same time firmly rounding the lips as for pronouncing *oo* in fool.
y as in yet.
ch as in church.
ch as in German ich. This is the front palatal continuant, and is pronounced with the blade of the tongue raised almost to the hard palate, producing a sound resembling a strong pronunciation of the *h* in hew, or the sound of *k* in key pronounced without complete stoppage of the breath.
g as in go, girl.
h as in hit; also for Spanish *g* before *e* and *i*, and for other foreign sounds which are similar strong guttural fricatives.
hw as *wh* in when.
K as *ch* in Scotch loch, and German ach, or as *g* in German tag, berg. This is the back palatal, or guttural, continuant, and is pronounced with the tongue raised almost to the palate, producing a sound somewhat resembling that made in clearing the throat.
ṅ is used to indicate a nasal pronunciation of the preceding vowel, as in French bon. The nasal vowels are pronounced somewhat as if blended with the sound of *ng* in song, pronounced without the complete closure for the *g*.
th as in thick, though.
TH as in then, thus.
zh as *z* in azure, or as *s* in measure.

An apostrophe ['], when used, denotes an almost complete elision of the vowel which it replaces or indicates a syllabic consonant, as in tā′k'n (taken), spaz'm (spasm).

VOLUME III.—Cévennes to Dendera.

Cévennes, sā-ven′.
Ceylon, sē lon′ *or* -lōn′.
Chabas, shȧ-bä′.
Chablis, shȧ-blē′.
Chabot, shȧ-bō′.
Chabrias, kā′bri-as.
Chabrier, shȧ-brē-ā′.
Chacma, chȧk′mȧ.
Chaco, chä′kō.
Chaconne, shȧ-kon′.
Chad, chäd.
Chadbourne, chad′burn.
Chærea, kē′rē-*a*.
Chæronea, ker-ō-nē′*a*.
Chætodon, kē′tō-don.
Chætognatha, kē-tog′n*a*-th*a* *or* kē-tog-nath′*a*.
Chætopoda, kē-top′ō-d*a* *or* kē-tō-pō′d*a*.
Chætopterus, kē-top′t*e*r-us.
Chaffarinas, chä-fä-rē′näs.
Chaffee, chaf′i.
Chagos, chä′gōs.
Chagres, chä′gres.
Chagwe, chäg′wā.
Chaillé-Long, shȧ-yā′-lông′.
Chaillu, du, dü shȧ-yū′.
Chaka, chä′kä.
Chalcedon, kal′si-don.
Chalcedony, kal-sed′ō-ni *or* kal′si-dō-ni.
Chalchihuitl, chal-chi-wē′t'l.
Chalcidice, kal-sid′i-sē.
Chalcis, kal′sis.
Chalcocite, kal′kō-sīt.
Chalcondylas, kal-kon′di-las.
Chalcopyrite, kal-kō-pī′-rīt.
Chaldæa, kal-dē′*a*.
Chaldir-gol, kal-dēr′gûl′.
Chaldron, chôl′drun.
Chaleurs, shȧ-lûr′.
Chalfont St. Giles, chȧl′-funt sent jīlz′.
Chalgrove, chal′grōv.
Chalice, chal′is.
Challemel-Lacour, shȧ-l-mel′ lȧ-ko͞or′.
Challis, chal′is.
Challoner, chal′un-*e*r.
Chalmers, chä′m*e*rz.
Châlons-sur-Marne, shä-lôṅ′-sür-märn′.
Châlon-sur-Saône, sōṅ′.
Chalybeate, kal-ib′i-et.
Chalybes, kal′i-bēz.
Cham, shäṅ.
Chamæleon, k*a*-mē′lē-on.
Chamærops, k*a*-mē′rops.
Chamalhari, chum-*a*-lä′rē.
Chamba, chum′b*a*.
Chambal, chum′bul.

Chamberlain, chām'b*e*r-lin.

Chamberlin, chām'b*e*r-lin.

Chambers, chām'b*e*rz.

Chambersburg, chām'-b*e*rz-bûrg.

Chambertin, shäṅ-ber-taṅ'.

Chambéry, shäṅ-bā-rē'.

Chambon-Feugerolles, shäṅ-bôṅ'fû-zh'-rōl'

Chambord, shäṅ-bor'.

Chambre Ardente, shäṅ'-br'är däṅt'.

Chamdo, chäm'dō.

Chameleon, k*a*-mē'li-un.

Chamfer, cham'f*e*r.

Chamfort, shäṅ-for'.

Chamier, sh*a*-mēr'.

Chaminade, shȧ-mē-nȧd'.

Chamisso, von, fon shä-mē'sō *or* kä-mē'sō; *by some as Fr.*, shä'mē-sō'.

Chamois, sham'i *or* shȧ-mwä'; *some use first pron. only for leather.*

Chamomile, kam'ō-mīl.

Chamonix, shȧ-mō-nē'.

Champagne (*wine*), sham-pān'; (*prov. France*) shäṅ-pän'y', *Eng. pron.* sham-pān'.

Champaign, sham-pān'.

Champaigne, shäṅ-pān'y'.

Champeaux, shäṅ-pō'.

Champerico, chäm-pā'rē-kō.

Champerty, cham'p*e*r-ti.

Champfleury, shäṅ-flû-rē'.

Champigny, shäṅ-pē-nyē'.

Championnet, shäṅ-pyo-nā'.

Champlain, sham-plān'; *Fr. pron.* shäṅ-plaṅ'.

Champneys, champ'niz.

Champollion, shäṅ-pōl-yôṅ'.

Champollion-Figeac, fē-zhȧk'.

Chanar, ch*a*-när' *or* chun'-är.

Chañaral de las Animas, chä-nyä-räl' dā läs ä'nē-mäs.

Chancre, shang'k*e*r.

Chanda, chän'dä.

Chandarnagar, chun'd*e*r-nug'*e*r.

Chandausi, chun-dou'sē.

Chandeleur Islands, shan-d*e*-lo͞or'.

Chandernagore, shän-d*e*r-nä-gōr'.

Chandos, chan'dos.

Chandragupta, chan-dr*a*-go͞op't*a*.

Chang, chäng.

Changarnier, shäṅ-gȧr-nyā'.

Chang-chia-ku, chäng-kyä-ko͞o'.

Chang-pai-shan, -pī-shän'.

Chang-sha-fu, -shä-fo͞o'.

Chang-te-fu, -te-fo͞o'.

Chansons de Gestes, shäṅ-sôṅ' d*e* zhest'.

Chantarelle, shän-t*a*-rel'.

Chantenay, shäṅ-t'nā'.

Chantilly, shäṅ-tē-yē'.

Chantrey, chan'tri.

Chanute, ch*a*-no͞ot'.

Chanzy, shäṅ-zē'.

Chaones, kā'ō-nēz.

Chaos, kā'os.

Chapala, chä-pä'lä.

Chaparral, chä-pär-räl'.

Chapelain, shȧ-p'-laṅ'.

Chapel-en-le-Frith, chap'-*e*l-en-li-frith'.

Chapelle, shȧ-pel'.

Chapin, chā'pin.

Chapleau, shȧ-plō'.

Chapone, shȧ-pōn'.

Chapong, ch*a*-pong'.

Chapra, chup'rä.

Chaptal, shȧp-tȧl'.

Chapu, shȧ-pü'.

Chapultepec, chä-po͞ol'te-pek'.

Chara, kā'r*a*.

Charade, sh*a*-rād'.

Charbon, shär'bon.

Charcot, shär-kō'.

Chardin, shär-daṅ'.

Charente, shȧ-räṅt'.

Charente-Inférieure, -aṅ-fā-rē-ûr'.

Charenton-le-Pont, shär-äṅ-tôṅ'-l*e*-pôṅ'.

Chares, kā'rēz.

Charette de la Contrie, shȧ-ret' d'lȧ kôṅ-trē'.

Chargé d'Affaires, shär-zhā' dȧ-fâr'.

Charing Cross, châr'ing.

Charites, kar'i-tēz.

Chariton, shar'i-tun.

Charivari, shȧ-rē'vȧ-rē' *or* shȧr'i-vȧr'i.

Charjui, chär-jo͝o-ē'.

Charkieh, shär-kē'ye.

Charlatan, shär'l*a*-t*a*n.

Charlemagne, shär'l*e*-mān; *Fr. pron.* shär-l'-män'y'.

Charleroi, *tn. Belgium* shär-l'rwä'; *tn. U.S.* shär'le-roi'.

Charles Eugen, *Ger. pron.* oi-gān'.

Charleston, chärlz'tun.

Charlet, shär-lā'.

Charleville, shärl-vēl'.

Charlevoix, *tn. U.S.* shär'-l*e*-voi; *Pierre F.*, shärl-vwä'.

Charlock, chär'lok.

Charlois, shär-lwä'.

Charlotte, shär'lot.

Charlotte Amalie, shär-lot' ä-mä'li-*e*.

Charlottenberg, shär-lot'-*e*n-bar'y'.

Charlottenburg, shär-lot'-*e*n-bo͝or*ch*.

Charlottesville, shär'lots-vil.

Charnwood Forest, chärn'-wo͝od.

Charolais, shä-rō-lā'.

Charon, kā'ron.

Charondas, ka-ron'das.

Charpentier, shär-päṅ-tyā'.

Charr, chär.

Charrière, shȧ-ryâr'.

Charron, shä-rôṅ'.

Charruas, chär-ro͞o'äs.

Charsadda, chur-sä'd*a*.

Charteris, chär'tris *or* chär't*e*rz.

Chartier, shär-tyā'.

Chartism, chärt'iz'm.

Chartres, shär'tr'.

Chartreuse, La Grande, lȧ gräṅd shär-trûz'.

Chartulary, kär'tū-ler-ĭ.

Charybdis, ka-rib'dis.

Chasidim, kas'i-dim.

Chaska, chas'k*a*.

Chaskoi, *ch*äs-koi'.

Chasles, shäl.

Chassé, sha-sā'.

Chassepot, shȧs-pō'.

Chassériau, shȧ-sā-ryō'.

Chasseurs, shȧ-sûr'.

Chastellux, shä-te-lü'.

Chasuble, chas'ū-b'l *or* chaz'ū-b'l.

Château, shä-tō'.

Chateaubriand, shȧ-tō-bryäṅ'.

Châteauroux, shä-tō-ro͞o'.

Château-Thierry, shä-tō'-tyer-ē'.

Châtel, shä-tel'.

Châtelet, shä-t'-lā'.

Châtelet-Lomont, lō-môṅ'.

Châtelineau, shä-t'lē-nō'.

Chatham, chat'*a*m.

Chattahoochee, chat-*a*-ho͞o'chē.

Chattanooga, chat-*a*-no͞o'-g*a*.

Châtellerault, shä-tel-rō'.

Chauci, kô'sī.

Chaudet, shō-dā'.

Chaudière, shō-dyâr'.

Chaudoc, shō-dok'.

Chaumette, shō-met'.

Chaumonot, shō-mo-nō'.

Chaumont-en-Bassigny, shō-môṅ'-äṅ-bȧ-sēn-yē'.

Chauncy, chän'si *or* chôn'-si.

Chauny, shō-nē'.

Chaus, kā'us.

Chausses, shō'sez *or*, *Fr. pron.*, shōs.

Chautauqua, sh*a*-tô'kw*a*.

Chauvenet, shō'v*e*-nā'.

Chauvinism, shō'vin-iz'm.

Chaux de Fonds, La, lä shō d*e* fôṅ'.

Chazy, shȧ-zē'.

Cheadle, chē'd'l.

Cheboygan, shē-boi'g*a*n.

Checquy, chek'i.

Chedorlaomer, kē-dôr-lā-ō'm*e*r.

Cheduba, chē-do͞o'bä *or* ched'o͝o-b*a*.

Cheeta, chē't*a*.

Cheetham, chēt'*a*m.

Cheever, chē'v*e*r.

Chefoo, chē'fo͞o'.

Cheilanthes, kī-lan'thēz.

Cheiranthus, kī-ran'thus.

Cheiromancy, kī'rō-man-si.

Chekhy, chek'i.

Che-kiang, che-kē-äng'.

Chelan, shē-lan'.

Chelmsford, chemz'f*e*rd.

Chelonia, kē-lō'ni-*a*.

Chelsea, chel'si.

Cheltenham, chelt'n*a*m.

Chelyabinsk, chel-yä-bēnsk'.

Chelyuskin, chel-yo͝os'kin.

Chemkend, chem-kent'.

Chemnitz, kem'nits.

Chemosh, kē'mosh.

Chemosis, kē-mō'sis.

Chemulpo, chem'ul-pō *or* chē-mul'pō.

Chemung, shē-mung'.

Chenab, chē-näb'.
Chenaub, chē-nôb'.

Chêne, shān.

Chenery, chen'*e*r-i.

Cheney, chē'ni.

Cheng-te-fu, cheng-te-fo͞o'.

Cheng-ting-fu, -ting-fo͞o'.

Cheng-tu-fu, -to͞o-fo͞o'.

Cheng-yang-kuan, -yang-kwän'.

Chénier, shā-nyā'.

Chenopodiaceæ, kē-nō-pō'di-ā'si-ē.

Chenopodium, kē-nō-pō'-di-um.

Chen-yuan-fu, chen-yo͞o-än-fo͞o'.

Cheops, kē'ops.

Cher, sher.

Cherbourg, sher-bo͞or'.

Cherbuliez, sher-bül-yā'.

Cherethites, ker'i-thīts.

Cheribon, sher'i-bon.

Cherimoya, cher-i-moi'*a*.

Cherkasi, cher-kä'si.

Chernigov, cher-nyē'gof.

Cherokee, cher-ō-kē'.

Cherokees, cher-ō-kēz'.

Cherso, ker'sō.

Chersonesus, k*e*r-sō-nē'-sus.

Chert, chûrt.

Chertsey, chûrt'si *or* ches'i.

Cherubim, cher'ū-bim.

Cherubini, kā-ro͞o-bē'nē.

Chéruel, shā-rü-el'.

Cherusci, kē-rus'ī.

Chervil, chûr'vil.

Cherville, sher-vēl'.

Cherwell, chär'wel.

Chesapeake, ches'*a*-pēk.

Cheselden, ches'*e*l-d*e*n.

Cheshire, chesh'*e*r.

Cheshunt, ches'hunt.

Chesme, ches-mě'.

Chesney, ches'ni.

Chester-le-Street, ches'-t*e*r-li-strēt'.

Chestnut, ches'nut.

Chesuncook Lake, chi-sun'ko͝ok.

Chetopa, shē-tō'p*a*.

Chettle, chet''l.

Cheval de Frise, sh*e*-vål' d*e* frēz'.

Chevalier, shev-*a*-lēr'; *proper name*, *Fr. pron.*, sh*e*-vål-yā'.

Chevalier au Cygne, Le, l*e* sh*e*-vål-yā' ō sēn'y'.

Cheves, chēvz.

Cheviot Hills, chē'vi-ut *or* chev'i-ut.

Chevreul, shev-rûl'.

Chevron, shev'run.

Chevrotain, shev-rō-tān'.

Chevy Chase, chev'i chās.

Chewink, chē-wingk'.

Cheyenne, shī-en'.

Cheyennes, shī-enz'.

Cheyne (*Thomas*), chān *or* chā'ni; (*T K.*), chā'ni.

Cheyne-Stokes, chā'ni-stōks'.

Chiabrera, kyä-brā'rä.

Chia-hsing-fu, kyä-sing-fo͞o'.

Chiana, kē-ä'nä.

Chiang-nan, kyäng-nan'.

Chiang-ning-fu, -ning-fo͞o'.

Chiang-yin, -yin.

Chianti, kyän'tē.

Chiao-chou, kyou-chou'.

Chiapas, chē-ä'pās.

Chiaramonte, kyä-rä-mon'-tā.

Chiari, kyä'rē'.

Chiaroscuro, kyä-rō-sko͞o'-rō.

Chiastolite, kī-as'tō-līt.

Chia-ting-fu, kyä-ting-fo͞o'.

Chiavari, kyä'vä-rē.

Chiavenna, kyä-ven'nä.

Chia-yu-kuan, kyä-yo͞o-kwän'.

Chibchas, chēb'chās.

Chica, chē'kā.

Chicacole, chik-*a*-kōl'.

Chicago, shi-kô'gō.

Chichagov, chē-chä'gof.

Chichas, chē'chās.

Chichen, chē-chen'.

Chichester, chich'es-t*e*r.

Chi-chou, chē-chou'.

Chickahominy, chik-*a*-hom'i-ni.

Chickamauga, chik-*a*-mô'-g*a*.

Chickasaws, chik'*a*-sôz.

Chiclana de la Frontera, chē-klä'nä dā lä fron-tā'rä.

Chiclayo, chē-klī'ō.

Chico, chē'kō.

Chicopee, chik'ō-pē.

Chicory, chik'ō-ri.

Chicoutimi, shē-ko͞o-tē-mē'.

Chidambaram, chē-dum'-b*a*-rum.

Chiemsee, ᴋēm'zā.

Chieng-mai, kyeng-mī'.

Chieri, kyā'rē.

Chieti, kyā'tē.

Chi-fu, chē-fo͞o'.

Chigi, kē'jē.

Chigirin, chē-gē-rin' *or* chē-gē'rin.

Chignecto, shig-nek'tō.

Chigoe, chig'ō.

Chih-feng, chē-feng'.

Chih-li, chē-lē'.

Chihuahua, chē-wä'wä.

Chilas, chē'läs.

Childebert, chil'd*e*-b*e*rt; *Fr. pron.* shēl-d'-bâr'.

Childeric, chil'd*e*r-ik; *Fr. form* **Childéric,** shēl-dā-rēk'.

Childers, chil'd*e*rz.

Childs, chīldz.

Chile, chil'i; *Span.* chē'-le.

Chilecito, chē-lā-sē'tō.

Chilianwala, chil-yän-wä'-lä.

Chililaya, chē-lē-lī'ä.

Chilka, chil'kä.

Chilkoot, chil'ko͞ot.

Chillán, chēl-yän'.

Chillicothe, chil-i-koth'i.

Chillingham, chil'ing-*a*m.

Chillon, shē-yôṅ' *or* shil'-on.

Chiloango, chē-lō-än'gō.

Chiloé Islands, chē-lō-ā', *almost* chēl-wā'.

Chilón, chē-lōn'.

Chilperic, chil'p*e*r-ik.

Chiltern, chil't*e*rn.

Chimæra, ki-mē'r*a*.

Chimborazo, chim-bō-rä'-zō; *Span.* -thō; *Amer. Span.* -sō.

Chimbote, chēm-bō'tā.

Chimkent, chim-kent'.

Chimney, chim'ni.

Chimoio, shē-moi'ō.

Chimpanzee, chim-pan'zi.

China, chī'n*a*.

China Bark, kī'n*a* *or* kē'-n*a*.

China (Clay and Grass), chī'n*a*.

Chinandega, chē-nän-dā'-gä.

Chi-nan-fu, chē-nän-fo͞o'.

Chincha, chin'ch*a*.

Chinch-bug, chinch.

Chin-chiang-fu, chin-ki-äng-fo͞o'.

Chinchilla, chin-chil'*a*.

Chin-chou, chin-chou'.

Chinde, shēn'dā.

Chindwin, chind'win.

Chinee, chē-nā'ā.

Chinese, chī-nēz' *or* chī-nēs'.

Ching, ching.

Ching-chou-fu, ching-chou-fo͞o'.

Ching-te, ching-tā'.

Ching-tzu-kuan, -tso͞o-kwän'.

Chin-hai, chin-hī'.

Chiniot, chin'i-ut.

Chin-ling, chin-ling'.

Chinook, chi-no͞ok'.

Chinooks, chi-no͞oks'.

Chinquapin, ching'k*a*-pin.

Chin-sha, chin-shä'.

Chinsurah, chin-so͞o'rä.

Chintz, chints.

Chioggia, kyod'jä.

Chios, kī'os.

Chippendale, chip'*e*n-dāl.

Chippewa, chip'*e*-wä.

Chippewayans, chip-*e*-wā'-*a*nz *or* -wä'y*a*nz.

Chippeways, chip'*e*-wāz.

Chipping Barnet, chip'-ing bär'net.

Chipping Wycombe, wik'um *or* wī'kum.

Chiquinquirá, chē-kēn'-kē-rä'.

Chiquitos, chē-kē'tōs.

Chira, chē'rä

Chiretta, chi-ret'*a*.

Chiriquí, chē-rē-kē'.

Chirna, chēr'nä.

Chiron, kī'ron.

Chiroptera, kī-rop't*e*r-*a*.

Chiru, chir'o͞o.

Chishima, chē'shē'mā.

Chisholm, chiz'um.

Chislehurst, chiz''l-hûrst.

Chistopol, chis-tō'poly'.

Chiswick, chiz'ik.

Chita, chē'tä.

Chitambo, chē-tām'bō.

Chitin, kī'tin.

Chiton, kī'ton.

Chitral, chi-träl'.

Chittagong, chit-*a*-gong'.

Chittenden, chit'*e*n-d*e*n.

Chitty, chit'i.

Chiung-Chou, kyo͝ong'-chou'.

Chiusi, kyo͞o'sē.

Chivalry, shiv'*a*l-ri (*not* chiv'-).

Chivasso, kē-väs'sō.

Chives, chīvz.

Chivilcoy, chē-vēl-koi'.

Chizerots, shē-z'-rō'.

Chladni, ᴋläd'nē.

Chlamydophorus, klam-i-dof'ō-rus.

Chloasma, klō-az'm*a*.

Chlopicki, ᴋlō-pits'kē.

Chloral, klō'r*a*l.

Chlorates, klō'rāts.

Chloric Acid, klō'rik.

Chloride of Lime, klō'rid *or* klō'rīd.

Chlorimetry, klō-rim'i-tri.

Chlorine, klō'rin *or* -rēn.

Chlorite, klō'rīt.

Chloritic Marl, klō-rit'ik.

Chlorophyll, klō'rō-fil.

Chlorosis, klō-rō'sis.

Chmel, ᴋmel.

Chobe, chō'bē.

Chobo, chō'bō.

Choctaws, chok'tôz.

Chodowiecki, ᴋō-dō-vyets'-ki.

Choga, chō'gä.

Choir, kwīr.

Choiseul-Stainville, de, d*e* shwä-zûl'-staṅ-vēl'.

Choisy-le-Roy, shwä-zē-l*e*-rwä'.

Chola, chō'l*a*.

Cholelithiasis, kol-i-lith-ī'*a*-sis.

Cholelithotrity, kol-i-lith-ot'ri-ti.

Cholera, kol'*e*r-*a*.

Cholera Infantum, in-fan'tum.

Cholesterin, kō-les't*e*r-in.

Cholet, shō-lā'.

Cholon, shō-lôṅ'.

Cholula, chō-lo͞o'lā.

Chondrodite, kon'drō-dīt.

Chonos Archipelago, chō'nōs är-ki-pel'*a*-gō.

{ **Chontals,** chōn-tälz'.
{ **Chontales,** chōn-tä'lās.

Chopin, shō-paṅ'.

Chopra, chō'prä.

Choptank River, chop'-tangk.

Chorale, kō-rä'lē.

Chord, kôrd.

Chordata, kor-dā't*a*.

Chorea, kō-rē'*a*.

Choregus, kō-rē'gus.

Choreography, kō-rē-og'-r*a*-fi.

Choriambus, kō-ri-am'bus.

Chorley, chôr'li.

Choroid, kō'roid.

Chorokh, cho-rôᴋ'.

Chorotegans, chō-rō'tā-gänz.

Chorum, chō-ro͞om'.
Chorus, kō'rus.
Chose in Action, shōz.
Choshi, chō'shē.
Chos-Malal, chōs-mä-läl'.
Chosroes I., kos'rō-ēz.
Chouans, sho͞o'*a*nz; *Fr. pron.* sho͞o-äṅ'.
Chou-chia-kou, chou'-kyä-kou'.
Chough, chuf.
Chouquet, sho͞o-kā'.
Chrestomathy, kres-tom'-*a*-thi.
Chrétien, *or* **Chrestien, de Troyes**, krā-tyaṅ' d*e* trwä'.
Chrism, kriz'm.
Chrisome, kriz'um.
Christadelphians, kris-t*a*-del'fi-*a*nz.
Christchurch, krīst'-chûrch.
Christen, kris't*e*n.
Christianborg, kris'ch*a*n-borg.
Christiania, kris-ti-ā'ni-*a*.
Christianity, kris-chan'i-ti *or* kris-chi-an'-.
Christiansund, kris'tyän-so͝on'.
Christie, kris'ti.
Christina, kris-tē'n*a*.
Christine de Pisan, krēs-tēn' d*e* pē-zäṅ'.
Christison, kris'ti-s'n.
Christlieb, krist'lēp.
Christmas, kris'm*a*s.
Christophe, krēs-tōf'.
Christopulos, kris-top'o͝o-lo͝os.
Christy, kris'ti.
Chromatic, krō-mat'ik.
Chromic Acid, krō'mik.
Chromite, krō'mīt.
Chromium, krō'mi-um.
Chromosphere, krō'mō-sfēr.
Chronicle, kron'i-k'l.
Chronogram, kron'ō-gram.
Chronograph, kron'ō-gråf.
Chronology, krō-nol'ō-ji.
Chronometer, krō-nom'*e*-t*e*r.
Chronoscope, kron'ō-skōp.
Chrudim, Kro͝o'dyēm.
Chrysalis, kris'*a*-lis.
Chrysander, kri-zān'd*e*r.
Chrysanthemum, kris-an'-thi-mum.
Chrysarobin, kris-*a*-rō'bin.
Chryseis, krī-sē'is.
Chryselephantine, kris-el-i-fan'tin.
Chrysippus, krī-sip'us.
Chrysoberyl, kris-ō-ber'il.
Chrysocolla, kris-ō-kol'*a*.
Chrysolite, kris'ō-līt.
Chrysoloras, kris-ō-lō'r*a*s.
Chrysoprase, kris'ō-prāz.
Chrysostom, kris'os-tum *or* kris-os'tum.
Chrysotile, kris'ō-til.
Chrzanow, Kzhā'nof *or* Kshä'no͝of.
Chu, cho͞o.
Chuan-chou, chwän-chou'.
Chubut, cho͞o-bo͞ot'.
Chudleigh, chud'li.
Chudskoye, cho͝ot'skō-ye.
Chu-fu-Hsien, Kio-fu-Hien, cho͞o-fo͞o-syen'; kyō-fo͞o-hyen'.
Chufut-Kaleh, cho͞o-fo͞ot'-kā-lā'.
Chuguyev, cho͞o-go͞o'yef.
Chu-hsiung-fu, Tsu-, cho͞o-syo͞ong-fo͞o'; tso͞o-.
Chukches, cho͝ok'chez.
Chunam, cho͞o-nam'.
Chunchos, cho͞on'chōs.
Chunchuses, cho͝on'cho͝o-sez.
Chundernagore, chun-d*e*r-n*a*-gōr'.
Chung-ching-fu, cho͝ong'-ching-fo͞o'.
Chung-king, cho͝ong'king'.
Chupanga, sho͞o-päṅ'gä.
Chuquisaca, cho͞o-kē-sä'kä.
Churchill, chûrch'il.
Churubusco, cho͞o-ro͝o-bo͞os'kō.
Chusan, cho͞o-sän'.
Chust, *ch*ust.
Chuvashes, cho͝o-väsh'ez.
Chu-yung-kuan, cho͞o-yo͝ong-kwän'.
Chyle, kīl.
Chyluria, kī-lū'ri-*a*.
Cialdini, chäl-dē'nē.
Ciampi, chäm'pē.
Ciampoli, chäm'pō-lē.
Cibber, sib'*e*r.
Cibrario, chē-brä'ri-ō.
Cicadas, si-kā'd*a*z.
Cicatrization, sik-*a*-tri-zā'shun.
Cicero, sis'*e*r-ō.
Cicerone, chē-chā-rō'nā; *Eng. pron.*, sis-*e*-rō'nē.
Cicester, sis'i-t*e*r.
Cid Campeador, *Span. pron.*, thēTH käm'pā-ä-THōr'.
Ciechanow, chā-Kä'nof *or* -no͝of.
Ciénaga, si-ā'nä-gä.
Cienfuegos, si-en-fwā'gōs.
Cieza, thi-ā'thā.
Cigoli, chē'gō-lē.
Cilia, sil'i-*a*.
Ciliary Body, sil'y*a*-ri *or* sil'i-*a*-ri.
Ciliata, sil-i-ā't*a*.
Cilicia, si-lish'i-*a*.
Cilician Gates, si-lish'i-*a*n.
Cima, chē'mä.
Cimabue, chē-mä-bo͞o'ā.
Cimarosa, chē-mä-rō'zä.
Cimbri, sim'brī.
Cimmerii, si-mē'ri-ī.
Cimon, sī'mon.
Cinchona, sin-kō'n*a*.
Cinchonine, sin'kō-nin *or* -nēn.
Cincinnati, sin-si-nä'ti.
Cincinnatus, sin-si-nā'tus.
Cineas, sin'i-as.
Cinematograph, sin-i-mat'ō-gråf.
Cinerary Urns, sin'*e*r-er-i.
Cingalese, sing-g*a*-lēz' *or* -lēs'.
Cinna, sin'*a*.
Cinnabar, sin'*a*-bär.
Cinnamic Acid, si-nam'ik.
Cino da pistoja, chē'nō dä pēs-tō'yä.
Cinq-Mars, saṅ-mär'.
Cinque-cento, chēn'kwā-chen'tō.
Cinquefoil, singk'foil.
Cinque Ports, singk'pōrts.
Cinthio, chēn'ti-ō.
Cintra, sēṅ'trā.
Ciotat, syō-tå'.
Cipriani, chē-pri-ā'nē.
Circars, s*e*r-kärz'.
Circassia, s*e*r-kash'i-*a*.
Circe, sûr'sē.
Circinus, sûr'si-nus.
Circuit, sûr'kit.
Circumcision, sûr-kum-sizh'un.
Circumpolar, sûr-kum-pō'-l*a*r.
Circumvallation, sûr'-kum-va-lā'-shun.
Cirencester, *popularly and usually* sis'i-t*e*r; *formally* sī'ren-ses-t*e*r.
Cire Perdue, sēr' per-dü'.
Cirque, sûrk.
Cirrhosis, si-rō'sis.
Cirripedia, sir-i-pē'di-*a*.
Cirro-stratus, sir'ō-strā'-tus.
Cirta, sûr't*a*.
Cisalpine, sis-al'pin.
Cissoid, sis'oid.
Cist, sist.
Cistercians, sis-tûr'sh*a*nz.
Cistus, sis'tus.
Cîteaux, sē-tō'.
Cithæron, si-thē'ron.
Cithara, sith'*a*-r*a*.
Citium, sish'i-um.
Citlaltepetl, sēt-lål-tā'-pet'l*or* -tā-pet''l.
Citric Acid, sit'rik.
Citrus, sit'rus.
Citta di Castello, chēt-tä' dē käs-tel'lō.
Cittavecchia, chēt-tä'vek'-kyä.
Ciudad Bolivar, sē-o͞o-THäTH' bō-lē'vär.
Ciudad Juarez, hwä'rās *or* -rāth.
Ciudad Porfirio Diaz, pôr-fē'ri-ō dē'äs *or* dē'äth.
Ciudad Real, rā-äl'.
Ciudad Rodrigo, rō-THrē'-gō.
Ciudad Victoria, vēk-tō'-ri-ä.
Civet, siv'et.
Civitavecchia, chē'vē-tä-vek'kyä.
Clackmannanshire, klak-man'*a*n-sh*e*r.
Clacton-on-Sea, klak'tun.
Claflin, klaf'lin.
Claiborne, klā'burn.
Clairau, Clairaut, klâr-ō'.
Clairvaux, klâr-vō'.
Clairvoyance klâr-voi'ans
Clan-na-Gael, klan-nä-gāl'.
Clapham, klap'*a*m.
Claque, klåk.
Clare, klâr.
Clarence, klar'*e*ns.
Clarenceux, klar'*e*n-sū.
Clarendon, klar'*e*n-dun.
Clarens, klå-räṅ'.
Claretie, klå-r'-tē'.
Claribel, klar'i-bel.
Clarinda, klar-in'd*a*.
Clarinet, klar'i-net *or* klar-i-net'.
Clarion, klar'i-un.
Claude, klōd.
Claude Lorraine, klôd lo-rān'; *Fr. pron.* klōd lō-raṅ'.
Claudianus, klô-di-ā'nus.
Claudius, klô'di-us; *Ger.* klou'di-o͝os.
Claus, klous.
Claus, Santa, san't*a* klôz'.
Clausel, Clauzel, klō-zel'.
Clausen, klô's*e*n.
Clausewitz, klou'z*e*-vits.
Clausius, klou'zi-o͝os.
Clavenna, kl*a*-ven'*a*.
Claverack, klô'v*e*r-ak.
Claverhouse, klav'*e*rs, klā'v*e*rs *or* klav'*e*r-us.
Claveria, klä-vā'ri-ä.
Clavichord, klav'i-kôrd.
Clavicle, klav'i-k'l.
Clavicornia, klav-i-kôr'-ni-*a*.
Clavier, klä-vēr'.
Clavigero, klä-vē-hā'rō.
Claymore, klā'mōr.
Clays, klās.
Clayton-le-Moors, klā'tun-li-mo͞orz'.
Clazomenæ, kla-zom'i-nē.
Cleanthes, klē-an'thēz.
Clearchus, klē-är'kus.
Cleburne, klē'burn.
Cleckheaton, klek'ē-tun.

Cleethorpes, klē′thôrps.
Clef, klef.
Cleishbotham, klēsh′-both-*a*m.
Cleland, klē′l*a*nd.
Clematis, klem′*a*-tis.
Clemenceau, kl*e*-mäṅ-sō′.
Clemencin, klā-men-thēn′.
Clemens, klem′*e*nz.
Clement, klem′*e*nt.
Clément, Jacques, klā-mäṅ′.
Clementi, klā-men′tē.
Clemson, klem′sun.
Cleobulus, klē-ō-bū′lus.
Cleombrotus, klē-om′brō-tus.
Cleomedes, klē-ō-mē′dēz.
Cleomenes, klē-om′*e*-nēz.
Cleon, klē′on.
Cleopatra, klē-ō-pā′tr*a*.
Clepsydra, klep′si-dr*a* *or* klep-sī′dr*a*.
Clerestory, klēr′sto′ri.
Clericis Laicos, kler′i-sis lā′i-kos.
Clericus, kler′i-kus.
Clerk, klûrk, *in England still often* klärk.
Clerke, klärk.
Clerkenwell, klärk′*e*n-wel *or* klûrk-.
Clerk-Maxwell, klärk′-maks′wel.
Clermont, klâr′mont.
Clermont-Ferrand, kler-môṅ′-fā-räṅ′.
Clerodendron, klē-rō-den′-dron.
Clery, klē′ri.
Clésinger, klā-zaṅ-zher′ *or* -zhā′.
Clevedon, klēv′dun.
Cleves, klēvz.
Clews, klo͞oz.
Clianthus, klī-an′thus.
Clichy (la Garenne), klē-shē′ lȧ gȧ-ren′.
Climacteric, klī-mak′t*e*r-ik *or* klī-mak-ter′ik.
Climatological, klī-m*a*-tō-loj′i-k*a*l.
Clinedinst, klīn′dinst.
Clinic, klin′ik.
Clinometer, klī-nom′i-t*e*r.
Clio, klī′ō.
Cliona, klī′ō-n*a* *or* klī-ō′n*a*.
Clione, klī′ō-nē *or* klī-ō′nē.
Clisthenes, klis′th*e*-nēz *or* klīs′-.
Clitheroe, klith′*e*r-ō.
Clitus, klī′tus.
Clive, klīv.
Cloaca, klō-ā′k*a*.
Clœlia, klē′li-*a*.
Cloisonnée, kloi′zo-nā′; *Fr. pron.* klwä-zo-nā′.
Clonmacnoise, klon-mak-noiz′.
Clonmel, klon-mel′.
Clontarf, klon-tärf′.
Clonus, klō′nus.
Cloots, klōts.
Cloquet, klō-kwet′.
Close (inclosure), klōs.
Clotaire, klō-târ′.
Clotho, klō′thō.
Clothilde, klō-tēld′.
Clouet, klo͞o-ā′.
Clough, kluf.
Clough-Leighter, lāt′*e*r.
Clous, klo͞os.
Clovelly, klō-vel′i.
Clovis, klō′vis; *Ger.* **Chlodwig-Ludwig,** klōt′vi*ch*-lo͞ot′vi*ch*.
Clowes, klouz.
Cluny, klü-nē′.
Cluseret, klüz′rā′.
Clusium, klo͞o′shi-um.
Clutha, klo͞o′th*a*.
Cluver *or* **Clüver,** klo͞o′-v*e*r, klü′v*e*r.
Clwyd, klwid *or* klo͝o-id′.
Clyde, klīd.
Clydesdale, klīdz′dāl.
Clytæmnestra, klī-tem-nes′tr*a* *or* klit-em-.
Cnidus, nī′dus.
Cnossus, Gnossus, nos′us
Coadjutor, kō-*a*-jo͞o′t*e*r.
Coagulation, kō-ag-ū-lā′-shun.
Coahuila, kō-ä-wē′lä.
Coalition, kō-*a*-lish′un.
Coamo, kō-ä′mō, *almost* kwä′mō.
Coanza, kwän′zä.
Coatesville, kōts′vil.
Coati, kō-ä′ti.
Coaticook, kō-at i-ko͝ok.
Coatzacoalcos, kō-ät′sä-kō-äl′kōs; *almost* kwät-sä-kwäl′kōs.
Cobalt, kō′bôlt.
Cobán, kō-vän′.
Cobbe, kob.
Cobbett, kob′et.
Cobbold, kob′uld.
Cobden, kob′d*e*n.
Cobet, kō-bā′.
Cobham, kob′*a*m.
Coblenz, kō′blents.
Cobleskill, kob′′lz-kil.
Cobourg, kō′bûrg.
Cobra (di Capello), kō′brä dē kä-p*e*l′lō.
Coburg, kō′bo͝or*ch*.
Coca, kō′k*a*.
Cocaine, kō′k*a*-in; *popularly* kō-kān′.
Cocanada, kō-k*a*-nä′d*a*.
Cocceius, kok-tsā′yo͝os.
Cocceji, von, fon kok-tsā′-yē.
Coccidia, kok-sid′i-*a*.
Coccosteus, kok-os′ti-us.
Cocculus, kok′ū-lus.
Coccyx, kok′siks.
Cochabamba, kō-chä-bäm′-bä.
Cochin, kō-chēn′ *or* kō′chin.
Cochin-China, kō′chin chī′n*a*.
Cochineal, koch′i-nēl.
Cochlea, kok′li-*a*.
Cochrane, kok′r*a*n.
Cockaigne, kok-ān′.
Cockatoo, kok-*a*-to͞o′.
Cockatrice, kok′*a*-trīs *or* -tris.
Cockburn, kō′burn.
Cockchafer, kok′chāf-*e*r.
Cockney, kok′ni.
Cockran, kok′r*a*n.
Cockscomb, koks′kōm.
Coco, kō′kō.
Cocoa, kō′kō.
Cocomas, kō′kō-mäs.
Cocoon, ko-ko͞on′.
Cocos, kō′kōs.
Cocytus, kō-sī′tus.
Coda, kō′dä.
Codeine, kō-dē′in.
Codex, kō′deks.
Codex Bezæ, bē′zē.
Codicil, kod′i-sil.
Codification, kod-i-fi-kā′-shun *or* kōd-i-.
Codogno, kō-dō′nyō.
Codrington, kod′ring-tun.
Codrus, kō′drus.
Cody, kō′di.
Coehoorn van, vän ko͞o′-hōrn *or* **Cohorn,** kō′hôrn.
Coelenterata, sē-len-t*e*r-ā′-t*a*.
Coele-Syria, sē′li-sir′i-*a*.
Coello, kō-āl′yō.
Coelogyne, sē-loj′i-nē.
Coelostat, sē′lō-stat.
Coemption, kō-emp′shun.
Coenobites, sē′nō-bīts
Coeur d'Alene, kûr dȧ-lān′.
Cogalniceanu, kō-gäl′nē-tsā-än′.
Coghlan, kōg′l*a*n.
Cognac, kōn-yȧk′.
Cognition, kog-nish′un.
Cognizance, kog′ni-z*a*ns *or* kon′i-z*a*ns.
Cogswell, kogz′wel.
Cohasset, kō-has′et.
Cohesion, kō-hē′zhun.
Cohn, kōn.
Cohoes, kō-hōz′.
Cohort, kō′hôrt.
Coimbatore, kō-im-b*a*-tōr′.
Coimbra, kō-ēm′brä; *Port. pron.*, kō-ēṅ′brä.
Coir, koir.
Coire, kwär; *Ger. form,* **Chur,** ko͞or.
Cojutepeque, kō-ho͞o′tā-pā′kā.
Colban, kōl′bän.
Colberg, kol′bûrg.
Colbert, kōl-bâr′.
Colborne, kōl′burn.
Colby, kōl′bi.
Colchagua, kōl-chä′gwä.
Colchester, kōl′ches-t*e*r.
Colchicum, kol′chi-kum.
Colchis, kol′kis.
Colden, kōl′d*e*n.
Coldingham, kōl′ding-*a*m.
Colebrooke, kōl′bro͝ok *or* ko͞ol′bro͝ok.
Colectomy, kō-lek′to-mi.
Colenso, kō-len′sō.
Coleoptera, kō-li-op′t*e*r-*a*.
Coleridge, kōl′rij.
Colet, kol′et.
Coleus, kō′li-us
Colfax, kōl′faks.
Colgate, kōl′gāt.
Coligny, de, d*e* kō-lēn′yi *or* kō-lēn-yē′.
Colima, kō-lē′mä.
Coliseum, kol-i-sē′um.
Colitis, kō-lī′tis.
Collaboration, ko-lab′ō-rā′shun.
Collagen, kol′*a*-jen.
Colle (di Val d'Elsa), kol′-lā dē väl del′sä.
Collect, kol′ekt.
Collectivism, ko-lek′tiv-iz'm.
Collège de France, ko-lezh′ d*e* fräṅs′.
Collegia Nationalia, kol-lā′jä nä-tyō-nä′li-ä.
Colleoni, kol-lā-ō′nē.
Colles's Fracture, kol′is-iz.
Collett, kol′*e*t.
Colletta, kol-let′tä.
Colley, kol′i.
Collier, kol′y*e*r.
Collimation, kol-i-mā′-shun.
Collimator, kol′i-mā-t*e*r.
Collingwood, kol′ing-wo͝od.
Collinsia, ko-lin′zi-*a*.
Cölln-an-der-Elbe, kûln′-än-d*e*r-el′b*e*.
Collodion, ko-lō′di-un.
Colloids, kol′oidz.
Collot d'Herbois, ko-lō′ der-bwä′.
Collusion, ko-lū′zhun.
Collyer, kol′y*e*r.
Colman, kōl′m*a*n.
Cöln, kûln.
Colne, kōn *or* kōln.
Colobus, kol′ō-bus.
Colocynth, kol′ō-sinth.
Cologne; kō-lōn′; *Fr. pron.* kō-lōn′y'; *Ger.* **Cöln** *or* **Köln,** kûln.
Colombes, kō-lôṅb′.
Colombia, kō-lom′bi-ä.
Colombo, kō-lom′bō.
Colon, *tn.* **Panama,** kō-lon′.
Colonel, kûr′n*e*l.
Colonia del Sacramento, kō-lō′ni-ä del sä-krä-men′tō.
Colonna, kō-lon′nä.

Colonne, kō-lon'.
Colonsay and Oronsay, kol'on-sā, ō'ron sā.
Colonus, kō-lō'nus.
Colophon, kol'ō-fon.
Colophony, kol'ō-fō-ni *or* kō-lof'ō-ni.
Colorado, kol-ō-rä'dō.
Colorimeter, kul-*e*r-im'*e*-t*e*r.
Colossae, kō-los'ē
Colosseum, kol-o-sē'um.
Colossians, kō-losh'i-*a*nz *or* kō-losh'*a*nz.
Colossus, kō-los'us.
Colotomy, kō-lot'ō-mi.
Colpachi Bark, kōl-pä'chē.
Colquhoun, kō-hōōn'.
Colquitt, kol'kwit.
Colton, kōl'tun.
Columba, kō-lum'b*a*.
Columban *or* **Columbanus,** kō-lum'b*a*n, kol-um-bā'nus.
Columbine, kol'um-bīn.
Columbite, kol'um-bīt.
Columella, kol-ū-mel'*a*.
Column, kol'um.
Columna Rostrata, kō-lum'n*a* ros-trā't*a*.
Colures, kō-lūrz'.
Colville, kol'vil.
Colvin, kol'vin.
Colza, kol'z*a*.
Coma, kō'm*a*.
Coma Berenices, ber-i-nī'sēz.
Comacchio, kō-mäk'ki-ō.
Comanches, kō-män'chez.
Comayagua, kō-mä-yä'gwä *or* kō-mī-ä'gwä.
Combaconum *or* **Kumbhakonam,** kom-b*a*-kō'num, ko͝om-b*a*-kō'num.
Combe, kōm *or* kōōm.
Combermere, kum'b*e*r-mēr.
Combes, kôṅb.
Combin, Grand, gräṅ koṅ-baṅ' *or* **Graffeneire** gräf'*e*n-ī-r*e*.
Comedia, kō-mā'dyä.
Comédie Française, *or* **Théâtre Français,** kō-mā-dē' fräṅ-sez', tā-ä'tr' fräṅ-sā'.
Comenius, kō-mā'ni-o͝os *or* kō-mē'ni-us.
Comfrey, kum'fri.
Comines, kō-mēn'.
Comiso, kō'mē-zō.
Comitia, kō-mish'i-*a*.
Comity, kom'i-ti.
Commagenae, kom-*a*-jē'nē.
Commandant, kom-*a*n-dänt'.
Commedia, kom-mā'dyä.
Commensalism, ko-men's*a*l-iz'm.
Commentry, kō-mäṅ-trē'.
Commination, kom-i-nā'shun.
Comminuted, kom'i-nū-tid.
Commissariat, kom-i-sā'ri-at.
Commissary, kom'i-ser-i.
Commodore, kom'ō-dōr.
Commodus, kom'ō-dus.
Commune, kom'ūn.
Communism, kom'ū-niz'm.
Commutator, kom'ū-tā-t*e*r.
Comnenus, kom-nē'nus.
Como, kō'mō.
Comorin, kom'ō-rin *or* kō'mō-rēn'.
Comoro Islands, kom'ō-rō.
Compagni, kom-pän'yē.
Comparetti, kōm-pä-ret'tē.
Compartimento, kom-pär-ti-men'tō.
Compass Berg, knm'p*a*s.
Compiègne, kôṅ-pyen'y'.
Compositae, kom-poz'i-tē.
Compost, kom'pōst.
Comptroller, kon-trōl'*e*r.
Compurgation, kom-pur-gā'shun.
Comstock, kum'stok.
Comte, kôṅt.
Comus, kō'mus.
Comyn, knm'in.
Conant, kō'n*a*nt.
Concepción, kon-sep'shnn; *Am. Span. pron.* kon-sep-syōn'.
Concertina, kon-s*e*r-tē'n*a*.
Concerto, kōn-cher'tō *or* kon-sûr'tō.
Conch, kongk.
Conchoid, kongk'oid.
Conchology, kongk-ol'ō-ji.
Conchos, kon'chōs.
Concord, *tns., N. H.* and *Mass.*, kong'kurd.
Concordance, kon-kôr'd*a*ns.
Concordat, kon-kôr'dat; *Fr. pron.* kôṅ-kôr-då'.
Concordia, kon-kôr'di-*a*.
Concrete, kon'krēt.
Concretion, kon-krē'shun.
Concubinage, kon-kū'bi-nij.
Condé, de, d*e* kôṅ-dā'.
Condillac, de, d*e* kôṅ-dē-yåk'.
Condor, kon'dôr.
Condorcet, de, d*e* kôṅ-dôr-sā'.
Condottieri, kōn-dot-tyā'rē.
Condylomata, kon-di-lō'm*a*-t*a*.
Conegliano, kō-nāl-yä'nō.
Coney, kō'ni; *formerly* kun'i.
Coney Island, kō'ni.
Confarreation, kon-far-i-ā'shun.
Conferva, kon-fûr'v*a*.
Confessio, kon-fesh'i-ō.
Confocal, kon-fō kal.
Conformable Strata, strā't*a*.
Confronté, *as French*, kôṅ-frôṅ-tā'.
Confucius, kon-fū'shus.
Congé d'élire, kôṅ-zhā'-dā-lēr'.
Conger, koug'g*e*r.
Congleton, kong'g'l-tun.
Conglomerate, kou-glom'*e*r-et.
Congo, kong'gō.
Congreve, kong'grēv.
Conibos, kō-nē'bōs.
Conic Sections, kon'ik.
Conifers, kon'i-f*e*rz.
Conington, kō'ning-tun *or* kun'ing-.
Coniston, kon'is-tun.
Conium, kō-nī'um *or* kō'ni-.
Conjevaram, kon'jev-*a*-ram' *or* kon-jev'*a*-r*a*m.
Conjugal Rights, kon'jū-g*a*l.
Conjugate Deviation, kon'jū-get.
Conjuring, knn'jnr-ing.
Conkling, kongk'ling.
Connaught, kon'ôt.
Conneaut, kou-i-ôt'.
Connecticut, ko-net'i-kut; *not* ko-nek'-.
Connellsville, kon'elz-vil.
Connemara, kon-i-mä'r*a*.
Connétable de France, ko-nā-tåb'l' d*e* fräṅs'.
Conodonts, kō'nō-donts.
Conolly, kon'ul-i.
Conquistadores, *Span. pron.* kōn-kēs-tä-ᴛʜō'rās.
Conrad, kon'rad; *Ger. pron.* kōn'rät.
Conradin, kōn'rä-dēn.
Conrart, kôṅ-rär'.
Conried, kon'rēd.
Consalvi, kōn-säl'vē.
Consanguinity, kon'sang-gwin'i-ti.
Conservatoire, kôṅ-ser-vå-twär'.
Conservatorio, kōn-ser-vä-tō'ri-ō.
Conshohocken, kon-shō-hok'*e*n.
Considérant, kôṅ-sē-dā-rän'.
Consistory Court, kon-sis'tō-ri *or* kon'sis-tō-ri.
Console, kon'sōl.
Consols, kon-solz' *or* kon'solz.
Consort, kon'sôrt.
Constable, kun'st*a*-b'l.
Constance, kon'st*a*ns; *Ger. form*, **Konstanz,** kōn'shtänts.
Constans, kon'stanz.
Constant, kôṅ-stäṅ'.
Constant de Rebecque, d*e* r*e*-bek'.
Constanta, kōn-stän'tsä; *Turk.* **Kustenje,** ko͝os-ten'je.
Constantine (*Algeria*), *Fr. pron.* kôṅ-stäṅ-tēn'.
Constantine (*emperors*), kon'st*a*n-tīn.
Constantinople, kon-stan-ti-nō'p'l; (**Stambul,** stäm-bōōl'; **Tsarigrad,** tsär'i-grät).
Constantinus, kon-stan-tī'nus.
Constantius, kon-stan'shi-us.
Constellation, kon-stel-ā'shun.
Constitución, kon-stē-tōō-syōn'.
Consubstantiation, kon-sub-stan'shi-ā'shun.
Contarini Family, kōn-tä-rē'nē.
Contemporaneity, kon-tem'pō-r*a*-nē'i-ti.
Conti, *Fr.* kôṅ-tē'; *Ital.* kôn'tē
Contour, kon-tōōr' *or* kon'tōōr.
Contralto, kon-tral'tō.
Contrat Social, kôṅ-trå' sō-syål'.
Conularia, kon-ū-lā'ri-*a*.
Convallaria, kon-v*a*-lā'ri-*a*.
Conventicle, kon-ven'ti-k'l.
Conversano, kōn-ver-sä'nō.
Conversion, kon-vûr'shun.
Convocation, kon-vō-kā'shnn.
Convolvulus, kon-vol'vū-lus.
Convoy, kon'voi.
Conway Cabal, kon'wā k*a*-bal'.
Conwell, kon'wel.
Conybeare, kun'i-bâr.
Coornhert, kōrn'hert *or* kôrn-.
Coorong, kōō'rong.
Copaiba *or* **Copaiva,** kō-pā'b*a*, -pā'v*a*.
Copais, kō-pā'is.
Copal, kō'p*a*l.
Copan, kō-pän'.
Coparceners, kō-pär'se-n*e*rz.
Copepoda, kō-pep'ō-d*a*.
Copernicus, kō-pûr'ni-kus.
Copiapó, kō-pyä-pō'.
Copland, kop'l*a*nd.

Coppée, ko-pā′.
Coppename, kop-*e* nä′m*e*.
Copperas, kop′*e*r-*a*s.
Coppet, ko-pā′.
Coppinger, kop′in-j*e*r.
Copra, kō′pr*a*.
Coprolites, kop′rō-līts.
Copse, kops.
Coquelin, kōk-laṅ′.
Coquerel, kōk-rel′.
Coques, or **Cocx**, kok.
Coquilla, kō-kwil′*a*.
Coquimbo, kō-kēm′bō.
Coquina, kō-kē′n*a*.
Coracle, kor′*a*-k'l.
Coracoid, kor′*a*-koid.
Coral, kor′*a*l.
Corallian, kō-ral′i-*a*n.
Coralline, kor′*a*l-in; -īn.
Coram, kō′r*a*m.
Cor Anglais, kôr äṅ-glā′.
Corato, kō-rä′tō.
Corban, kôr′b*a*n.
Corbel, kôr′bel.
Corbie-step, kôr′bi-step′.
Corbulo, kôr′bū-lō.
Corchorus, kôr′kō-rus.
Corcoran, kôr′kō-r*a*n.
Corcyra, kor-sī′r*a*.
Corday d'Armans, kor-dā′ där-mäṅ′.
Cordelier, kôr-d*e*-lēr′; *Fr. pron.* kor-d'-lyā′.
Cordier, kor-dyā′.
Cordierite, kôr′di-*e*r-īt.
Cordilleras, kôr-dil-yā′r*a*z, *or* kor-dil′*e*r-*a*z.
Cordoba, kôr′dō-vä.
Cordova, kôr′dō-vä.
Corduroy, kôr′du-roi; kôr-du-roi′.
Coregonus, kō-reg′ō-nus.
Corelli, kō-rel′i.
Corentyne, kō-ren-tīn′.
Coreopsis, kō-rē-op′sis.
Corfu, kor-fo͞o′.
Corinth, kor′inth.
Corinto, kō-rēn′tō.
Coriolanus, kō-ri-ō-lā′nus.
Corisco, kō-ris′kō.
Corleone, kor-lā-ō′nā.
Cormac, kôr′mak.
Cormenin, kor-m'-naṅ′.
Cormorant, kôr′mō-r*a*nt.
Cornbury, kôrn′b*e*r-i.
Cornea, kôr′nē-*a*.
Corneille, kor-nā′y'.
Cornel, kôr′nel.
Cornelia, kor-nē′li-*a* *or* -ly*a*.
Cornelisz, kor-nā′lis.
Cornelius, kor-nē′li-us *or* -lyus.
Cornell, kor-nel′.
Cornet, kôr′net *or* kor-net′.
Corneto Tarquinia, kor-nā′tō tär-kwin′i-*a*.
Corniferous, kor-nif′*e*r-us.
Corno, kôr′nō.
Cornouaille, kôr-no͞o-ä′y', *almost* kôr-no͞o-ī′.
Cornu, kôr-nü′.
Cornucopia, kôr-nū-kō′pi-*a*.
Coriander, kō-ri-an′d*e*r.
Corigliano Calabro, kō-rēl-yä′nō kä-lä′brō.
Coro, kō′rō.
Corocoro, kō′rō-kō′rō.
Corolla, kō-rol′*a*.
Coromandel, kor-ō-man′del.
Corona Australis, kō-rō′n*a* ôs-trā′lis.
Corona Borealis, bō-rē-ā′lis.
Coronado, kō-rō-nä′ᴛʜō.
Coronea, kor-ō-nē′*a*.
Corot, kō-rō′.
Corozal, kō-rō-säl′.
Corps, kōr.
Corpus Christi, kôr′pus kris′tē.
Corpus delicti, kôr′pus dē-lik′tī.
Corpus Juris Civilis, jo͞o′ris si-vī′lis.
Corra Linn, kor′*a* lin.
Corregidor, ko-rej′i-dōr; *Sp. pron.* kor-rā′hē-dōr′.
Correggio, kor-red′jō.
Correnti, kor-ren′tē.
Corrèze, ko-rez′.
Corrib, Lough, loᴋ kor′ib.
Corridor, kor′i-dor *or* -dōr.
Corrie, kor′i.
Corrientes, kor-i-en′tās; **(Cape)**, -tes.
Corrigan, kor′i-g*a*n.
Corroboree, ko-rob′ō-rē
Corsica, kôr′si-k*a*.
Corsicana, kôr-si-kä′n*a* *or* kā′n*a*.
Corssen, kôr′sen.
Cort, kôrt.
Cortes, kôr′tās.
Cortés, kôr-tās′.
Cortona, kôr-tō′nä.
Corumbá, kō-ro͝om-bä′.
Corundum, kō-run′dum.
Corunna, kō-run′*a*; *Span.* **Coruña**, kō-ro͞o′nyä.
Corvallis, kor-val′is.
Corvée, kôr-vā′ *or* kôr-vē′.
Corvidæ, kôr′vi-dē.
Coryate, kor′i-*a*t.
Corybantes, kor-i-ban′tēz.
Corydalis, kō-rid′*a*-lis.
Corymb, kor′imb *or* kor′im.
Coryphæus, kor-i-fē′us.
Coryza, kō-rī′z*a*.
Cosa, Juan de la, kō′sä, hwän dā lä.
Coscinomancy, kos′i-nō-man′si.
Cosenz, kō′zents.
Cosenza, kō-zent′sä.
Coshocton, kō-shok′tun.
Cosimo, koz′ē-mō.
Cosmogony, koz-mog′ō-ni.
Cosquin, kos-kaṅ′.
Cossa, kos′sä.
Costa, kōs′tä.
Costa Rica, kōs′tä rē′kä.
Costello, kos-tel′ō.
Coster, kos′t*e*r.
Costmary, kost′mā-ri.
Costus, kos′tus.
Cotabato, kō-tä-vä′tō.
Côte-d'Or, kōt-dôr′.
Cotentin, kō-täṅ-taṅ′.
Côtes-du-Nord, kōt-dü-nôr′.
Cotillon (*Fr. form*), kō-tē-yôṅ′.
Cotoneaster, kō-tō′nē-as′t*e*r.
Cotopaxi, kō-tō-paks′ē; *Span. pron.* kō-tō-pä′hē.
Cotrone, kō-trō′nā.
Cotswold Hills, kots′wōld.
Cottbus, kot′bo͝os.
Cottian Alps, kot′i-*a*n.
Cottin, kō-taṅ′.
Cotyledon, kot-i-lē′dun.
Coucal, ko͞o′k*a*l.
Couchant, kouch′*a*nt.
Coucy, de, d*e* ko͞o-sē′.
Coudersport, kou′d*e*rz-pōrt.
Coudert, ko͞o-der′.
Coues, kouz.
Cougar, ko͞o′g*a*r.
Coulomb, *Charles A.*, ko͞o-lôṅ′; *elec. unit*, ko͞o-lom′.
Coumarin, ko͞o′m*a*-rin.
Coup d'état, ko͞o dā-tä′.
Couped *or* **Coupé**, ko͞opt *or* ko͞o′pā′.
Couper, ko͞o′p*e*r.
Couperus, kou-pā′rus.
Couple, kup′'l.
Coupon, ko͞o′pon (*not* kū′pon); *Fr. pron.* ko͞o-pôṅ′.
Courbet, ko͞or-bā′.
Courbevoie, ko͞or-b'-vwä′.
Courcelles, ko͞or-sel′.
Courier de Méré, ko͞o-ryā′ d*e* mā-rā′.
Courlan, ko͞or′l*a*n; *Fr. pron.* ko͞or-läṅ′.
Courtenay, kûrt′nā.
Courtesy Titles, kûr′t*e*-si.
Courthope, kōrt′ōp.
Courtney, kûrt′ni.
Courtois, ko͞or-twä′.
Courtrai, ko͞or-trā′.
Cousin, Jean, ko͞o-zaṅ′.
Cousin-Montauban, ko͞o-zaṅ′-môṅ-tō-bäṅ′.
Couthon, ko͞o-tôṅ′.
Couvade, ko͞o-våd′.
Couvreur, ko͞o-vrûr′.
Covent Garden, kuv′*e*nt.
Coventry, kuv′*e*n-tri.
Coverdale, kuv′*e*r-dāl.
Covilhão, kō-vēl-youṅ′.
Covington, kuv′ing-t'n.
Cowen, kou′*e*n.
Cowes, kouz.
Cowles, kōlz.
Cowley, kou′li; *formerly* ko͞o′li.
Cowper, ko͞o′p*e*r *or* kou′p*e*r. "An old spelling [of cooper] remains in the surname *Cowper*, pronounced *Cooper* by those who bear it." *Oxford Eng. Dict.*, s. v. *cooper*.
Coxe, koks.
Coxie, van, vän kok′si *or* kok-sē′.
Coxsackie, ko͝ok-sä′ki.
Coyote, kī-ō′ti *or* kī′ōt.
Coypu, koi′po͞o.
Coysevox, kwäz′voks′.
Cozens, kuz′'nz.
Crabbe, krab.
Cracovienne, krå-kō-vi-en′.
Cracow, krā′kō; *German* **Krakau**, krä′kou.
Craiova, krä–yō′vä.
Cramer, krä′m*e*r.
Cranach, kran′*a*k *or* krä′näᴋ.
Cranganore, krang-g*a*-nōr′.
Craniata, krā-ni-ā′t*a*.
Craniotabes, krā′ni-ō-tā′bēz.
Crashaw, krash′ô.
Cratægus, kr*a*-tē′gus.
Craterus, krat′*e*r-us.
Crawford and Balcarres, bal-kar′es.
Crayer, krī′y*e*r *or* krā-yer′.
Crébillon, krā-bē-yôṅ′.
Crèche, kresh.
Crécy-en-Ponthieu, krā-sē′-äṅ-pôṅ-tyû′.
Credi, krā′dē.
Crédit Foncier, krā-dē′ fôṅ-syā′.
Crefeld, krā′felt.
Creighton, krā′tun.
Crelinger, krā′ling-*e*r.
Creon, krē′on.
Crescimbeni, krā-shēm-bā′nē.
Cresols, krē′sōlz.
Crespi, kres′pē.
Creswick, kres′wik.
Cretaceous, krē-tā′shus.
Cretineau-Joly, krā-tē-nō′-zhō-lē′.
Cretinism, krē′tin-iz'm.
Cretonne, krē-ton′.
Creusa, krē-ū′s*a*.
Creusot, krû-zō′.
Creutz, kroits.
Creuzer, kroit′s*e*r.
Crevillente, krā-vēl-yen′tā.
Crichton, krī′tun.
Crieff, krēf.

Crillon, krē-yōṅ′.
Crimea, kri-mē′*a*.
Crinan, krē′n*a*n.
Crinoidea, krī-noi′di-*a*.
Crinum, krī′num.
Crispi, krēs′pē.
Critias, krish′i-*a*s *or* krit′-.
Critolaus, krit-ō-lā′us.
Crivelli, krē-vel′lē.
Crnagora, ch*e*r-nä-gō′rä.
Croaghpatrick, krō′äᴋ-pat′rik.
Croatia-Slavonia, krō-ā′-shi-*a*-sl*a*-vō′ni-*a*.
Crochet-work, krō-shā′; *in England usually* krō′-shā.
Crocidolite, krō-sid′ō-līt.
Croesus, krē′sus.
Croker, krō′k*e*r.
Croll, krōl.
Croly, krō′li.
Cromarty, krom′*a*r-ti.
Cromlech, krom′lek.
Cromwell, krom′wel *or* krum′wel.
Cronegk, krō′nek.
Cronholm, kron′hōlm.
Cronje, krōn′ye.
Cronos, krō′nos.
Cronstadt, krōn′shtät.
Crook, kro͝ok.
Croquet, krō-kā′; *in England usually* krō′kā.
Crosier, krō′zh*e*r.
Crossopterygii, kros-op′-t*e*r-ij′i-ī.
Crotalus, krot′*a*-lus.
Crowell, krō′*e*l.
Crowley, krō′li.
Crozet Islands, krō-zā′.
Crozier, krō′zh*e*r.
Crucian Harp, kro͞o′sh*a*n.
Cruciferæ, kro͞o-sif′*e*r-ē.
Cruikshank, kro͝ok′-shangk.
Crusenstolpe, kro͞o′z*e*n-stōl′p*e*.
Crusius, kro͞o′zi-o͝os.
Crustacea, krus-tā′shi-*a*.
Cruz, Juan de la, hwän dā lä kro͞oth′.
Crwth, kro͞oth.
Cryolite, krī′ō-līt.
Cryophorus. krī-of′ō-rus.
Cryptogamia, krip-tō-gā′-mi-*a* *or* -gam′i-*a*.
Cryptomeria, krip-tō-mē′-ri-*a*.
Crystallomancy, kris′-t*a*l-ō-man-si.
Csaba, chob′å.
Csardas, chär′däsh.
Csengery, chen′ge-ri.
Csepel, chep′el.
Csiky, chē′ki.
Csokonay, chō′kō-noi.
Csóma de Körös, chō′må d*e* kû′rûsh.
Csongrád, chon′gräd.
Csorba, chor′bå.
Ctenophora, tē-nof′ō-r*a*.
Ctesias, tē′shi-*a*s,
Ctesibius, tē-sib′i-*u*s.
Ctesiphon, tes′i-fon.
Cuango, kwäng′gō.
Cuanza, kwän′zä.
Cubitt, kū′bit.
Cuckoo-pint, ko͝ok′o͞o-pint.
Cucumis, kū′kū-mis.
Cudbear, kud′bâr.
Cuddalore, kud-*a*-lōr′.
Cuenca, kwān′kä.
Cuera, kwā′rä.
Cuernavaca, kwâr-nä-vä′-kä.
Cuero, kwā′rō.
Cuesta, kwes′t*a*.
Cueva, kwā′vä.
Cuevas de Vera, kwā′väs dā vā′rä.
Cuirassier, kwē-rå-sēr′.
Cujas, kü-zhäs′.
Culasi, ko͞o-lä′sē.
Culiacan, ko͞ol-yä-kän′.
Cullera, ko͞ol-yä′rä.
Cullinan, kul′i-nan.
Culloden, ku-lō′d*e*n *or* -lod′*e*n.
Culpeper, kul′pep-er.
Cumæ, kū′mē.
Cumaná, ko͞o-mä-nä′.
Cumbraes, kum-brāz′.
Cumin, kum′in.
Cunard, kū-närd′.
Cunas, ko͞o′näz.
Cunaxa, kū-nak′s*a*.
Cundinamarca, ko͞on-dē-nä-mär′kä.
Cuneiform, kū-nē′i-form.
Cunene, ko͞o-nā′ne.
Cuneo, ko͞o′nā-ō.
Cunha, ko͞o′nyä.
Cuoco, ko͞o-ō′kō.
Cupola, kū′pō-l*a*.
Cura, ko͞o′rä.
Curaçao, ko͞o-rä-sō′ *or* ko͞o-rä-sä′ō; *written also, less correctly,* **Curaçoa,** ko͞o-rä-sō′ä.
Curare, ko͞o-rä′ri.
Curassow, kū′r*a*-sō *or* kū-ras′ō.
Curci, ko͞or′chē.
Curé, kü-rā′.
Cureghem, kü-r*e*-gem′.
Cures, kū′rēz.
Curetes, kū-rē′tēz.
Curicó, ko͞o-rē-kō′.
Curie, kü-rē′.
Curio, kū′ri-ō.
Curityba, ko͞o-rē-tē′bä.
Curius, kū′ri-us.
Curragh, kur′äᴋ.
Cursor Mundi, kûr′s*e*r mun′dī.
Curtea de Argeshi, ko͞or-tä′ä de är′zhes.
Curtius, *German* ko͞or′tsi-o͝os; *Latin* kûr′shi-us.
Curzola, ko͞or′dzō-lä.
Curzon, kûr′zun.
Cusa, kū′z*a*.
Cushat, ko͝osh′*a*t.
Cushing, ko͝osh′ing.
Cushman, ko͝osh′m*a*n.
Custos Rotulorum, kus′-tos rot-ū-lō′rum.
Cutch *or* **Kachh,** kuch.
Cuthbert, kuth′b*e*rt.
Cuttack, kut-tak′.
Cuttyhunk, kut′i-hungk.
Cuvier, kü-vyā′.
Cuxhaven, *Ger. pron.* ko͝oks′hä-fen; *Eng.* kuks-hā′v′n.
Cuyabá, ko͞o-yä-bä′.
Cuyahoga, kī-*a*-hō′g*a*.
Cuyapo, ko͞o-yä′pō.
Cuyler, kī′l*e*r.
Cuyo, ko͞o′yō.
Cuyos, ko͞o′yōs.
Cuyp, koip.
Cuyuni, ko͞o-yo͞o-nē′.
Cuzco, ko͞os′kō.
Cyaneæ Rupes, sī-ā′ni-ē ro͞o′pēz.
Cyanide, sī′*a*-nid *or* -nīd.
Cyanite, sī′*a*-nīt.
Cyanogen, sī-an′ō-jen.
Cyanometer, sī-*a*-nom′*e*-t*e*r.
Cyanopathy, sī-*a*-nop′*a*-thi.
Cyanosis, sī-*a*-nō′sis.
Cyaxares, sī-ak′s*a*-rēz.
Cybele, sib′*e*-lē.
Cycas, sī′kas.
Cyclades, sik′l*a*-dēz *or* sī′-kl*a*-dēz.
Cyclamen, sik′l*a*-men *or* sī′kl*a*-men.
Cyclas, sī′klas.
Cyclopes, sī-klō′pēz.
Cyclopteria, sī-klop-tē′-ri-*a*.
Cyclostomata, sī-klō-stō′-m*a*-t*a*.
Cydnus, sid′nus.
Cygnäus, sig′nā-o͝os.
Cygnet, sig′net.
Cylon, sī′lon.
Cymbeline, sim′b*e*-lin *or* -līn.
Cyme, sīm.
Cymry, kim′ri.
Cynanche Parotidea, si-nang′kē par-ō-tid′i *a*.
Cynewulf, kin′*e*-wo͝olf.
Cynocephalus, sī-nō-sef′*a*-lus.
Cynodon, sī′nō-don.
Cynocephalæ, sī-nō-sef′-*a*-lē *or* sin-ō-.
Cynosure, sī′nō-sho͞or.
Cynthia, sin′thi-*a*.
Cynthiana, sin-thi-an′*a* *or* ā′n*a*.
Cyperus, sī-pē′rus
Cypress, sī′pr*e*s.
Cy Près, sē prā′ *or* sī pres′.
Cyprian, sip′ri-*a*n.
Cyprinidæ, si-prin′i-dē *or* sī-.
Cyprinodontidæ, si-prin′-ō-don′ti-dē *or* sī-.
Cypripedium, sip-ri-pē′di-um *or* sī-pri-.
Cyprus, sī′prus.
Cypselus, sip′s*e*-lus.
Cyrano de Bergerac, sē-rå-nō′d*e* bâr-zh′-råk′.
Cyrenaica, sir-i-nā′i-k*a*.
Cyrenaics, sir-i-nā′iks *or* sī-ri-.
Cyrene, sī-rē′nē.
Cyril, sir′il.
Cyrillus, si-ril′us.
Cyrus, sī′rus.
Cysticercus, sis-ti-sûr′kus.
Cystidea, sis-tid′i-*a*.
Cystitis, sis-tī′tis.
Cythera, si-thē′r*a*.
Cytisus, sit′i-sus.
Cytology, sī-tol′ō-ji.
Cyzicus, siz′i-kus.
Czar, zär *or* tsär.
Czarniecki, chär-nyets′ki.
Czartoryski, chär-tō-rēs′-ki.
Czaykowski, chī-kôf′ski *or* chī-kôs′ki.
Czechs, cheks.
Czegléd, tseg′lād.
Czelakowski, chel-ä-kôf′-ski *or* -kôs′ki.
Czenstochowa, cheṅ-stō-ᴋō′vä.
Czermak, cher′mäk.
Czernówitz, cher′nō-vits.
Czerny, cher′ni.
Czolgosz, chol′gosh.
Czuczor, tso͝ot′sor.

Daan Bantayán, dä′än bän-tä-yän′.
Da Capo, dä kä′pō.
D'Ache, däsh.
Dachshund, däᴋs′ho͝ont.
Dacia, dā′shi-*a*.
Dacier, då-syā′.
Dacites, dā′sīts.
Dacoits, da-koits′.
Da Costa, dä kos′tä
Dacrydium, dak-rid′i-um.
Dacryocystitis, dak′ri-ō-sis-tī′tis.
Dactyl, dak′til.
Dado, dā′dō.
Dædalus, ded′*a*-lus.
Daendels, dän′d*e*ls.
Daet, dä-āt′.
Dagami, dä-gä′mē.
Dagestan *or* **Daghestan,** dä-ges-tän′.
Dagnan-Bouveret, då-nyäṅ′-bo͞o-v′-rā′.

Dagö, dăg-û′, **Daġden**, dăg′d*e*n.
Dagoba, dag′ō-b*a* *or* dä′-gō-b*a*.
Dagobert, dag′ō-b*e*rt, *Fr. pron.* dȧ-gō-bâr′.
Dagon, dā′gon.
Daguerre, dȧ-gâr′.
Daguerreotype, d*a*-ger′ō-tīp.
Dagupan, dä-go͞o-pän′.
Dahabiyeh, dä′-hä-bē′yeh *or* **Dahabeah**, dä-hä-bē′ä.
Dahl, däl.
Dahlak, dä-läk′.
Dahlgren, *Karl Frederick*, däl′gren.
Dahlgren, *John Adolf*, dal′gren.
Dahlia, däl′y*a*; *also com monly*, dal′-y*a*, *and* dāl′-y*a*.
Dahlmann, däl′män.
Dahlonega, dä-lō-nē′g*a*.
Dahn, dän.
Dahomey, dä-hō′mi.
Daimiel, dī-myāl′.
Daimio, dī′mi-ō.
Daimler, dīm′l*e*r.
Dais, dā′is.
Dakahlieh, dä-kä-lē′yeh.
Dakar, dä-kär′.
Dakota, d*a*-kō′t*a*.
Dal, däl.
Dalaguete, dä′lä-gā′tā.
Dalai-Kui, dä-lī′-ko͞o′i.
Dalai Lama, dä-lī′ lä′m*a*.
Dalai-nor, dä-lī′-nor.
Dalarne, dä′lär-ne.
Dalecarlia, dä′le-kär′li-*a*.
D'Alembert, dȧ-läṅ-bâr′.
Dalgarno, dal-gär′nō.
Dalhousie, dal-ho͞o′zi *or* -hou′zi.
Dalin, dä′lin.
Dalles, dalz.
Dallinger, dal′in-j*e*r.
Dallmeyer, däl′mī-*e*r.
Dalmatia, dal-mā′shi-*a*.
Dalny, däl′ni.
Dalou, dȧ-lo͞o′.
Dalriada, dal-ri-ä′d*a* *or* -ā′d*a*.
Dalrymple, dal′rim-p'l *or* dal-rim′p'l.
Dalserf, dal-sûrf′.
Dalswinton, dal-swin′tun.
Dalton, dôl′-t*u*n.
Dalyell, *or* **Dalzell**, dal-yel′ *or* dal-zel′.
Dalzell, *John*, dal-zel′.
Dalziel, dal-zel′ *or* dal-yel′.
Damanhur, dä-män-ho͞or′.
Damão, dä-mouṅ′ *or* **Daman**, dä-män′.
Damaraland, dä-mä′rä-land.
Damascening, dam-*a*-sēn′-ing.
Damascus, d*a*-mas′kus.
Damasus, dam′*a*-sus.
Damiani, dä-myä′nē.
Damien, dȧ-myäṅ′.
Damiens, dȧ-myäṅ′.
Damietta, dam-i-et′*a*.
Dammar, dam′*a*r.
Damocles, dam′ō-klēz.
Damodar, dam′ō-där *or* dä′mō-där.
Damon, dā′mun.
Dampier, dam′pēr.
Damrosch, dȧm′rosh.
Danaë, dan′*a*-ē.
Danaïdes, da-nā′i-dēz.
Danakil, dä-nä′kil.
Danao, dä-nä′ō.
Danaüs, dan′ā-us.
Dancourt, däṅ-ko͞or′.
Dandie Dinmont, dan′di-din′mont.
Dandolo, dän′dō-lō.
Danebrog, dan′*e*-brog.
Danegeld, dān′geld.
Danelagh, dä′n*e*-läᴋ *or* dān′lô.
Danenhower, dä′n*e*n-hou-*e*r.
Daniel, dan′yel.
Danilo, dä-nē′lō.
Danites, dan′īts.
Dankara, dän′kä-rä.
Dannecker, dän′e-k*e*r.
Dannemora, *tn.* U. S., dan-*e*-mō′r*a*; *Sweden*, dä′n*e*-mō′rä.
D'Annunzio, dän-no͞on′-dzē-ō.
Dante Alighieri, dan′te ; *Ital. pron.* dän′tā ä-lē-gyā′rē.
Danton, däṅ-tôṅ′.
Danube, dan′ūb.
D'Anville, däṅ-vēl′.
Danzig, dänt′si*ch*; *in English usually* **Dantzig** *or* **Dantzic**, dant′sik.
Daphne, daf′nē.
Dapitán, dä-pē-tän′.
Daraga, dä-rä′gä.
Daraiyeh, dä-rī′yeh *or* **Derayeh**, de-rä′yeh.
Darbanda, där-bän′dä.
Darbhanga, dur-bung′g*a*.
D'Arblay, där′blā *or* där-blā′.
Darboy, där-bwä′.
Dardanelles, där-d*a*-nelz′.
Dardania, där-dā′ni-*a*.
Dardanus, där′d*a*-nus.
Dardistan, där-dis-tän′.
Dar-el-Beida, där′-el-bā′-d*a*.
Dares, dā′rēz.
Dar-es-Salam, där′es-sȧ-läm′.
Dar Fertit, där fer-tēt′.
Darfur, där′fo͞or.
Dargai, där′gī.
D'Argens, där-zhäṅs′.
D'Argenson, där-zhäṅ-sôṅ′.
Darial, dä-ri-al′.
Daric, dar′ik.
Darien, dā-ri-en′; *Span. pron.* dä-ri-en′.
Darius, d*a*-rī′us.
Darjiling, där-jēl′ing.
Darlaston, där′l*a*s-tun.
Dar-ling-to′ni-a Cal-i-for′ni-ca.
Darmesteter, där-mes-t'-târ′.
Darmstadt, därm′shtät.
D'Artagnan, där-tȧ-nyäṅ′.
Daru, dȧ-rü′.
Darwaz, dur-wäz′.
Dasent, dā′s*e*nt.
Dashkoff, däsh′kof.
Daskam, das′k*a*m.
Dass, dȧs.
Dasyures, das′i-ūrz.
Datia, dut′ē-ä.
Datis, dā′tis.
Datolite, dat′ō-līt.
Datura, dā-tū′r*a*.
Daub, doup.
Daubenton, dō-bäṅ-tôṅ′.
Daubeny, dōb′ni *or* dô′b*e*-ni.
D'Aubignac, dō-bē-nyȧk′.
D'Aubigné, dō-bē-nyā′.
Daubigny, dō-bē-nyē′.
D'Aubusson, dō-bü-sôṅ′.
Daudet, dō-dā′.
Dauin, dou-ēn′.
D'Aulnoy, dō-nwä′.
D'Aumale, dō-mȧl′.
Daumier, dō-myā′.
Daun, doun.
Dauphin, dô′fin.
Dauphiné, dō-fē-nā′.
Daurat, dō-rȧ′.
Dávao, dä′vä-ō.
Davenant, dav′*e*n-*a*nt.
Davenport, dav′*e*n-pōrt.
David, *tn. Panama*, dä-vēᴛʜ′; *French and German*, dä-vēd′.
Davies, dā′vēz.
Davila, dä′vē-lä.
Da Vinci, dä vēn′chē.
Davitt, dav′it *or* dā′vit.
Davoût, dȧ-vo͞o′.
Dax, dȧks.
Dayaks, dī′aks.
Deafness, def′nes.
Deák, Ferencz, dā′äk.
De Amicis, dā ä-mē′chēs.
Dearborn, dēr′burn.
De Bary, dā bä′rē.
Debi Patan, dā′bi pä′t*a*n.
Debir, dē′b*e*r.
Deborah, deb′ō-r*a*.
De Bow, dē bō′.
Debreczen, deb′ret-sen.
Debruised, dē-bro͞ozd′.
Debs, debz.
Decagon, dek′*a*-gon.
Decalogue, dek′*a*-log.
Decameron, dē-kam′*e*r-un
Decamps, d*e*-käṅ′.
De Candolle, d*e* käṅ-dōl′.
Decapoda, dē-kap′ō-d*a* *or* dek-a-pō′d*a*.
Decapolis, dē-kap′ō-lis.
Decatur, dē-kā′tur.
Decazes, d*e*-kȧz′.
Decazeville, d*e*-kä′z'-vēl′.
Deccan, dek′*a*n.
Decebalus, dē-seb′*a*-lus.
Decemviri, dē-sem′vi-rī.
Decius, dē′shi-us.
Decius Mus, mus.
Decken, dek′*e*n.
Deciduous, dē-sid′ū-us.
Decimation, des-i-mā′ shun.
Declarator, dek′l*a*-rā-t*e*r.
Declaratory Act, dē-klar′-a-tō-ri.
Declé, d*e*-klā′.
Decorah, dē-kō′r*a*.
Decort, d*e*-kôr′.
De Costa, dē kos′t*a*.
Decoy, dē-koi′.
Decrescent, dē-kres′*e*nt.
Dedham, ded′*a*m.
De Donis, dē dō′nis.
Defamation, def-*a*-mā′-shun.
Defeasance, dē-fē′z*a*ns.
Deffand, de-fäṅ′.
Defilade, def-i-lād′.
Deflagration, def-l*a*-grā′-shun.
Defoe, dē-fō′.
Defregger, dā′freg-*e*r *or* d*e*-freg′*e*r.
De Funiak Springs, dē-fū′ni-ak.
De Garmo, dē gär′mō.
Degas, d*e*-gäs′.
De Geer, d*e*-gār′.
Degérando, d*e*-zhā′räṅ-dō′.
De Grasse, d*e* gräs′.
De Gubernatis, dā go͞o-ber-nä′tēs.
Dehra, dā′rä.
Deianira, dē-y*a*-nī′r*a*.
Dei Gratia, dē′ī grā′shi-*a* *or* dā′ē grä′ti-ä.
Deioces, dē-ī′ō-sēz.
Deiotarus, dē-ī-ot′*a*-rus.
Deiphobus, dē-if′ō-bus.
Deira, dē′i-r*a*.
Deism, dē′iz'm.
Déjazet, dā-zhȧ-ze′.
De Kalb, dē-kalb′.
De Kay, dē kā′.
Dekker, dek′*e*r.
De Koven, dē kō′v*e*n.
De la Bèche, d*e* lä besh′.
De Laborde, d*e* lȧ-bord′.
Delaborde, d*e*-lȧ-bord′
Delacroix, d*e*-lȧ′krwä′.
Delafield, d*e*l′*a*-fēld.
Delagoa Bay, del-*a*-gō′*a*.

Delambre, d*e*-läṅ′br’.
Delancey, dē-lan′si.
Deland, dē-land′.
Delane, dē-lān′.
Delano, dē-lā′nō.
De la Ramée, d*e* lȧ rȧ-mā′.
Delarey, De la Rey, del·*a*-rā′.
Delaroche, d*e*-lȧ-rōsh′.
De la Rue, del·*a*-rōō′.
Delaunay, de-lō-nā′.
Delavan, del′*a*-v*a*n.
Delavigne, d*e*-lȧ-vēn′ y’.
Delaware, del′*a*-wâr.
De la Warr, d*e* lȧ wȧr′ *or* del′a-wâr.
Delbrück, del′brük.
Delcassé, del-kȧ-sā′.
Del Credere, del kred′*e*r-i *or* del kred′e-rā.
Deleb Palm, del′eb.
Delescluse, d*e*-lā′klüz′.
Delfshaven, delfs′hä-v*e*n.
Delft, delft.
Delhi, del′i.
Delibes, d*e*-lēb′.
Delille, d*e*-lēl′.
Ieliquescence, del-i-kwes′*e*ns.
Delirium Tremens, dē-lir′i-um trē′m*e*nz.
Delisle, d*e*-lēl′.
Delitzsch, dā′lich.
Delium, dē′li-um.
Delius, dā′li-ōōs.
Della Cruscan, del′l*a* krus′k*a*n.
Dellys, de-lēs′.
Delmar, del′mär.
Delmenhorst, del′men-horst.
De Lolme, d*e*-lōlm′.
Delorme, d*e*-lôrm′.
Delos, dē los, *modern Gr.* THē′los.
Delphi, del′fī.
Delphinium, del-fin′i-um.
Delphinus, del-fī′nus.
Delphos, del′fos.
Del Rio, del rē′ō.
De Luc, d*e* lük′.
Delyannis, del-yän′is.
Demades, dem′*a*-dēz *or* de-mā′dēz.
Demaratus, dem-*a*-rā′tus.
Demavend, dem-*a*-vend′.
Dembea, dem′bi-*a*.
Dembinski, dem-bēn′ski.
Deme, dēm.
Démembré, dā-mäṅ-brā′.
Demerara, dem-*e*r-ä′r*a*.
Demeter, de-mē′t*e*r.
Demetrius, de-mē′tri-us.
De Mille, dē mil′.
Demise, dē-mīz′.
Demiurge, dem′i-ûrj.
Demmin, de-mēn′.
Democracy, d*e*-mok′r*a*-si.
Democritus, d*e*-mok′ri-tus.
De Moivre, d*e* mwä′vr’.
Demonetization, dē-mun′-i-ti-zā′shun.
Demopolis, dē-mop′ō-lis.
De Morgan, dē môr′g*a*n.
Demosthenes, d*e*-mos′th*e*-nēz.
Dempster, demp′st*e*r.
Demulcent, dē-mul′s*e*nt.
Denain, d*e*-naṅ′.
Denarius, de-nā′ri-us.
Denbighshire, den′bi-sh*e*r *or* -shir.
Dendera, den′d*e*r-*a*.

030
N338

NELSON'S
Perpetual
Loose-leaf
Encyclopaedia

Directions for entering this loose-leaf material into three holed binders. There are envelopes for the superseded pages.

All of the sheets to be entered for one given time are in one complete section. The first page of each section has a list of the renewal pages to be entered. Also the date and season will appear just below the title. The page numbers will be listed under the particular volume in which they are to be placed. In the event that a new subject is introduced of great length, a section of temporary pages are printed to be inserted until the entire volume is revised. Directions for entering these temporary pages accompany the section--such as "Elections in the United States, 1940" follow page 272 in volume four.

If a new subject or item of a person is added, the page numbers will be added to for specification such as pages 61, 61a, 61b, 61c, then 62. This happens because page 61 can not longer hold all of the material that it once held. There are many sections in the twelve volumes that grow in just this manner. Be careful when inserting pages, that illustrations, colored plates and maps are saved from the old pages and placed in their proper places among the new pages.

The second page of each group is a list of minor corrections to be written in the margine by pen and ink. This is temporary until new pages are snet to replace the superseded ones. Example--In volume 1, page 16, appears an article on Abbot, Nathan, whose death occurred in 1941. The date of death is noted on the list of corrections for volume 1 and the reader has but to turn to page and write the correction on the margin.

The word "superseded" should be written or stamped and placed in the envelopes so marked. Also supersede the direction sheets in the same manner.

UNIVERSITY OF ILLINOIS-URBANA
3 0112 057955749